CHAPTER ES
EXECUTIVE SUMMARY

This chapter provides a summary of the Environmental Impact Report (EIR) for the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). Included in this summary are areas of known controversy and issues to be resolved, a summary of Project alternatives, a summary of all Project impacts and associated mitigation measures, and a statement of the ultimate level of significance after mitigation is applied.

ES.1 DOCUMENT PURPOSE

This EIR was prepared by the March Joint Powers Authority (JPA), as lead agency, to inform decision makers and the public of the potential significant environmental effects associated with the Project. This EIR has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (California Public Resources Code, Section 21000 et seq.) and the Guidelines for Implementation of the California Environmental Quality Act (CEQA Guidelines; 14 CCR 15000 et seq.) published by the Public Resources Agency of the State of California.

The purpose of this EIR is to focus the discussion on those potential effects on the environment of the Project that the lead agency has determined may be significant. In addition, feasible mitigation measures are recommended, when applicable, that could reduce significant environmental impacts or avoid significant environmental impacts.

ES.2 PROJECT LOCATION

The Project site, which collectively consists of the K4 Parcel and the Cactus Avenue Drainage Channel (Cactus Channel), is located on the south side of Cactus Avenue and immediately north of March Air Reserve Base (ARB). The approximately 35.4-acre K4 Parcel is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California. Interstate (I) 215 is located approximately 0.8 miles east of the K4 Parcel. The K4 Parcel is comprised of five parcels designated as Assessor's Parcel Numbers 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The latitude and longitude of the approximate center of the K4 Parcel is 33°54′32.14″ North and 117°15′47.05″ West. The K4 Parcel sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.

The Cactus Channel portion of the Project is located along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The portion of the Cactus Channel that would be improved as part of the proposed Project runs a total of 7,900 linear feet.

ES.3 PROJECT DESCRIPTION

ES.3.1 Background

In 1993, the federal government mandated the realignment of March Air Force Base (AFB) and a substantial reduction in its military use. In April 1996, March AFB was re-designated an ARB. Approximately 4,400 acres of land that had historically supported March AFB was no longer needed to support the ARB. The cities of Moreno Valley, Perris, and Riverside, and the County of Riverside formed the March JPA to oversee the dispensation and management of the surplus land. A General Plan and Master EIR were prepared and adopted/certified in 1999 for the March JPA planning area, which includes the March ARB.

Concurrent with the U.S. Air Force's preparation of the Environmental Impact Statement, the March JPA and the March Joint Powers Redevelopment Agency prepared an EIR for the proposed March ARB Redevelopment Project. The Project evaluated in this EIR considered the development of approximately 7,250 acres. The area evaluated including 6,782 acres comprising the boundaries of March ARB, of which approximately 4,524 acres would fall under the authority of March JPA. The remaining 2,258 acres would remain under the control of the military. Additionally, 467 acres within the City of Moreno Valley were included in the EIR evaluation.

Upon approval by the federal government for the realignment of March ARB and the transfer of excess property from March ARB to March JPA, March JPA prepared a General Plan and certified a Master EIR for the General Plan in 1999 (SCH No. 97071095). The K4 Parcel was grouped in the Northeast Planning Subarea and assigned a land use designation of Business Park.

Meridian Park K4 LLC is now pursuing development of the K4 Parcel with an e-commerce warehouse. Additionally, the Project includes regional improvements to the Cactus Channel proposed by Riverside County Flood Control and Water Conservation District (District) as part of the District's Master Plan, which would convert the existing Cactus Channel drainage ditch into a box culvert. While the K4 Parcel was previously conceptually considered for development in the Disposal of Portions of March AFB Environmental Impact Statement, the March AFB Redevelopment Project EIR, and the Master EIR for March JPA, with a specific development plan identified, the analysis in this EIR addresses the proposed build-out of the K4 Parcel and associated Cactus Channel improvements.

ES.3.2 Project Objectives

The primary objectives of the Project include the following:

- Provide appropriate land use intensities to comply with the parameters of the March ARB/Inland Port Airport Compatibility Plan.

- Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel, specifically encouraging the development of industrial uses to expand the employment and financial base of the March JPA Planning Area in a manner that is compatible with the nearby airbase and adjacent industrial uses.
- Provide increased job opportunities for local residents through the provision of employment-generating businesses.
- Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.
- Develop the property with land uses that are compatible with the March AFB Reuse program.
- Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.
- Provide a range of job types for the community's residents.
- Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians and bicyclists.
- Minimize impacts from construction of the development to sensitive biological resources.
- Minimize water wildlife attractants, which are hazards to aircraft flights associated with the naturalized open-air Cactus Channel drainage channel by undergrounding the drainage channel.

ES.3.3 Proposed Project

ES.3.3.1 Project Overview

The proposed Project involves the development of the five parcels on the 35.4-acre K4 Parcel with a 718,000-square-foot building conservatively assumed to be occupied by High-Cube e-commerce/fulfillment center use.[1] The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day.

[1] The proposed warehouse would operate as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end uses. These facilities typically handle smaller packages and quantities than other types of high-cube warehouses and often contain multiple mezzanine levels. This is a conservative approach because an e-commerce/fulfillment center generates the most traffic of any type of high-cube warehouse use.

The proposed Project would also include improvements to the drainage channel within the Cactus Channel Improvements Site. The drainage improvements are proposed to be an underground box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). The installation of the box culvert would require trenching through the existing swale behind the Cactus Avenue right-of-way. It is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale. The location of the channel course would remain in its current location. This portion of the Project is being proposed by the District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the District and it would either be constructed contemporaneously with the Project or built separately depending on permitting and timing. The Cactus Channel would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan. The installation of the box culvert would require trenching through the existing swale behind the Cactus Avenue right-of-way.

ES.3.3.2 Project Construction

Construction of the proposed warehouse would occur over a 12-month period of time, commencing in quarter 1 of 2020 and completing in quarter 1 of 2021. Generally, warehouse construction would include site grading, utility relocation/installation, and building construction. Rough grading and utility installation would last approximately 25 days, and building construction, including pad/site-specific grading activities, would occur over approximately 11 months. Heavy equipment to be used on site during construction would include flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks, and bobcats. Heavy equipment would be delivered and removed from the site throughout the construction phase. As most heavy equipment is typically not authorized to be driven on a public roadway, most of the equipment would be delivered and removed from the site via large flatbed trucks. It is anticipated that delivery of heavy equipment would not occur on a daily basis, but rather periodically throughout the construction phase based on need. During summer months, concrete pours for the warehouse could begin as early as 3:00 a.m.; during the remainder of the year, concrete pours would occur after 4:00 a.m. All other deliveries would occur at any time during the day. Any early morning concrete pours would comply with existing noise limitations identified in March JPA Development Code Sections 9.10.140 and 9.10.030.

Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Channel Improvement Site. Construction of the Cactus Channel improvements would occur over an approximately 30-month period, commencing in quarter 4 of 2020 and completing in quarter 1 of 2023. Heavy equipment to be used on site during construction would include excavators, dozers, loaders, tractors, backhoes, and cranes. Heavy equipment would be delivered and removed from

the site throughout the construction phase. Currently it is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale.

ES.3.3.3 Project Operations

The proposed warehouse building would include a total of 105 loading dock positions for trucks. Vehicles would access the warehouse site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day.

Placement of the Cactus Channel in a box culvert as part of the District's Master Plan would not affect channel flows upon completion of construction. Flows would continue to the east, where the channel would connect with the Heacock Channel and turn south.

ES.3.3.4 Requested Approvals and Entitlements

To facilitate Project approval, the following would be required:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

ES.3.4 Discretionary Actions

The following additional permits, approvals, and discretionary actions may be necessary as part of Project approval:

a. U.S. Army Corps of Engineers – A Jurisdictional Determination will be required to identify and locate the boundaries of jurisdictional waters of the United States on the Project site, and if found, will be regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

b. State Water Resources Control Board (SWRCB) – A National Pollutant Discharge Elimination System Construction General Permit will need to be obtained from the SWRCB. Permit registration documents include a Storm Water Pollution Prevention Plan.

c. SWRCB – A National Pollutant Discharge Elimination System Industrial General Permit may need to be obtained from the SWRCB, depending on the type of facility ultimately built, consistent with the requested General Plan land use designations of Industrial.

d. Regional Water Quality Control Board, Santa Ana Region – 401 Water Quality Certification – A Waste Discharge Requirement Permit will need to be obtained from the Regional Water Quality Control Board.

e. South Coast Air Quality Management District – A Dust Control Plan will need to be approved by the South Coast Air Quality Management District.

f. Federal Aviation Administration – A Form 7460-1 will need to be approved by the Federal Aviation Administration.

g. Riverside County Airport Land Use Commission – A consistency finding with Riverside County Land Use Plan will be required by Riverside County Airport Land Use Commission.

ES.4 SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table ES-1, Summary of Environmental Impacts and Mitigation Measures, provides a summary of the impact analysis related to the Project. Table ES-1 identifies a summary of the significant environmental impacts resulting from the Project pursuant to the CEQA Guidelines Section 15123(b)(1). For more detailed discussion, please see Chapter 4, Environmental Impact Analysis, of this EIR. Table ES-1 also lists the applicable mitigation measures related to identified significant impacts, as well as the level of significance after mitigation is identified. As stated in Chapter 2, Project Description, of this EIR, the Initial Study prepared and circulated with the Notice of Preparation (NOP) for public review on the Project (see Appendix A, Initial Study, of this EIR) concluded that the Project would not result in significant impacts to agriculture and forestry resources, mineral resources, population and housing, public services, and recreation; therefore, these topics are not addressed in this EIR and not summarized in Table ES-1.

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
Aesthetics			
AES-1. In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	Less than Significant	N/A	N/A
AES-2. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Less than Significant	N/A	N/A
Air Quality			
AQ-1. Would the project conflict with or obstruct implementation of the applicable air quality plan?	Potentially Significant	**MM-AQ-1. Construction Equipment Emissions Standards** During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the U.S. Environmental Protection Agency (EPA). In addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment. **MM-AQ-2. Low-VOC [volatile organic compound] Architectural Coatings** The construction contractor shall be required to utilize Super-Compliant volatile organic compound (VOC) interior and exterior paints, which are defined by the South Coast Air Quality Management District (SCAQMD) as meeting the "super-compliant" VOC standard of 10 grams per liter, during construction and long-term operations (SCAQMD n.d.b).	Significant Unavoidable

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		MM-AQ-3. Construction Relations Officer The Project will provide a construction relations officer to act as a community liaison to oversee on-site construction activity and all emissions and congestion related matters. A phone number and email contact information for the construction relations officer shall be posted on signage at construction site entrance points. **MM-AQ-4. Improved Energy Efficiency and Water Reduction** The Project applicant shall incorporate the following measures into the Project design: • The Project will install approximately 4.5 MW of solar photovoltaic electricity generation. • The Project will install Energy Star certified light bulb and lighting fixtures. • The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation as required by 2016 Title 24 and consistent with the Riverside County Climate Action Plan criteria. • Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof, defined as Cool Roof Rating Council (CRRC) Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of heating, ventilation, and air conditioning equipment with a Seasonal Energy Efficiency Ratio (SEER) of 14 or higher; Installation of water heaters with an energy factor of 0.92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project. • The Project will provide electrical outlets at building exterior areas.	

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		• The Project landscape non-potable water system will meet "purple" pipe standards. • The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers. • The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle charging stations and fifty-four off-site EV charging stations. **MM-AQ-5. Commute Trip Reduction** The Project applicant shall incorporate the following measures in order to encourage alternative modes of transportation and reduce commute trips. • Five percent (5%) of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools. • Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet of office space may pursue video conferencing as feasible. • The Project will provide short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces). • The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).	

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		• Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Each tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will consider the provision of an ATM machine as feasible. **MM-AQ-6. Truck Requirements** In order to minimize on-road mobile source criteria air pollutant emissions, March Joint Powers Authority (JPA) shall require the following measures for the Project. • For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks. The March JPA will require evidence of compliance prior to issuance of a certificate of occupancy for any warehouse use.	
AQ-2. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard	Potentially Significant	See **MM-AQ-1** through **MM AQ-6** above.	Significant Unavoidable
AQ-3. Would the project expose sensitive receptors to substantial pollutant concentrations?	Less than Significant	N/A	N/A
AQ-4. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	Less than Significant	N/A	N/A
Biological Resources			
BIO-1. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	Potentially Significant	**MM-BIO-1. Smooth Tarplant Mitigation and Monitoring Plan** Surveys shall be conducted for smooth tarplant the season prior to each phase of construction. Surveys shall occur within the Project site and include suitable habitat within a 100-foot buffer (access permitting), at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with California	Less than Significant

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		Department of Fish and Wildlife (CDFW) protocols and by a qualified botanist knowledgeable of the local flora. Since annual variation in weather may result in fewer specimens being observed, the locations of plants considered will be cumulative (i.e., all known plant locations over the course of the various surveys, will be noted). The full extent of the occurrence within the survey area shall be recorded using GPS. The location of smooth tarplant shall be mapped and number of individuals for each occurrence documented. The outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented: 1. Establish Environmentally Sensitive Areas (ESAs). Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the Project disturbance areas and within 100 feet of Project disturbance areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field (e.g., with temporary construction fencing) to ensure that avoided plants are not inadvertently harmed during construction. 2. Monitoring. A qualified biologist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA. 3. Smooth Tarplant Mitigation Plan. If impacts to smooth tarplant cannot be avoided a Smooth Tarplant Mitigation Plan shall be submitted to CDFW for review and approval prior to ground disturbance to occupied habitat. Upon approval, the plan will be implemented by the applicant or its designee. The plan will demonstrate the feasibility of enhancing or	

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		restoring smooth tarplant habitat in areas to be managed as natural open space (i.e., within the designated conservation areas west of Interstate 215) without conflicting with other resource management objectives. Habitat enhancement replacement will be at a 1:1 ratio (acres enhanced or restored:acres impacted). The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals. **MM-BIO-2. Best Management Practices (BMPs)** To prevent inadvertent disturbance to areas outside the limits of the proposed Project construction limits, the following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum once a month) to ensure implementation with the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements. 1. Workers Environmental Awareness Training. All construction personnel must attend an environmental awareness training to educate personnel about special-status species that may potentially occur on site, their protective status, avoidance and minimization measures to be implemented by all personnel, flagging/fencing of any exclusion areas, permit requirements, the boundaries within which the Project construction shall occur, trash and debris collection and disposal, spill avoidance and clean-up, and other environmental issues;	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		2. Demarcate Construction Limits. To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground disturbance activities and all construction activities, including, equipment staging and maintenance shall be conducted within the marked disturbance limits. The work limit delineation will be maintained throughout Project construction. 3. Flush Special-Status Species. Biologist will flush special-status species (i.e., avian or other mobile species) from suitable habitat areas to the maximum extent practicable immediately prior to initial vegetation removal activities. 4. Speed Limit. Construction vehicles shall not exceed 15 miles per hour or unpaved roads adjacent to the Project site or the right-of-way accessing the site. 5. Trash and Debris. If trash and debris need to be stored overnight during the maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof will be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day, but must be removed each night. 6. Open Trenches. At the end of each workday, check that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled, covered, or sloped to allow wildlife egress. Should wildlife become trapped, a qualified biologist shall remove and relocate it. 7. Vegetation Removal. Cut vegetation must be hauled out of the channel and stored, if necessary, where it cannot be washed by rainfall or runoff into the channel. When maintenance activities are completed, any excess materials or debris will be removed from the Project site.	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		8. Staging/Storage. Temporary structures and staging/storage of construction equipment and materials will not be located in or within 100 feet of jurisdictional waters, including wetlands and riparian areas. 9. Pets. Pets on or adjacent to construction sites will not be permitted by the operator. 10. Construction Lighting. Construction activities will be limited to daylight hours to the extent feasible. If nighttime work is necessary, lighting will be shielded away from surrounding natural areas. Fixtures will be shielded to downcast below the horizontal plane of the fixture height and mounted as low as possible. 11. Permanent Lighting. Permanent lighting will be shielded away from surrounding natural areas. Fixtures will be shielded to downcast below the horizontal plane of the fixture height and mounted as low as possible. 12. Landscaping Guidelines. As per the Landscaping Guidelines of the Resource Management Element of the March Joint Powers Authority (JPA) General Plan (1999), drought tolerant vegetation and native vegetation will be used to the extent feasible, consistent with March JPA Landscape Water Efficiency Ordinance No. JPA 16-03, with the purpose of preserving existing mature trees and native vegetation. Landscape plans shall be reviewed by a qualified botanist to recommend appropriate provisions to minimize the spread of invasive plant species as defined by the County of Riverside, and listed by the California Invasive Plant Council (www.cal-ipc.org) and California Native Plant Society (www.cnps.org) within the Project area. Provision may include: a) installation of container plants and/or hydro-seeding areas adjacent to existing, undisturbed native vegetation areas with native plant species common within temporary impact areas; and (b) review and screening of proposed plants to identify and avoid potential invasive species and weed removal during the initial planting of landscaped.	

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		MM-BIO-3. Listed Vernal Pool Branchiopods and Western Spadefoot Focused surveys shall be conducted for federally listed large branchiopods and sensitive western spadefoot prior to initiation of construction related activities. Surveys for federally listed branchiopods shall be conducted according to the current U.S. Fish and Wildlife Service (USFWS) Survey Guidelines for the Listed Large Branchiopods (USFWS 2015), which describes a complete survey for branchiopods as one wet season and one dry season survey conducted according to the new guidelines and within a 3 year period. Additionally, pre-construction surveys for western spadefoot shall be conducted during a time of year when the species can be detected (i.e., when the vernal pool and/or drainage channel on the south side of Cactus Avenue is inundated). Surveys shall be initiated at least one year prior to the initiation of construction related activities to allow sufficient time to complete one wet season and one dry season survey within the Project site, including suitable habitat within a 250-foot buffer. If focused surveys are negative, no additional mitigation is required. If focused surveys are positive, the full extent of listed branchiopod and/or western spadefoot occurrence within the survey area shall be recorded using GPS. The location of occupied features shall be mapped and number of individuals for each occurrence documented. The outer extent of each occupied listed branchiopod and/or western spadefoot feature shall be flagged at the time of the survey. Consultation with USFWS shall occur and/or take authorization may be obtained from the USFWS through Section 7 Consultation for impacts to federally listed branchiopods. Alternatively, the applicant may choose to mitigate for impacts through the Western Riverside County (WRC) Multiple Species Habitat Conservation Plan (MSHCP) as	

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		a participating special entity. Occupied listed branchiopod habitat shall be mitigated at a minimum 1:1 ratio for temporary impacts, 2:1 ratio for permanent impacts, as specified by the resources agencies (e.g., within take authorization), or as per the requirements within the WRC MSHCP. Occupied western spadefoot habitat shall be mitigated at a minimum 1:1 ratio. Avoidance and minimization measures shall be implemented in accordance with provisions of the take authorization and shall include, at a minimum: 1. Establish Environmentally Sensitive Areas (ESAs). Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid occupied federally listed branchiopod and/or western spadefoot breeding habitat that occur outside of the Project disturbance areas and within 250 feet of Project disturbance areas. The locations of ESAs shall be clearly delineated through brightly colored fencing or other highly visible means and include a designated avoidance buffer developed in consultation with the USFWS to prevent construction from affecting the pool and its associated watershed. Construction crews will be directed not to encroach beyond the limits of construction. 2. Monitoring. A qualified biologist shall be present during construction within 300 feet of occupied or assumed occupied vernal pool habitat(s) to conduct daily monitoring of the ESAs that protect occupied federally listed branchiopod and/or western spadefoot habitat. The monitor shall have the authority to stop construction activities in the vicinity (within 250 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA. 3. Best Management Practices (BMPs). All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from vernal pool or aquatic habitat.	

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		4. Mitigation, Monitoring, and Management Plan. Prior to construction within 500 feet of occupied or assumed occupied vernal pool habitat, the Project applicant shall develop and implement a mitigation, monitoring, and management plan, with input from regulatory agencies that outlines long-term management strategies and performance standards to be attained to compensate for habitat losses resulting from the Project. At a minimum, the plan shall include standards for mitigation site selection and construction specifications for mitigation sites, a description of site conditions including aerial maps, an analysis of local vernal pool habitat, and performance criteria by which site quality can be assessed over time (e.g., size, vegetation communities and plant species present, date of initial ponding, ponding duration, and wildlife usage). The mitigation, monitoring and management plan shall provide species-specific conservation objectives for covered species and habitats; success criteria for meeting conservation objectives for covered species and habitats; success criteria for meeting conservation objectives; and methods for remediating restoration/enhancement sites that do not achieve the success criteria. A monitoring program shall be established to track the development of habitat conductions that are conducive to the establishment of vernal pool wildlife species. 5. Creation/Restoration/Enhancement of Suitable Vernal Pool Habitat. If impacts to occupied listed vernal pool branchiopod habitat cannot be avoided, then creation, restoration, and/or enhancement of suitable vernal pool habitat suitable for vernal pool fairy shrimp and/or Riverside fairy shrimp shall be required, as applicable (specific to species impacted and habitat requirements). The creation, restoration, and/or enhancement effort would incorporate measures to salvage these species from on-site ponds and relocate them into created, restored, and/or enhanced pools within designated open space easement, upon coordination with the necessary regulatory agencies (i.e., USFWS and/or ACOE [U.S. Army Corps of Engineers]). The created, restored, and/or enhanced habitat would be	

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Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		monitored for fairy shrimp at intervals specified in the mitigation, monitoring, and management plan. Quarterly reports would be prepared by a qualified restoration specialist for the first year and annual reports thereafter. If the success criteria listed in the mitigation, monitoring, and management plan are not met at the end of a given year, remedial action would be taken, pursuant to the direction and approval from the regulatory agencies (i.e., USFWS and ACOE). Alternatively, impacts to occupied listed branchiopod habitat may be mitigated by purchasing mitigation credits at a USFWS-approved mitigation bank for listed branchiopods at a minimum of 2:1 ratio for temporary impacts and 3:1 for permanent impacts, or as otherwise required by the respective permits. **MM-BIO-4. Special-Status Small Mammals** Potentially suitable habitat to support special-status small mammals (i.e., Stephens' kangaroo rat, Northwestern San Diego pocket mouse, and Los Angeles pocket mouse) occurs within the Project site and areas adjacent to the Project site. If potential burrows may be impacted by the proposed Project activities in areas of suitable habitat for these species, a qualified permitted biologist shall conduct focused small mammal surveys for Stephens' kangaroo rat, Northwestern San Diego pocket mouse, and/or Los Angeles pocket mouse to determine presence/absence of these species on the Project site and within 200 feet of the Project site (access permitting) prior to the initiation of construction activities. The survey shall consist of a habitat assessment, followed by five consecutive nights of trapping using Sherman live trapping within suitable habitat as determined by a permitted small mammal trapping individual. If special-status species are not found, no further action is required. If special-status individuals are identified during focused surveys, potentially active special-status small mammal burrows shall be avoided to the extent feasible. If avoidance of active burrows is not	

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		possible, a trapping/relocation program shall be implemented and conducted by qualified biologists in consultation with the appropriate regulatory agencies (i.e., U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW)). In accordance with the trapping/relocation program, special-status small mammal individuals shall be relocated to adjacent suitable habitat areas or preserves (including within the conservation area west of Project site), and/or measures shall be provided to ensure exclusion during construction activities, including trenching. Occupied habitat for special-status mammals shall be mitigated at a minimum 1:1 ratio. The trapping/relocation program shall include submitting a plan for regulatory agency approval, with the following elements included at a minimum: 1. Allow for at least one night without disturbance to the burrow and surrounding area to allow the individuals to vacate the burrow. Remaining individuals shall be live-trapped and relocated out of impacted areas into adjacent occupied areas or into unoccupied areas within the same habitat. 2. Methods (e.g., one-way doors) shall be used to prevent reentry to any burrows not destroyed by construction until construction is complete in these areas. 3. At least 45 days before the start of construction within 200 feet of an active burrow, a trapping/relocation plan shall be submitted to the USFWS and/or CDFW for approval. The plan shall include but not be limited to the following: the methods for capturing animals, the procedures for evaluating health of the animals, the location and methods for storing live animals the methods for release (i.e., fencing), the location of release, on-site habitat restoration and methods for restoring temporarily destroyed burrows where appropriate, and remedial actions for injured or lost animals.	

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		MM-BIO-5. Burrowing Owl Habitat Prior to the initiation of construction activities, a qualified biologist shall conduct preconstruction surveys for burrowing owl to determine presence/absence of the species. The survey shall be conducted in accordance with the most current and applicable California Department of Fish and Wildlife (CDFW) protocol within 30 days of site disturbance to determine whether the burrowing owl is present at the site. Preconstruction surveys shall include suitable burrowing owl habitat within the Project footprint and within 500 feet of the Project footprint (or within an appropriate buffer as required in the most recent guidelines and where legal access to conduct the survey exists). If burrowing owls are not detected during the clearance survey, no additional mitigation is required. 1. If burrowing owl is located, occupied burrowing owl burrows shall not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies through non-invasive methods that either the birds have not begun egg-laying and incubation or that juveniles from the occurred burrows are foraging independently and capable of independent survival. A 500-foot non-disturbance buffer (where no work activities may be conducted) will be maintained between Project activities and nesting burrowing owls during the nesting season, unless otherwise authorized by CDFW. 2. If burrowing owl is detected during the non-breeding season (September 1 through January 31) or confirmed to not be nesting, a 160-foot buffer non-disturbance buffer will be maintained between the Project activities and occupied burrow. Alternatively, a Burrowing Owl Relocation and Mitigation Plan may be prepared and submitted for approval by CDFW. Once approved, the Plan would be implemented to relocate non-breeding burrowing owls from the Project site. The Plan will detail methods and guidance for passive relocation of burrowing owls from the Project site, provide monitoring and management of the	

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		replacement burrow sites, reporting requirements, and ensure that a minimum of two suitable, unoccupied burrows are available off site for every burrowing owl or pair of burrowing owls to be passively relocated. Compensatory mitigation of habitat would be required if occupied burrows or territories occur within the permanent impact footprint. Ratios typically include a minimum of 19.5 acres per nesting burrow lost; however, habitat compensation will be approved by CDFW and detailed in the Burrowing Owl Relocation and Mitigation Plan. Suitable burrowing owl habitat conserved pursuant to the Settlement Agreement may be counted toward mitigation for impacts to burrowing owl habitat and would be based upon regulatory agency approval. 3. Construction work may proceed after owls have been excluded from the site following accepted protocol and approval of CDFW, and as approved by March Joint Powers Authority (JPA). Results of the surveys and relocation efforts shall be provided to CDFW. **MM-BIO-6. Suitable Habitat for Nesting Birds** The Migratory Bird Treaty Act (MBTA) of 1918 (50 C.F. R. Section 10.13) and similar provisions under the CDFG Code (Sections 3503, 3503.5, and 3513) prohibit the "Take" of any native bird. March Joint Powers Authority (JPA) shall ensure that vegetation clearing on the Project site would be conducted outside of the nesting season (February 1 through September 15). If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking, demolition activities, and grading. If active nests of native species are identified, the biologist shall establish suitable buffers around the nests, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests. Typically, established buffers are greater for raptors than songbirds and depend on the species, the nesting stage, and type of construction activity proposed. The buffer should be no less than 300 feet for raptors and	

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		no less than 150 feet for songbirds, unless specifically determined by a qualified biologist familiar with the nesting phenology of the nesting species. In some cases, the buffer may need to be larger. There are no specific protocols for nesting bird surveys or for buffers once nests are found. The key is to ensure that no direct mortality of a native bird, which when nesting includes eggs and young. Implementation of this measure would ensure the Project is not in violation of the MBTA and California Fish and Game Code (CFGC). Alternatively, the Project shall comply with survey requirements imposed by U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW). **MM-BIO-7. Western Spadefoot** Prior to construction, the applicant shall develop a relocation plan for adult western spadefoot. The plan should include, but not be limited to the timing and location of the surveys conducted for western spadefoot, identify the habitats and conditions in the proposed relocation site(s); methods used for trapping and relocating the species, and documentation/recordation of the species and number of the animals relocated. The plan shall be provided to California Department of Fish and Wildlife (CDFW) for approval 30 days prior to any ground-disturbing activities within potentially occupied habitat. A qualified biologist will be present during ground-disturbing activities immediately adjacent to or within the grassland or coastal scrub habitat that could support populations of western spadefoot. The qualified biologist shall possess an appropriate California scientific collecting permit to handle special-status species likely to occur in the Project area. If special-status amphibian and/or reptile species (i.e., western spadefoot) are detected in the work area during pre-construction surveys and/or monitoring, the authorized biologist will capture and relocate individuals to nearby undisturbed areas with suitable habitat outside of the construction area, but as close to their origin as possible (i.e., within designated conservation areas west of	

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		Interstate 215). All wildlife moved during Project activities will be documented by the biologist on site and provided in the plan, which will be submitted to CDFW quarterly. **MM-BIO-8. San Diego Black-Tailed Jackrabbit** Thirty days prior to construction a qualified biologist shall conduct a survey within the proposed construction disturbance zone and within 200 feet of the disturbance zone for San Diego black-tailed jackrabbit. If San Diego black-tailed jackrabbits are present, non-breeding rabbits shall be flushed from areas to be disturbed. Dens, depressions, nests, or burrows occupied by pups shall be flagged and ground-disturbing activities avoided within a minimum of 200 feet during the pup-rearing season (February 15 through July 1). This buffer may be reduced based on the location of the den upon consultation with California Department of Fish and Wildlife (CDFW). Occupied maternity dens, depressions, nests, or burrows shall be flagged for avoidance, and a biological monitor shall be present during construction. If unattended young are discovered, they shall be relocated to suitable habitat by a qualified biologist. The applicant shall document all San Diego black-tailed jackrabbit identified, avoided, or moved and provide a written report to CDFW within 72 hours. Collection and relocation of animals shall only occur with the proper scientific collection and handling permits.	
BIO-2. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	Potentially Significant	See **MM-BIO-2** above**.** **MM-BIO-9.** Jurisdictional Features. In order to mitigate Project impacts to jurisdictional features under the jurisdiction of the U.S. Army Corps of Engineers (ACOE), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB), the Project applicant shall implement mitigation required by the regulatory agencies. March Joint Powers Authority (JPA) shall require proof that the applicable Section 404, 401, and 1600 permits and/or clearances have been obtained or verification that they are not required shall be obtained prior to any disturbance of the jurisdictional features on site. All mitigation	Less than Significant

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		measures and conditions contained within the permits shall be implemented. At a minimum, the following shall be completed for mitigation for impacts to waters of the United States and jurisdictional streambeds. Mitigation options include on-site, off-site, in lieu fee mitigation, or a combination of mitigation strategies, to replace the disturbed jurisdictional features, including sensitive riparian vegetation communities, at a minimum of 1:1 ratio for temporary impacts and 2:1 for permanent impacts, or as otherwise required by the respective permits. Avoided jurisdictional waters shall be fenced or flagged for avoidance. Best management practices (BMPs) shall be implemented to avoid indirect impacts to jurisdictional waters, including the following: 1. A biologist will conduct daily site visits during the removal of riparian vegetation. 2. Vehicles and equipment will not be operated in ponded or flowing water except as described in permits. 3. Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows. 4. Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages. 5. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters. 6. No equipment maintenance will be performed within 100-feet of jurisdictional waters, including wetlands and riparian areas, where petroleum products or other pollutants from the equipment may enter these areas. Fueling of equipment will not occur on the Project site.	

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BIO-3. Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	Potentially Significant	See **MM-BIO-2 and MM-BIO-9** above.	Less than Significant
BIO-4. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	Potentially Significant	See **MM-BIO-6** above.	Less than Significant
BIO-5. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	No Impact	N/A	N/A
BIO-6. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	Potentially Significant	See **MM-BIO-2** through **MM-BIO-5** and **MM-BIO-9** above.	Less than Significant
Cultural Resources			
CUL-1. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5?	Less than Significant	N/A	N/A
CUL-2. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?	Potentially Significant	**MM-CUL-1. Inadvertent Discovery of Archaeological Resources** In the event that archaeological resources are inadvertently unearthed during excavation and grading activities for the Project and no monitors are present, the contractor shall cease all earth-disturbing activities within a 100-foot radius of the area of the discovery, March Joint Powers Authority (JPA) shall be notified, and a qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology shall evaluate the significance of the find and determine the	Less than Significant

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Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		appropriate course of action. Depending upon the significance of the find under the California Environmental Quality Act (CEQA) (14 CCR 15064.5(f); PRC, Section 21082), the archaeologist may simply record the find and allow work to continue. If the resource is a Native American cultural resource or is prehistoric, the appropriate tribe(s) shall weigh in on the evaluation of the resource and the appropriate course of action. Pursuant to California Public Resources Code Section 21083.2(b) and CEQA Guidelines Section 15126.4, avoidance is the preferred method of preservation for archaeological resources. If avoidance of the resources is not feasible, salvage operation requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed and shall take in to account tribal preferences and sensitivity concerns. If potentially significant features or sites are discovered, an Evaluation and Treatment Plan shall be developed by the qualified archaeologist and the Native American representative and shall contain, at a minimum, a research design and field methodology designed to address the criterion outlined in the CRHR. If a site is determined to be significant, data recovery excavations may be necessary unless the resource is avoided and preserved/protected in place. The qualified archaeologist shall also be required to curate specimens in a repository with permanent retrievable storage and submit a written report to March JPA for review and approval. Once artifact analysis is completed, a final written report detailing the results of all research procedures and interpretation of the site shall be submitted to March JPA for review and approval. Evaluation and treatment shall be supervised by an individual or individuals that meet the Secretary of the Interior's Professional Qualification Standards.	

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		After the find has been appropriately avoided or mitigated and cleared by March JPA, the qualified archaeologist and, if applicable, the Native American representative, work in the area may resume. Resources shall be documented on Department of Parks and Recreation 523 series forms and shall be submitted to the Eastern Information Center (EIC) along with the final written report for inclusion in the California Historical Resources Information System (CHRIS).	
CUL-3. Would the project disturb any human remains, including those interred outside of dedicated cemeteries?	Potentially Significant	**MM-CUL-2. Inadvertent Discovery of Human Remains** In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found, the Riverside County Coroner shall be immediately notified of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within 2 working days of notification of the discovery, the appropriate treatment and disposition of the human remains. If the County Coroner determines that the remains are, or are believed to be, Native American, he or she shall notify the Native American Heritage Commission (NAHC) within 24 hours. In accordance with California Public Resources Code, Section 5097.98, the NAHC must immediately notify those persons it believes to be the most likely descendant (MLD) from the deceased Native American. The MLD shall complete their inspection within 48 hours of being granted access to the site. The MLD representative would then determine, in consultation with the property owner, the disposition of the human remains.	Less than Significant
Energy			
EN-1. Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	Less than Significant	N/A; also see **MM-AQ-5** and **MM-AQ-6**, above.	N/A

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EN-2. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	Less than Significant	N/A	N/A
Geology and Soils			
GEO-1. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and/or liquefaction?	Potentially Significant	**MM-GEO-1. Geotechnical Exploration Recommendations** The recommendations included within both the Geotechnical Exploration for the Proposed Industrial Warehouse Site K-4 and Geotechnical Addendum Report for the K4 Moreno Valley Storm Drain, prepared by Leighton Consulting Inc. shall be implemented throughout Project design and construction (Leighton Consulting Inc. 2018a, 2018b). Prior to the issuance of building permits, the March Joint Powers Authority (JPA)-designated plan reviewer shall ensure that design recommendations are incorporated into the K4 Warehouse and Cactus Channel improvements designs.	Less than Significant
GEO-2. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	Potentially Significant	See **MM-GEO-1** above.	Less than Significant
GEO-3.Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	Potentially Significant	See **MM-GEO-1** above.	Less than Significant
GEO-4. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	Potentially Significant	**MM-GEO-2: Paleontological Resources** In accordance with the provisions of the California Environmental Quality Act and the proposed guidelines of SVP (2010) and the Paleontological Resources Assessment Report prepared by CRM TECH, the proposed Project shall implement the following actions: • Prior to the commencement of any grading activity, the applicant shall retain a qualified paleontologist to ensure the implementation of a paleontological monitoring program. The qualified	Less than Significant

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		paleontologist shall obtain a repository agreement from an accredited paleontological repository such as the WSC prior to the initiation of ground disturbing activities associated with the Project. The Society of Vertebrate Paleontology (SVP 2010) defines a qualified paleontologist as having: "1. A graduate degree in paleontology or geology, and/or a publication record in peer reviewed journals; and demonstrated competence in field techniques, preparation, identification, curation, and reporting in the state or geologic province in which the project occurs. An advanced degree is less important than demonstrated competence and regional experience. 2. At least two full years professional experience as assistant to a Project Paleontologist with administration and project management experience; supported by a list of projects and referral contacts. 3. Proficiency in recognizing fossils in the field and determining significance. 4. Expertise in local geology, stratigraphy, and biostratigraphy. 5. Experience collecting vertebrate fossils in the field." • The qualified paleontologist should attend any preconstruction meetings; present a worker environmental training to construction personnel outlining pertinent laws protecting paleontological resources, typical fossils recovered from the geological units onsite, and the steps to take if paleontological resources are discovered during project implementation; and manage the paleontological monitor(s) if he or she is not doing the monitoring. A paleontological monitor should be on-site during all excavations below the depth of previously disturbed sediments. Specifically, all earth-moving operations above the depth of three feet shall be monitored periodically to identify the sediments being impacted,	

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		and any earth-moving operations reaching beyond the depth of three feet will require continuous monitoring for potential paleontological remains. The SVP (2010) defines a qualified paleontological monitor as having: "1. BS or BA degree in geology or paleontology and one year experience monitoring in the state or geologic province of the specific project. An associate degree and/or demonstrated experience showing ability to recognize fossils in a biostratigraphic context and recover vertebrate fossils in the field may be substituted for a degree. An undergraduate degree in geology or paleontology is preferable, but is less important than documented experience performing paleontological monitoring, or 2. AS or AA in geology, paleontology, or biology and demonstrated two years experience collecting and salvaging fossil materials in the state or geologic province of the specific project, or 3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in the state or geologic province of the specific project. 4. Monitors must demonstrate proficiency in recognizing various types of fossils, in collection methods, and in other paleontological field techniques." • The monitor shall be prepared to quickly salvage fossils, if they are unearthed, to avoid construction delays, but must have the power to temporarily halt or divert construction equipment to allow for removal of abundant or large specimens. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow evaluation and potential recovery of paleontological resources by the qualified paleontologist. The area of discovery will be	

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		roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will remove the rope and allow grading to recommence in the area of the find. • If appropriate sedimentological indicators, as outlined in the SVP (2010) guidelines, are observed, sediment samples shall be collected and processed to recover small fossil remains following SVP (2010) guidelines for collection and processing of sediment samples. The amount of sediment collected and processsed shall be consistent with SVP (2010) or determined by the qualified paleontologist. • Recovered specimens shall be identified to the lowest taxonomic and curated at a repository with permanent retrievable storage that allows for further research in the future, such as the WSC. • If during the paleontological monitoring program, half the Project excavations have occurred with no fossil recovery, monitoring can be reduced or terminated, as determined by the qualified paleontologist. • A report of findings, including an itemized inventory of recovered specimens and a discussion of their significance when appropriate, shall be prepared upon completion of the research procedures outlined above. The report should summarize the monitoring program and include geological observations and any paleontological resources recovered during paleontological monitoring for the proposed project. The approval of the report and the inventory by the March Joint Powers Authority shall signify completion of the mitigation program.	
Greenhouse Gas Emissions			
GHG-1. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	Less than Significant	N/A	N/A
GHG-2. Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	Less than Significant	N/A	N/A

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Hazards and Hazardous Materials			
HAZ-1. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	Potentially Significant	**MM-HAZ-1. Hazards Materials Transport** Aboveground bulk storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged in Zone C1, and would generally not be permitted unless no feasible alternatives are available. Any aggregate aboveground oil/fuel storage containers in Zone C1 greater than 1,320 gallons (or completely buried 42,000 gallons) shall include preparation and implementation of a Spill Prevention, Control and Containment (SPCC) plan pursuant to 40 C.F.R. 112 (or, for small quantities, a spill prevention and response plan) during construction, and if applicable, during site operations. The SPCC plan (or spill prevention and response plan) shall identify Best Management Practices for spill and release prevention and provide procedures for cleaning up and disposing of any spills or releases. **MM-HAZ-2. Hazardous Materials Contingency Plan** A Hazardous Materials Contingency Plan shall be prepared by a qualified environmental consultant and implemented during demolition, excavation, and construction activities for the Project. The Hazardous Materials Contingency Plan shall include, at a minimum, the following: • Identification of known areas with hazardous waste and hazardous materials of concern • Procedures for temporary cessation of construction activity and evaluation of the level of environmental concern • Procedures for limiting access for properly trained personnel to the contaminated area • Procedures for notification and reporting, including internal management and local agencies (e.g., local fire department, county Certified Unified Program Agency), as needed • Health and safety measures for removal and excavation of contaminated soil	Less than Significant

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		• Procedures for characterizing and managing excavated soils • Procedures for certification of completion of remediation The Hazardous Materials Contingency Plan shall be submitted to March JPA for approval no less than 30 days prior to the initiation of construction activities at the site. **MM-HAZ-3. UXO Identification, Training, and Reporting Plan** Prior to commencement of construction activities, a UXO Identification, Training, and Reporting Plan to properly train all site workers in the recognition, avoidance, and reporting of military waste debris and ordnance shall be prepared by a qualified environmental consultant. The plan shall contain, at a minimum, the following: • A description of the training program outline and materials, and the qualifications of the trainers; • Identification of available trained experts that will respond to notification of discovery of any suspected ordnance (unexploded or not); • Procedures to stop work immediately in the vicinity of suspected UXO and to notify the Riverside County Sherriff's Department, Certified Unified Program Agency (CUPA) and the U.S. Army Corps of Engineers; • A work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near-surface or buried ordnance in all proposed land disturbance areas; • Documentation of all surveys and investigations performed to evaluate and remove discovered ordnance.	

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		The UXO Identification, Training, and Reporting Plan shall be submitted to March JPA for approval no less than 30 days prior to the initiation of construction activities at the site. The results of geophysical surveys shall be submitted to March JPA within 30 days of completion of the surveys. **MM-HAZ-4. Hazards Materials Business Plan** Businesses that use 55 gallons (liquid) or 500 pounds (solid) of hazardous materials are required to submit a Hazardous Materials Business Plan (pursuant to California Health and Safety Code Section 25500) within 30 days of beginning operations. The Hazardous Materials Business Plan shall contain information on hazardous materials inventory, inspections, training, record keeping, and reporting. The Hazardous Materials Business Plan shall be submitted online through the California Environmental Reporting System website. Further information can be found on the County of Riverside Department of Environmental Health website (http://www.rivcoeh.org/HazMat/hmbp).	
HAZ-2. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	Potentially Significant	See **MM-HAZ-1** through **MM-HAZ-4,** above**.**	Less than Significant
HAZ-3. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	Potentially Significant	See **MM-HAZ-1** through **MM-HAZ-4,** above**.**	Less than Significant
HAZ-4. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as result, would is create a significant hazard to the public or the environment?	Potentially Significant	See **MM-HAZ-2** and **MM-HAZ-3, above.**	Less than Significant

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HAZ-5. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	Potentially Significant	**MM-HAZ-5. Solar Voltaic System Approval** In the event the Project Applicant chooses to include solar photovoltaic system(s) as part of the Project, the system shall be reviewed and approved by the Air Force prior to the issuance of building permits. The Project Applicant shall demonstrate that the solar panels and hardware are designed to minimize glare and spectral highlighting. Emerging technologies shall be used, such as diffusion coatings and nanotechnological innovations to effectively reduce the refractive index of the solar cells and protective glass. **MM-HAZ-6. Emittance of Steam/Smoke** In the event the Project Applicant decides to include system(s) that would result in the emittance of steam and/or smoke as part of the Project, written approval shall be granted by March Air Reserve Base and March Inland Port airport officials prior to the issuance of building permits. **MM-HAZ-7. Compliance with FAA [Federal Aviation Administration] Advisory Circular 150/5200-33B** In order to ensure proper functioning of the Project drain system to avoid potential hazards to March Air Reserve Base flights, an additional best management practice (BMP) shall be added to the Project Water Quality Management Plan, which shall require that the applicant enter into a covenant and agreement with the March Joint Powers Authority (JPA) similar to the Water Quality Management Plan and Urban Runoff Best Management Practice Transfer, Access and Maintenance Agreement between March JPA and Sun Life Assurance Company of Canada (Document No. 2014-0030862), which shall be recorded prior to issuance of a certificate of occupancy. A copy of the recorded agreement and BMP shall be provided to the Riverside County Airport Land Use Commission. The BMP shall include the following:	Less than Significant

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Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		a. The property owner or its designated representative shall monitor the conditions of the detention basins and promptly inspect such basins following completion of each "significant" rain event and the 48-hour period thereafter. b. The Project includes an underground stormwater detention design so as to minimize the attraction of birds. However, if any standing water remains in a basin that is not beneath a rock, gravel, or other layer following the completion of the "significant" rain event and the 48-hour period thereafter, the property owner or its designated representative shall arrange to have such standing water either removed or covered within the next 2 business days following the conclusion of the 48-hour period. c. In the event that the standing water situation recurs on a regular basis following the 48-hour detention period, the detention basin may no longer be draining as originally designed to prevent standing water from rising above a rock, gravel, or other layer (for example, due to a rise in groundwater levels or other circumstance beyond the property owner's ability to control). In that situation, the property owner or its designated representative shall promptly engage a licensed civil engineer to prepare a design plan to ensure that such condition does not persist for more than 48 hours following the conclusion of a "significant" rain event. The required engineering design solution shall be implemented promptly, but no later than 180 days following its approval by all applicable authorities, providing that, until such time as the engineered design solution is implemented, the property owner or its designated representative will maintain the detention basins such that after 48 hours following a significant rain event, the water levels are below a rock, gravel, or other layer.	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		MM-HAZ-8. Tree Planting Restrictions Trees species with masts and tree species that are suitable for roosting shall not be planted on the Project site. Prior to issuance of a grading permit, the plant palette for the proposed Project shall be reviewed and approved by the March Joint Powers Authority.	
		Hydrology and Water Quality	
HYD-1. Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	Less than Significant	N/A	N/A
HYD-2. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	Less than Significant	N/A	N/A
HYD-3. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces in a manner which would: (i) result in substantial erosion or siltation on- or off-site; (ii) substantially increase the rate or amount of surface the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; (iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or (iv) impede or redirect flood flows?	Less than Significant	N/A	N/A

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
Land Use			
LU-1. Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	Potentially Significant	See the following mitigation: **MM-AQ-1** through **MM-AQ-6,** **MM-BIO-1** through **MM-BIO-9,** **MM-CUL-1** and **MM-CUL-2,** **MM-GEO-1** and **MM-GEO-2,** and **MM-HAZ-1** through **MM-HAZ-8,** above. Also see **MM-TRAF-1** through **MM-TRAF-19**, below.	Less than Significant
LU-2. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?	Potentially Significant	See the following mitigation: **MM-AQ-1** through **MM-AQ-6,** **MM-BIO-1** through **MM-BIO-9,** **MM-CUL-1** and **MM-CUL-2,** **MM-GEO-1** and **MM-GEO-2,** and **MM-HAZ-1** through **MM-HAZ-8,** above. Also see **MM-TRAF-1** through **MM-TRAF-19**, below.	Less than Significant
Noise			
NOISE-1. Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than Significant	N/A	N/A
NOISE-2. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?	Less than Significant	N/A	N/A
NOISE-3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport,	Less than Significant	N/A	N/A

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
would the project expose people residing or working in the project area to excessive noise levels?			
Transportation			
TRAF-1. Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	Potentially Significant	Existing Conditions **MM-TRAF-1. Elsworth Street/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall contribute its fair-share towards the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches; and, restriping of the northbound shared left-though-right turn lane and southbound shared left-through lane. The signal modification shall include traffic signal synchronization improvements along Cactus Avenue. Opening Year Cumulative Conditions **MM-TRAF-2. Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements: • Modify the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue • Add a second northbound left turn lane • Add a third westbound through lane • Add a westbound right turn lane **MM-TRAF-3. Elsworth Street/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:	Significant and Unavoidable

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		• Modify the traffic signal to implement protected left turn phasing on the northbound and southbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-4. Heacock Street/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements: • Add a third eastbound through lane • Add a third westbound through lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-5. Sycamore Canyon Boulevard/Alessandro Boulevard** Prior to issuance of first certificate of occupancy, the Project shall contribute its fair share towards the installation of a second northbound left turn lane; and, the modification of the traffic signal to implement protected left turn phasing on the southbound, eastbound, and westbound approaches. <u>Horizon Year Traffic Conditions</u> **MM-TRAF-6. I-215 Southbound Ramps/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements: • Add a third eastbound through lane • Add a second westbound left turn lane • Add a third westbound through lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-7. I-215 Northbound Ramps/Alessandro Boulevard** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the installation of a second northbound left turn lane.	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		MM-TRAF-8. Old 215 Frontage Road/Alessandro Boulevard Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements: • Add a third eastbound through lane • Add a third westbound through lane **MM-TRAF-9. Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share toward the following improvements: • Modify the traffic signal to implement protected left turn phasing on the southbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue • Add a second northbound through lane • Add two southbound right turn lanes • Add a second eastbound left turn lane • Add a third eastbound through lane • Add an eastbound right turn lane • Add a fourth westbound through lane **MM-TRAF-10. Day Street/Alessandro Boulevard** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements: • Add a third westbound through lane **MM-TRAF-11. Elsworth Street/Alessandro Boulevard** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a second northbound left turn lane. **MM-TRAF-12. Elsworth Street/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share toward the following improvements:	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		• Add a second northbound left turn lane • Add a fourth eastbound through lane • Add a fourth westbound through lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-13. Frederick Street/Alessandro Boulevard** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a third eastbound through lane. **MM-TRAF-14. Graham Street/Riverside Drive/Cactus Avenue** Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a second eastbound left turn lane. **MM-TRAF-15. Heacock Street/Cactus Avenue** Prior to issuance of first certificate of occupancy, the project shall pay its fair share toward the following improvements: • Add a third eastbound through lane • Add a third westbound through lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-18. WRCOG TUMF Contribution** Prior to the issuance of building permits, the Project Applicant shall participate in the WRCOG TUMF fee programs by paying the requisite fees at the time of building permit. Improvements may be eligible for a fee credit or reimbursement through the program where appropriate. Table 4.11-28 provides share calculations in the event a particular facility is not included in a pre-existing fee program.	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		MM-TRAF-19. Construction Traffic Management Plan Prior to the issuance of building permits, the Project Applicant would be required to develop and implement a March JPA-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.	
TRAF-2. Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	Potentially Significant	See **MM-TRAF-1** through **MM-TRAF-15, MM-TRAF-18,** and **MM-TRAF-19**, above.	Less than Significant
TRAF-3. Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	Less than Significant	N/A	N/A
TRAF-4. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves, or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Potentially Significant	**MM-TRAF-16 Veteran's Way/Driveway 1/Cactus Avenue (#21)** Prior to issuance of first certificate of occupancy, the Project shall construct the following improvements: • Construct northbound approach with left turn lane, and shared through-right lane • Re-stripe southbound left-right turn lane to a through lane • Add westbound left turn lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue **MM-TRAF-17 Frederick Street/Driveway 2/Cactus Avenue (#23)** Prior to issuance of first certificate of occupancy, the Project shall construct the following improvements:	Less than Significant

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		• Construct northbound approach with left turn lane, through lane, and right turn lane • Re-stripe southbound right turn lane to a through-right lane • Add westbound left turn lane • Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue	
TRAF-5. Would the project result in inadequate emergency access?	Less than Significant	N/A	N/A
Tribal Cultural Resources			
Threshold TCR-1 Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	Less than Significant	N/A	N/A
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	Potentially Significant	**MM-TCR-1. Inadvertent Discovery of Tribal Cultural Resources** While no Tribal Cultural Resources (TCRs) have been identified that may be affected by the proposed Project, the following approach for the inadvertent discovery of TCRs has been prepared to ensure there are no impacts to unanticipated resources. Should a potential TCR be encountered, construction activities near the encounter shall be temporarily halted within 50 feet of the discovery and March Joint Powers Authority (JPA) notified. March JPA will notify Native American tribes that have been identified by the Native American Heritage Commission (NAHC) to be traditionally and culturally affiliated with the	Less than Significant

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		geographic area of the Project. If the potential resource is archaeological in nature, appropriate management requirements shall be implemented as outlined in Mitigation Measure **MM-CUL-1** (see Section 4.4.5, Mitigation Measures). If March JPA determines that the potential resource is a TCR (as defined by PRC, Section 21074), tribes consulting under AB 52 and SB 18 would be provided a reasonable period of time, typically 5 days from the date of a new discovery is made, to conduct a site visit and make recommendations regarding future ground disturbance activities as well as the treatment and disposition of any discovered TCRs. A qualified archaeologist shall implement a plan for the treatment and disposition of any discovered TCRs based on the nature of the resource and considering the recommendations of the tribe(s). Implementation of proposed recommendations made pursuant to **MM-TCR-1** will be made based on the determination of March JPA that the approach is reasonable and feasible.	
		Utilities and Service Systems	
UTIL-1. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities or expansion of existing facilities, the construction or relocation of which could cause significant environmental effects?	Potentially Significant	**MM-UTL-1. WMWD Conditions of Approval** Prior to issuance of building permits, the applicant shall follow the conditions of approval specified in the Water Supply Assessment expected to be shortly adopted by the Western Municipal Water District (WMWD). The conditions of approval must include: 1. The Applicant shall meet with WMWD to determine if the proposed Project should include the construction of on-site and off-site water facilities as needed near the Project area. 2. The Applicant shall promptly pay all applicable fees and charges as specified in WMWD's Rules and Regulations Governing Water Service and Water Users, Water Rate Schedules and Water Rate Schedules by Service Area, Cost Recovery charges and connection and Added Facilities Charges and Fees.	Less than Significant

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		3. The Applicant shall ensure that all landscape plans are compliant with applicable requirements. In WMWD's area, those requirements may include, but are not limited to, landscape ordinances of the County of Riverside (Water Efficient Landscape Requirements Ordinance No. 859), City of Riverside (Municipal Code 19.570), City of Murrieta (Ordinance 443-10), and March JPA Ordinance No. JP 09-05 (Water Efficient Landscape Ordinance). 4. The Applicant shall be required to plan and install water efficient devices and landscaping in accordance with applicable ordinances and requirements. 5. The Applicant shall use recycled water for landscaped areas. The proposed Project is located near existing recycled water distribution infrastructure on Cactus Avenue and the Applicant shall be required to use recycled water for landscaped areas. 6. If WMWD deems it necessary, the Applicant shall develop a specific plan of service for the proposed Project and coordination of land use decisions and water supply planning with WMWD to ensure sufficient and reliable water supply for WMWD's existing and future uses. Thereby, if WMWD adopts and implement rules, regulations, policies and procedures within its authority that may apply to the proposed Project, they will be implemented. 7. The proposed Project shall be subject to any special or additional requirements imposed by the Metropolitan Water District or WMWD on water deliveries, including increased pricing or a different pricing structure. 8. Prior to certificate of occupancy, the Applicant shall demonstrate the proposed Project complies with all provisions within the March Joint Powers Authority Ordinance No. JP 09-05 (Water Efficient Landscape Ordinance) including but not limited to: • Irrigation systems shall be designed, maintained, and managed to meet or exceed an average irrigation efficiency of 0.71.	

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		• All irrigation systems shall be designed to prevent runoff, over-spray, low head drainage, and other similar conditions where water flows off site onto adjacent property, non-irrigated areas, walk, roadways, or structures. Irrigation systems shall be designed, constructed, installed, managed, and maintained to achieve as high an overall efficiency as possible. • Landscaped areas shall be provided with a smart irrigation controller which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions unless the use of the property would otherwise prohibit use of a timer.	
UTIL-2. Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	Less than Significant	N/A	N/A
UTIL-3. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	Less than Significant	N/A	N/A
UTIL-4. Would the project be generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	Potentially Significant	**MM-UTL-2. Construction Waste Recycling Plan and Waste Recycling Report** Prior to issuance of building permits, the applicant shall complete a Construction Waste Recycling Plan and submit the plan to the Riverside County Waste Management Department (RCWMD) for approval. The plan shall identify and estimate the materials to be recycled during construction activities and shall specify where and how the recyclable materials will be stored on the site. Compliance with the plan will be a requirement in all construction contracts. The RCWMD-approved plan shall be attached to all construction plans and distributed to all construction contractors. Once construction is complete, the applicant shall prepare a Waste Recycling Report that demonstrates that the	Less than Significant

Table ES-1
Summary of Project Impacts

Environmental Topic	Impact?	Mitigation Measure(s)	Level of Significance After Mitigation
		Project recycled a minimum of 50% of its construction and demolition waste. The waste recycling report shall be submitted to and approved by the RCWMD prior to issuance of occupancy permits. **MM-UTL-3. Use of Mulch and/or Compost** The use of mulch and/or compost shall be used in the development and maintenance of all landscaped areas within the Project. Green waste shall be recycled through either on-site composting of grass (i.e., leaving the grass clippings on the lawn) or sending separated green waste to a composting facility. **MM-UTL-4. Drought-Tolerant Vegetation** The Project shall use xeriscaping and drought-tolerant low-maintenance vegetation in all landscaped areas of the Project site.	
UTIL-5. Would the project comply with federal, state, and local management reduction statutes and regulations related to solid waste?	Potentially Significant	See **MM-UTL-2,** above. **MM-UTL-5. RCWMD Approval of Buildings Plans** Prior to issuance of building permits, the Applicant shall submit building plans to the Riverside County Waste Management Department (RCWMD) and obtain approval from the RCWMD for compliance with the Riverside County Design Guidelines for Refuse and Recyclables Collection and Loading Areas, which include specifications for recyclable storage space, location and access, signage, protection and security, compatibility, and overall compliance with federal, state, and local laws.	Less than Significant

ES.5 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

Section 15123(b) (2) of the CEQA Guidelines requires that areas of controversy known to the lead agency must be stated in the EIR summary. Issues of interest to the public and public agencies were identified during the 50-day public comment period of the Initial Study and NOP, which began on November 19, 2018 and concluded on January 7, 2019 A Scoping Meeting was held on December 3, 2018. Discussion at the December 3, 2018 Scoping Meeting included concerns regarding hazards to air flight, traffic and truck traffic, air emissions, and the Project's proximity to the March ARB. None of the comments received change the issue areas that the Initial Study determined would be discussed in the EIR. All of the issues and concerns raised in the comments have been fully addressed and analyzed in this EIR.

Written comments in response to the NOP were received from the following agencies and organizations:

- Southern California Association of Governments
- Western Municipal Water District

The Initial Study, NOP, distribution list, scoping meeting comment cards, and comment letters received during the NOP review period are included in Appendix A of this EIR.

Section 15123(b)(3) of the CEQA Guidelines requires that an EIR identify issues to be resolved; this includes the choice among alternatives and whether or how to mitigate significant impacts. The major issues to be resolved for the Project include decisions by March JPA as to whether this EIR adequately describes the potential environmental impacts of the Project, whether the recommended mitigation measures should be adopted or modified, whether additional mitigation measures need to be applied, whether the Project should or should not be approved as proposed, and/or whether the Project should be modified based on the alternatives considered in this EIR.

ES.6 SUMMARY OF PROJECT ALTERNATIVES

Section 15126.6 of the CEQA Guidelines identifies the parameters within which consideration and discussion of alternatives to the Project should occur. As stated in this section of the guidelines, alternatives must focus on those that are reasonably feasible and that attain most of the basic objectives of the Project. Each alternative should be capable of avoiding or substantially lessening any significant effects of the Project. The rationale for selecting the alternatives to be evaluated and a discussion of the No Project Alternative are also required, per Section 15126.6.

ES.6.1 Alternatives Evaluated

This EIR includes an evaluation of the following alternatives:

- Alternative 1 – No Project

- Alternative 2 – General Warehouse
- Alternative 3 – High-Cube Short-Term Storage Warehouse
- Alternative 4 – High-Cube Parcel Hub Warehouse

ES.6.1.1 Alternative 1 – No Project

Under Alternative 1, development of the Project would not occur as discussed in Chapter 2 of this EIR. The Project site would remain unchanged, and no development activity would occur. As a result, the proposed General Plan Amendment, Zoning Designation, Master Plot Plan, Tentative Tract Map, and all other applicable pending approvals associated with the Project would not be necessary, as no new development would occur on the Project site that would trigger such actions.

ES.6.1.2 Alternative 2 – General Warehouse

Under Alternative 2 – General Warehouse, the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment e-commerce Center, which is characterized by a significant storage function and direct distribution of e-commerce product to end uses, the building on the K4 Parcel would operate as a general warehouse. As a general warehouse, Alternative 2 would be primarily devoted to the storage of materials with minimal space devoted to office and maintenance areas. Alternative 2 would also require a General Plan Amendment, Zoning Designation, Master Plot Plan, Tentative Tract Map, and all other discretionary action included in Section ES.3.4, Discretionary Actions. Under Alternative 2, improvements to the Cactus Channel would also be completed.

ES.6.1.3 Alternative 3 – High-Cube Short-Term Storage Warehouse

Under Alternative 3 – High-Cube Short-Term Storage Warehouse, the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end uses, the building on the K4 Parcel would operate as a high-cube warehouse (HCW) building. A HCW is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly efficient processing of goods through the HCW. The HCWs included in this land use include transload and short-term facilities. Transload facilities have a primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. They typically have little storage duration, high throughput, and are high-efficiency facilities. Short-term HCWs are high-efficiency distribution facilities often with custom/special features built into structure for movement of large volumes of freight with only short-term storage of products. Alternative 3 would also require a General Plan

Amendment, Zoning Designation, Master Plot Plan, Tentative Tract Map, and all other discretionary action included in Section ES.3.4. Under Alternative 3, improvements to the Cactus Channel would also be completed.

ES.6.1.4 Alternative 4 – High-Cube Parcel Hub Warehouse

Under Alternative 4 – High-Cube Parcel Hub Warehouse, the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end uses, the building on the K4 Parcel would operate as a high-cube parcel hub warehouse. A high-cube parcel hub warehouse typically serves as a regional and local freight forwarder facility for time-sensitive shipments via airfreight and ground carriers. These sites also often include truck maintenance, wash and fueling facilities. Alternative 4 would also require a General Plan Amendment, Zoning Designation, Master Plot Plan, Tentative Tract Map, and all other discretionary action included in Section ES.3.4. Under Alternative 4, improvements to the Cactus Channel would also be completed.

ES.6.2 Environmentally Superior Alternative

Table ES-2, Comparison of Impacts of the Alternatives, provides a summary of the alternatives impact analysis considered in this EIR and identifies the areas of potential environmental effects per CEQA, and ranks each alternative as better, the same, or worse than the Project with respect to each issue area.

Table ES-2
Comparison of Project Alternatives Impacts

Environmental Issue Area	Proposed Project	Alternative 1 No Project	Alternative 2 General Warehouse	Alternative 3 High-Cube Short-Term Storage Warehouse	Alternative 4 High-Cube Parcel Hub Warehouse
Aesthetics	**LTS**	▼	—	—	—
Air Quality	**SU**	▼	▼	▼	▲
Biological Resources	**LTS-MM**	▼	—	—	—
Cultural Resources	**LTS-MM**	▼	—	—	—
Geology and Soils	**LTS**	▼	—	—	—
Greenhouse Gas Emissions	**LTS**	▼	—	—	—
Hazards and Hazardous Materials	**LTS-MM**	▼	—	—	—
Hydrology and Water Quality	**LTS**	▼	—	—	—
Land Use and Planning	**LTS-MM**	▼	—	—	—
Noise	**LTS**	▼	—	—	—

Table ES-2
Comparison of Project Alternatives Impacts

Environmental Issue Area	Proposed Project	Alternative 1 No Project	Alternative 2 General Warehouse	Alternative 3 High-Cube Short-Term Storage Warehouse	Alternative 4 High-Cube Parcel Hub Warehouse
Transportation	**SU**	▼	▼	▼	▼
Tribal Cultural Resources	**LTS-MM**	▼	—	—	—
Utilities and Service Systems	**LTS**	▼	—	—	—
Energy Conservation	**LTS**	▼	—	—	—
Meets Project Objectives?	**Yes**	**No**	**Yes**	**Yes**	**Yes**

— Alternative is likely to result in similar impacts to issue when compared to Project.
▼ Alternative is likely to result in reduced impacts to issue when compared to Project.
▲ Alternative is likely to result in greater impacts to issue when compared to Project.
LTS = less than significant impact; LTS-MM = less than significant impact with mitigation; SU = significant, unavoidable impact.

As indicated in Table ES-2, Alternative 1, the No Project Alternative would result in the fewest environmental impacts, and based on this would be considered the environmentally superior alternative. However, Section 15126.6(e)(2) of the CEQA Guidelines states that if the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

Of the alternatives evaluated above, Alternative 3 was found to be environmentally superior over the Project because it had the most reductions in impacts from the Project. Alternative 3 was found to have fewer air quality impacts and fewer overall vehicle trips. For the remaining environmental impact areas, Alternative 3 would result in the same impacts as the proposed Project. However, as with the proposed Project, identified significant and unavoidable impacts associated air quality, greenhouse gas emissions, and transportation impacts would remain under Alternative 3.

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K4 Warehouse and Cactus Channel Improvements Project
Environmental Impact Report

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CHAPTER 1
INTRODUCTION

1.1 PURPOSE AND SCOPE

The purpose of this Environmental Impact Report (EIR) is to evaluate and disclose the potential environmental consequences of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). The proposed Project constitutes a "project" as defined in the California Environmental Quality Act (CEQA) Guidelines Section 15378. The March Joint Powers Authority (JPA) is the lead agency preparing this EIR in accordance with the CEQA statutes (California Public Resources Code, Section 21000 et seq.) and the March JPA's 2016 Local CEQA Guidelines.

The Project consists of a proposed warehouse building on the K4 Parcel, an approximately 35.4-acre site located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California (Figure 1-1, Project Location). Interstate 215 is located approximately 0.8 miles east of the K4 Parcel. The K4 Parcel is comprised of five parcels, which would be consolidated into one, designated as Assessor's Parcel Numbers 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The latitude and longitude of the approximate center of the K4 Parcel is 33°54′32.14″ North and 117°15′47.05″ West. The K4 Parcel sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.

Additionally, the Project includes regional improvements to the Cactus Avenue Channel proposed by Riverside County Flood Control and Water Conservation District as part of the district's master Plan, which would convert the existing Cactus Avenue Drainage Channel (Cactus Channel) drainage ditch into a box culvert. The Cactus Channel portion of the Project is located along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel (Channel Improvement Site). The portion of the Cactus Channel that would be improved as part of the proposed Project runs a total of 7,900 linear feet. The K4 Parcel and Cactus Channel are located outside of but adjacent to, and westerly of, the existing March Business Center and Meridian Specific Plan area but within the jurisdiction of the March JPA.

To facilitate Project approval, the following would be required:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing

Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.

- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000 square foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

1.2 COMPLIANCE WITH CEQA

1.2.1 Format

This chapter of this EIR sets forth the summary requirements of CEQA as required by Section 15123 of the CEQA Guidelines. Chapter 2, Project Description, also complies with CEQA project description requirements by discussing the Project location (Section 2.1), providing a statement of the document's purpose and intended use (Section ES.3.1, Background), and identifying the Project objectives (Section ES.3.2).

Issues identified in the Initial Study prepared for the Project by the March JPA that were found to have no impact or a less than significant impact are provided in Appendix A, Initial Study and Notice of Preparation, of this document. This EIR has been formatted to address the issues found to be potentially significant in the Initial Study. For the issue areas found to be potentially significant in the Initial Study, there is a corresponding EIR section. Each EIR section includes an existing setting discussion that describes the physical environmental conditions within the Project area, as they existed at the time the Notice of Preparation (NOP) was prepared, in November 2018, and that are considered the baseline physical condition from which the March JPA determines whether an impact is considered to be significant (14 CCR 15125(a)). Section 15125(d) of the CEQA Guidelines requires that an EIR "discuss any inconsistencies between the project and applicable general plans and regional plans," which will be addressed in Section 4.9, Land Use and Planning. Each EIR section identifies thresholds of significance as well as includes an analysis to determine the amount and degree of impact relative to each significance threshold that is associated with the Project. For all significant environmental impacts, mitigation measures, where feasible, are required in order to reduce the impacts to a less-than-significant level.

The analysis of impacts and identification of mitigation measures are derived from technical reports that are included as technical appendices to this EIR and from other informational resources as listed at the end, in the references subsection, within each section of this document.

1.2.2 Environmental Procedures

The basic purposes of CEQA are the following:

1. Inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities;
2. Identify the ways that environmental damage can be avoided or significantly reduced;
3. Prevent significant, avoidable damage to the environment by requiring changes in the project through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
4. Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved (14 CCR 15002).

The EIR process typically consists of three parts: (1) the NOP (including the Initial Study), (2) the Draft EIR, and (3) the Final EIR. Pursuant to Section 15063 of the CEQA Guidelines, the March JPA prepared an Initial Study (Environmental Checklist) for the Project in order to determine if the Project would have a significant effect on the environment. The NOP was intended to encourage interagency communication concerning the proposed action and provide sufficient background information about the proposed action so that agencies, organizations, and individuals could respond with specific comments and questions on the scope and content of the EIR. Based upon the analysis contained in the Initial Study/NOP, the March JPA concluded that an EIR should be prepared. The NOP for the EIR and a description of potential adverse impacts were distributed to the State Clearinghouse, responsible agencies, and other interested parties on November 19, 2018. Pursuant to Section 15082 of the CEQA Guidelines, recipients of the NOP were requested to provide responses within 50 days after their receipt of the NOP. During the 50-day public review period of the NOP, March JPA held a Scoping Meeting on December 3, 2018, to gather additional public input on the Project. Copies of the NOP (including the Initial Study) and the NOP distribution list are provided in Appendix A. All comments received during the NOP public notice period were considered during the preparation of this EIR. Written comments received on the NOP are included in Appendix A of this EIR.

Based on the scope of analysis for this EIR, including comments received during the NOP public scoping period, the following issues were determined to be potentially significant and are therefore addressed in Chapter 4, Environmental Impact Analysis, of this document:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality

- Land Use and Planning
- Noise
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Energy

Other potential environmental impact areas, such as agriculture and forestry resources, mineral resources, population and housing, public services, recreation, and wildfire were not found to be significant based on the results of the Initial Study. These issues are addressed in Chapter 3, Effects Found Not to Be Significant, of this EIR.

As the lead agency for the Project, the March JPA has assumed responsibility for preparing this EIR. The decision to consider the Project is within the purview of the March Joint Powers Commission. The March JPA will use the information included in this EIR to consider potential impacts to the physical environment associated with the Project when considering approval of the Project. As set forth in Section 15021 of the CEQA Guidelines, the March JPA, as lead agency, has the duty to avoid or minimize environmental damage where feasible. Furthermore, Section 15021(d) states that:

> CEQA recognizes that in determining whether and how a Project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian. An agency shall prepare a statement of overriding considerations as described in Section 15093 to reflect the ultimate balancing of competing public objectives when the agency decides to approve a Project that will cause one or more significant effects on the environment (14 CCR 15021(d)).

In accordance with CEQA, the lead agency will be required to make findings for each environmental impact of the Project that cannot be mitigated to a less-than-significant level. If the lead agency determines that the benefits of the Project outweigh unmitigated, significant environmental effects, the agency will be required to adopt a statement of overriding considerations stating the reasons supporting their action notwithstanding the Project's significant environmental effects.

The EIR will be made available for review to agencies and the public for 45 days to provide comments on the "sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the Project might be avoided or mitigated" (14 CCR 15204).

1.2.3 Incorporation by Reference

Information provided in (1) the General Plan of the March Joint Powers Authority (March JPA 1999a), (2) Master Environmental Impact Report for the March Joint Powers Authority (March JPA 1999b), (3) Air Installation Compatible Use Zone Study for March Air Reserve Base (ARB) (March ARB 2005), (4) March ARB/Inland Port Airport Land Use Compatibility Plan (Mead & Hunt 2014) and other references, were reviewed in order to assist environmental review of the Project.

The March JPA's General Plan describes plans for development on the site and evaluates the environmental effects of the land uses proposed in the General Plan for the site. Accordingly, these documents are incorporated by reference (14 CCR 15150). These documents are available for review at the March JPA, 23555 Meyer Drive, Riverside, California 92518, as well as on the March JPA's website at www.marchjpa.com.

1.2.4 NOP Comment Letters and Scoping Meeting

The NOP for the Project was published on November 19, 2018, which will thus be the environmental baseline for the Project. Currently the site is flat land that is vacant and undeveloped. The public review period for the Initial Study/NOP began on November 19, 2018, and ended on January 7, 2019. A number of agencies and organizations commented on the Initial Study/NOP, and those comments can be found in Appendix A. During the 50-day public review period of the NOP, March JPA held a Scoping Meeting on December 3, 2018. Discussion at the December 3, 2018, Scoping Meeting included concerns regarding hazards to air flight, traffic and truck traffic, air emissions, and the Project's proximity to the March ARB. None of the comments received change the issue areas that the Initial Study determined would be discussed in the EIR. All of the issues and concerns raised in the comments have been fully addressed and analyzed in the EIR.

1.3 REFERENCES

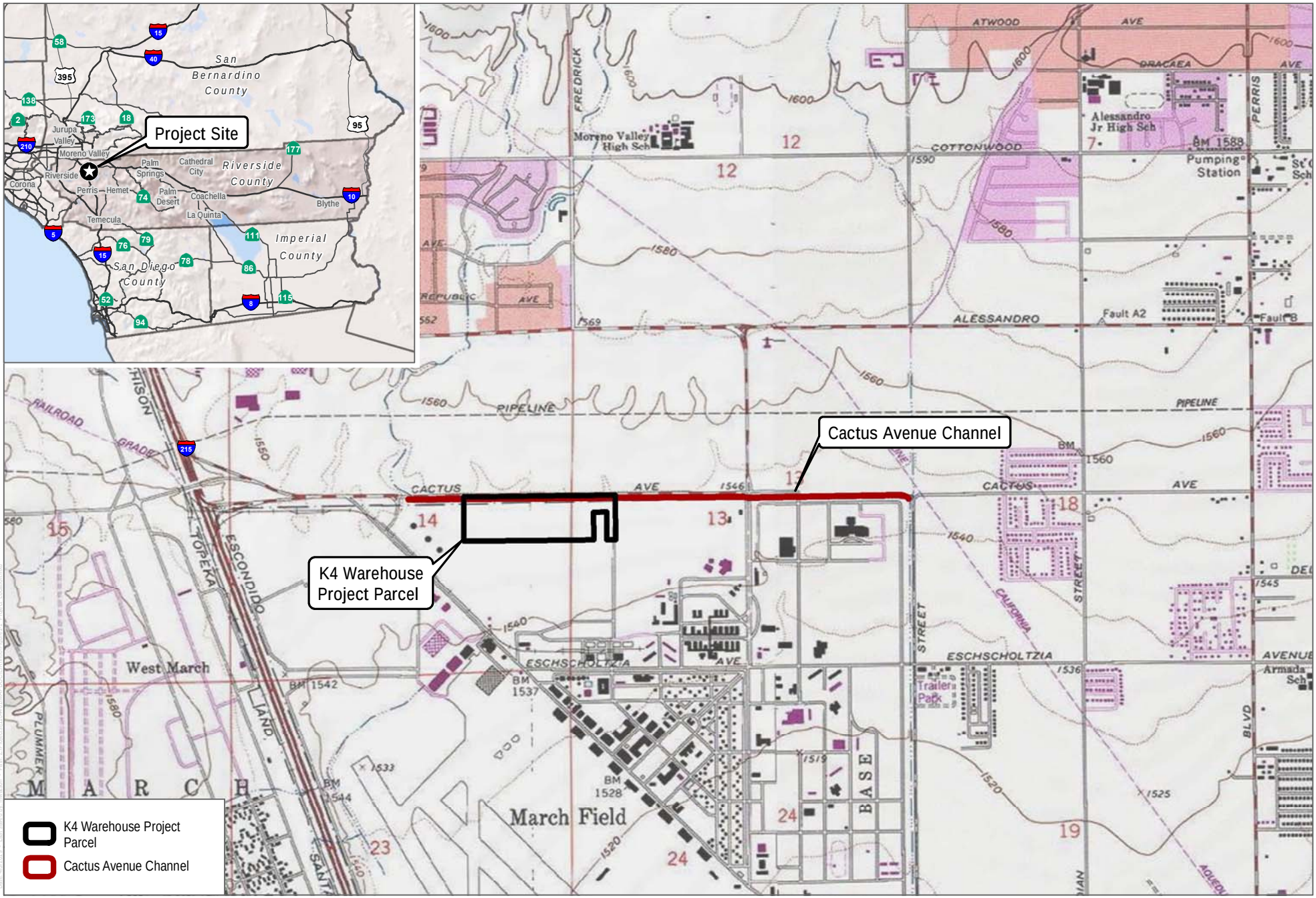
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SOURCE: USGS 7.5-Minute Series Riverside East Quadrangle

FIGURE 1-1

Project Location

K4 Warehouse and Cactus Channel Improvements Project EIR

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CHAPTER 2
PROJECT DESCRIPTION

This chapter describes the objectives of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) and Environmental Impact Report (EIR) and provides a detailed description of Project characteristics. This chapter also discusses the discretionary actions required and includes a brief description of the environmental effects, which are evaluated in Chapter 3, Effects Found Not to Be Significant, through Chapter 6, Cumulative Effects, of this EIR.

2.1 PROJECT LOCATION

The Project site, which collectively consists of the K4 Parcel and the Cactus Avenue Drainage Channel (Cactus Channel), is located on the south side of Cactus Avenue and immediately north of March Air Reserve Base (ARB). The approximately 35.4-acre warehouse site (K4 Parcel) is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The K4 Parcel is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location). Interstate 215 is located approximately 0.8 miles east of the K4 Parcel. The K4 Parcel is comprised of five parcels designated as Assessor's Parcel Numbers 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The latitude and longitude of the approximate center of the K4 Parcel is 33°54′32.14″ North and 117°15′47.05″ West. The K4 Parcel sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.

The Cactus Channel portion of the Project is located along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel (Channel Improvement Site). The portion of the Cactus Channel that would be improved as part of the proposed Project runs a total of 7,900 linear feet.

According to the March JPA General Plan Land Use Plan (March JPA 2012), the K4 Parcel's land use designation is Business Park, as shown in Figure 2-2, March JPA General Plan Land Use Designations. The K4 Parcel has not previously been given a zoning designation per the official March JPA Zoning Map, as shown in Figure 2-3, March JPA Zoning Designations.

2.2 PROJECT BACKGROUND

In 1993, the federal government mandated the realignment of March Air Force Base (AFB) and a substantial reduction in its military use. In April 1996, March AFB was re-designated an ARB. Approximately 4,400 acres of land that had historically supported March AFB was no longer needed

to support the ARB. The cities of Moreno Valley, Perris, and Riverside, and the County of Riverside formed the March JPA to oversee the dispensation and management of the surplus land. A General Plan and Master EIR were prepared and adopted/certified in 1999 for the JPA planning area, which includes the March ARB.

Concurrent with the U.S. Air Force's preparation of the Environmental Impact Statement (U.S. Air Force 1996), the March JPA and the March Joint Powers Redevelopment Agency prepared an EIR for the proposed March ARB Redevelopment Project (March Joint Powers Redevelopment Agency 1996). The Project evaluated in this EIR considered the development of approximately 7,250 acres. The area evaluated including 6,782 acres comprising the boundaries of March ARB, of which approximately 4,524 acres would fall under the authority of March JPA. The remaining 2,258 acres would remain under the control of the military. Additionally, 467 acres within the City of Moreno Valley were included in the EIR evaluation.

Upon approval by the federal government for the realignment of March ARB and the transfer of excess property from March ARB to March JPA, March JPA prepared a General Plan and certified a Master EIR for the General Plan in 1999 (SCH No. 97071095; March JPA 1999). The K4 Parcel was grouped in the Northeast Planning Subarea and assigned a land use designation of Business Park.

Meridian Park K4 LLC is now pursuing development of the K4 Parcel with an e-commerce warehouse. Additionally, the Project includes regional improvements to the Cactus Channel proposed by Riverside County Flood Control and Water Conservation District (District) as part of the District's Master Plan (Riverside County Flood and Water Conservation District 2015), which would convert the existing Cactus Channel drainage ditch into a box culvert. While the K4 Parcel was previously conceptually considered for development in the Disposal of Portions of March AFB Environmental Impact Statement, the March AFB Redevelopment Project EIR, and the Master EIR for March JPA, with a specific development plan identified, the analysis in this EIR addresses the proposed build-out of the K4 Parcel and associated Cactus Channel improvements.

2.3 PROJECT OBJECTIVES

The primary objectives of the Project include the following:

- Provide appropriate land use intensities to comply with the parameters of the March ARB/Inland Port Airport Compatibility Plan.
- Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel, specifically encouraging the development of industrial uses to expand the employment and financial base of the March JPA Planning Area in a manner that is compatible with the nearby airbase and adjacent industrial uses.

- Provide increased job opportunities for local residents through the provision of employment-generating businesses.
- Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.
- Develop the property with land uses that are compatible with the March AFB Reuse program.
- Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.
- Provide a range of job types for the community's residents.
- Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians and bicyclists.
- Minimize impacts from construction of the development to sensitive biological resources.
- Minimize water wildlife attractants, which are hazards to aircraft flights, associated with the naturalized open-air Cactus Channel drainage channel by undergrounding the drainage channel.

2.4 PROJECT CHARACTERISTICS

2.4.1 Project Overview

The proposed Project involves the development of the five parcels on the 35.4-acre K4 Parcel with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use, as shown in Figure 2-4, K4 Warehouse Site Plan. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day.

The proposed Project would also include improvements to the drainage channel within the Cactus Channel Improvement Site (Figure 2-5, Cactus Channel Overview). The drainage improvements are proposed to be an underground box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot-wide box to a 9-foot-wide double box (approximately 19 feet in width). The installation of the box culvert would require trenching through the existing swale behind the Cactus Avenue right-of-way. It is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale. The location of the channel course would remain in its

current location. This portion of the Project is being proposed by the District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the District and it would either be constructed contemporaneously with the Project or built separately depending on permitting and timing. The Cactus Channel would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan. The installation of the box culvert would require trenching through the existing swale behind the Cactus Avenue right-of-way.

2.4.2 Project Construction

Construction of the proposed warehouse would occur over a 12-month period of time, commencing in quarter 1 of 2020 and completing in quarter 1 of 2021. Generally, warehouse construction would include site grading, utility relocation/installation, and building construction. Rough grading and utility installation would last approximately 25 days, and building construction, including pad/site-specific grading activities, would occur over approximately 11 months. Heavy equipment to be used on site during construction would include flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks, and bobcats. Heavy equipment would be delivered and removed from the site throughout the construction phase. As most heavy equipment is typically not authorized to be driven on a public roadway, most of the equipment would be delivered and removed from the site via large flatbed trucks. It is anticipated that delivery of heavy equipment would not occur on a daily basis, but rather periodically throughout the construction phase based on need. During summer months, concrete pours for the warehouse could begin as early as 3:00 a.m.; during the remainder of the year, concrete pours would occur after 4:00 a.m. All other deliveries would occur at any time during the day. Any early morning concrete pours would comply with existing noise limitations identified in March JPA Development Code Sections 9.10.140 and 9.10.030.

Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Channel Improvement Site. Construction of the Cactus Channel improvements would occur over an approximately 30-month period, commencing in quarter 4 of 2020 and completing in quarter 1 of 2023. Heavy equipment to be used on site during construction would include excavators, dozers, loaders, tractors, backhoes, and cranes. Heavy equipment would be delivered and removed from the site throughout the construction phase.

2.4.3 California Environmental Quality Act

The baseline for a project is typically the physical environmental condition that exists in the vicinity of a Project when the Notice of Preparation is published (14 CCR 15125(a)). The Notice of Preparation for the Project was published on November 19, 2018, which will thus be the

environmental baseline for the Project. Currently the K4 Parcel is flat land that is vacant and undeveloped and the Cactus Channel is an earthen ditch with drainage flowing from west to east.

2.4.4 Project Operations

The proposed warehouse building would include a total of 105 loading dock positions for trucks. Vehicles would access the warehouse site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day.

Placement of the Cactus Channel in a box culvert as part of the District's Master Plan would not affect channel flows upon completion of construction. Flows would continue to the east, where the channel would connect with the Heacock Channel and turn south.

2.4.5 Requested Approvals and Entitlements

To facilitate Project approval, the following would be required:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

2.5 DISCRETIONARY ACTIONS

The following additional permits, approvals and discretionary actions may be necessary as part of Project approval.

a. U.S. Army Corps of Engineers – A Jurisdictional Determination will be required to identify and locate the boundaries of jurisdictional waters of the United States on the Project site,

and if found, will be regulated by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act.

b. State Water Resources Control Board (SWRCB) – A National Pollutant Discharge Elimination System Construction General Permit will need to be obtained from the SWRCB. Permit registration documents include a Storm Water Pollution Prevention Plan.

c. SWRCB – A National Pollutant Discharge Elimination System Industrial General Permit may need to be obtained from the SWRCB, depending on the type of facility ultimately built, consistent with the requested General Plan land use designations of Industrial.

d. Regional Water Quality Control Board, Santa Ana Region – 401 Water Quality Certification – A Waste Discharge Requirement Permit will need to be obtained from the Regional Water Quality Control Board.

e. South Coast Air Quality Management District – A Dust Control Plan will need to be approved by the South Coast Air Quality Management District.

f. Federal Aviation Administration – A Form 7460-1 will need to be approved by the Federal Aviation Administration.

g. Riverside County Airport Land Use Commission – A consistency finding with Riverside County Land Use Plan will be required by Riverside County Airport Land Use Commission.

2.6 REFERENCES

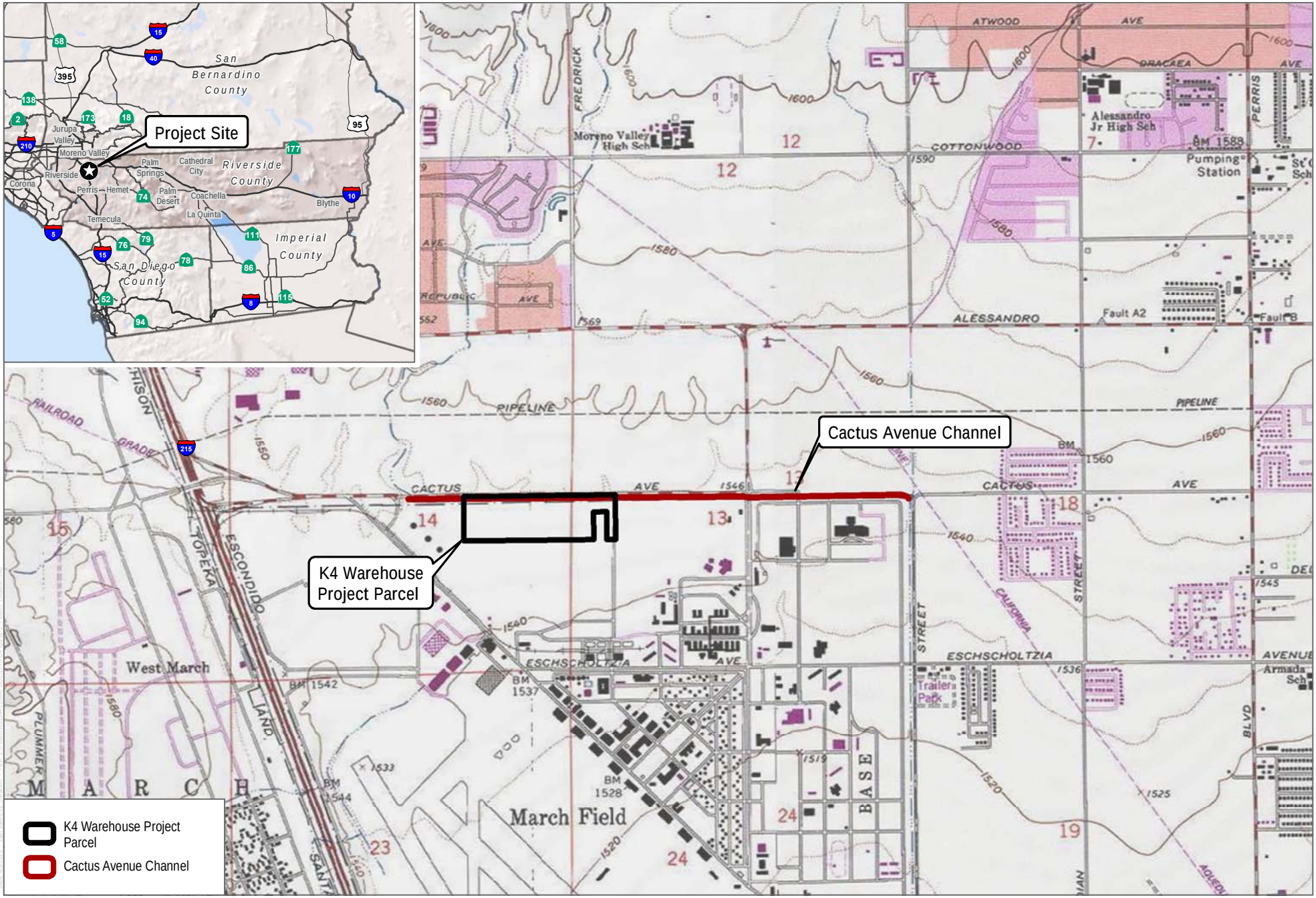
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U.S. Air Force. 1996. *Final Environmental Impact Statement, Disposal of Portions of March Air Force Base, California*. February 1996.



SOURCE: USGS 7.5-Minute Series Riverside East Quadrangle

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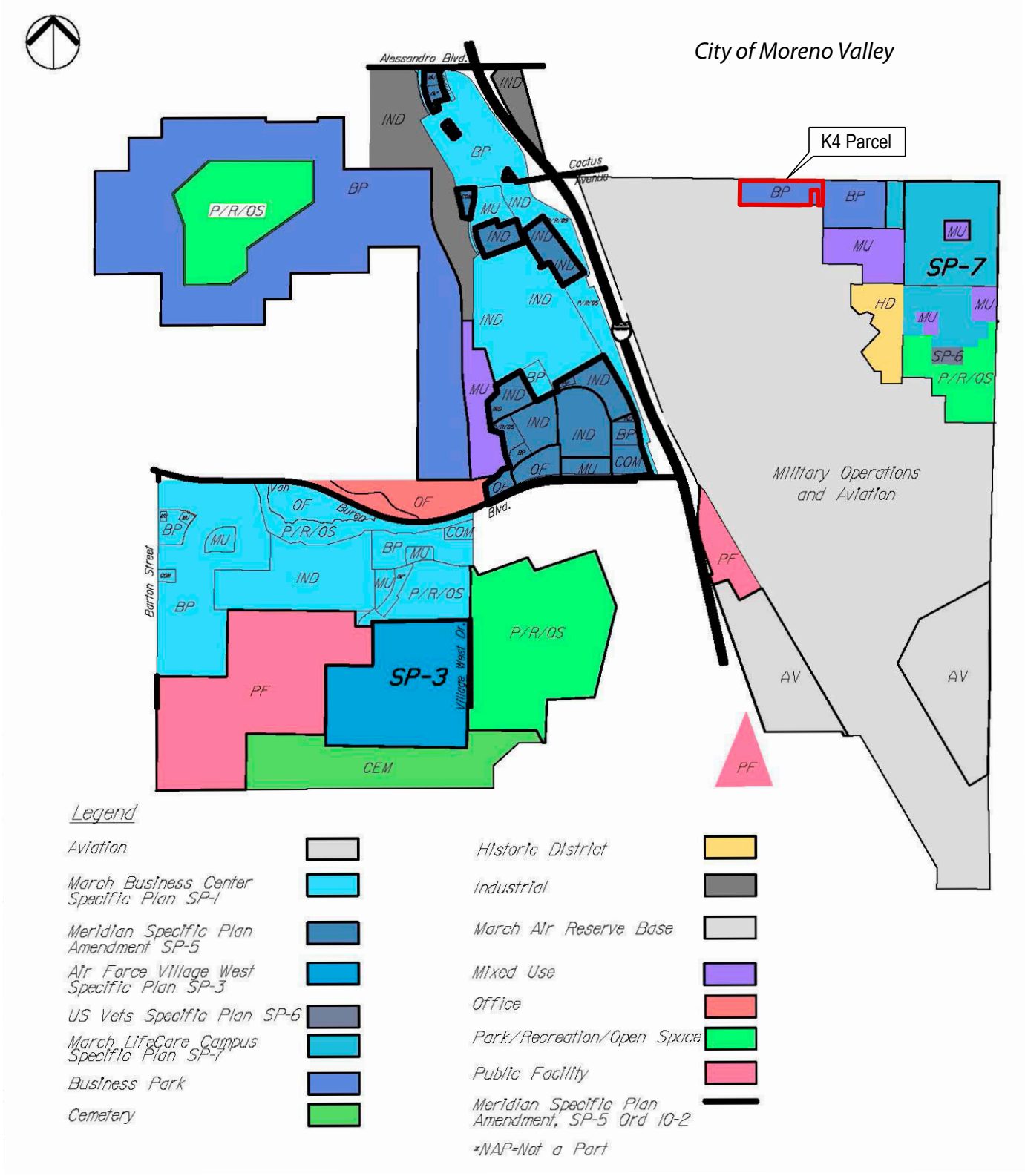
0 1,000 2,000 Feet

FIGURE 2-1

Project Location

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: March Joint Powers Authority (2017-10-06)

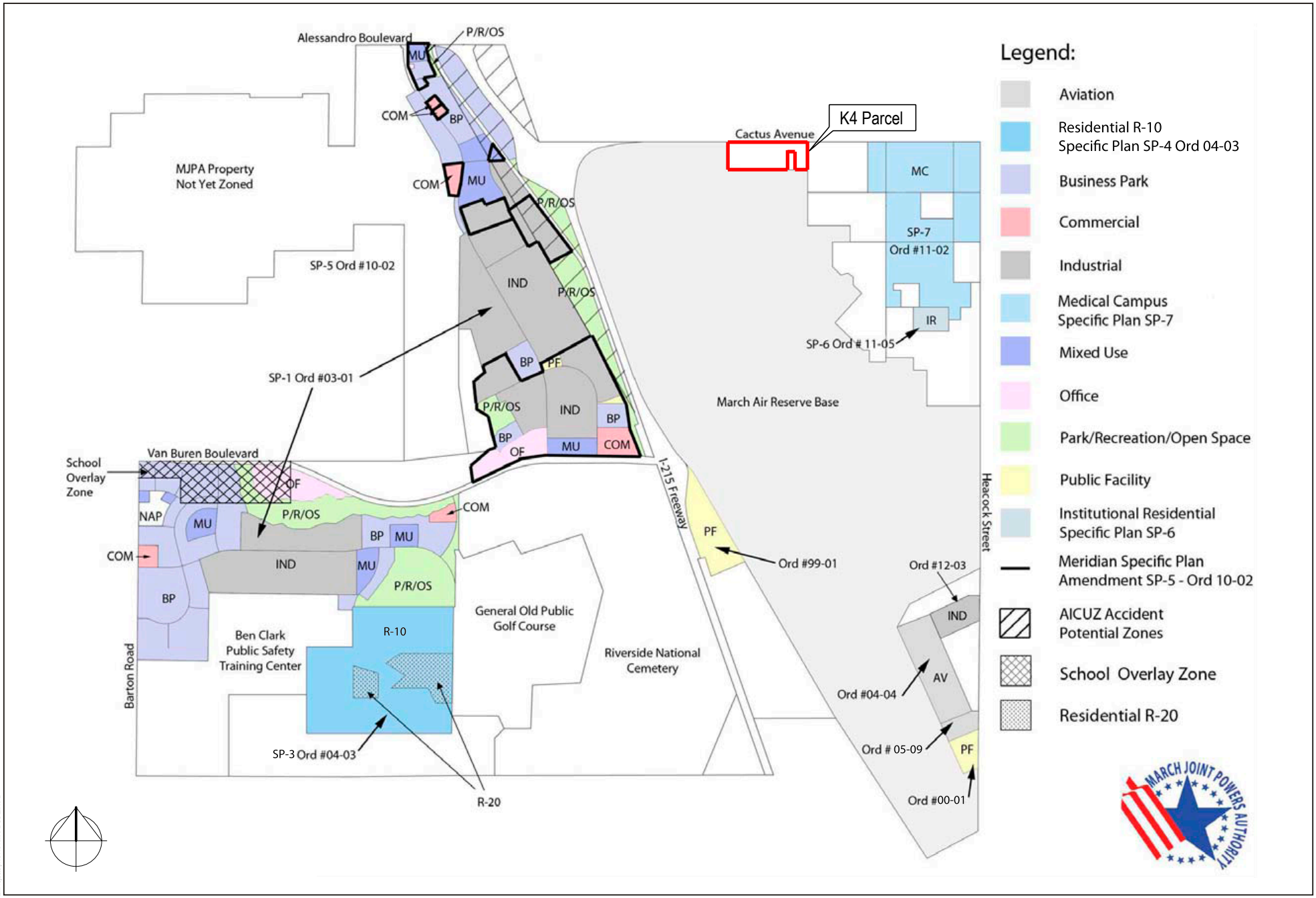
FIGURE 2-2

March JPA General Plan Land Use Designations

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: March Joint Powers Authority (2014-03-24)

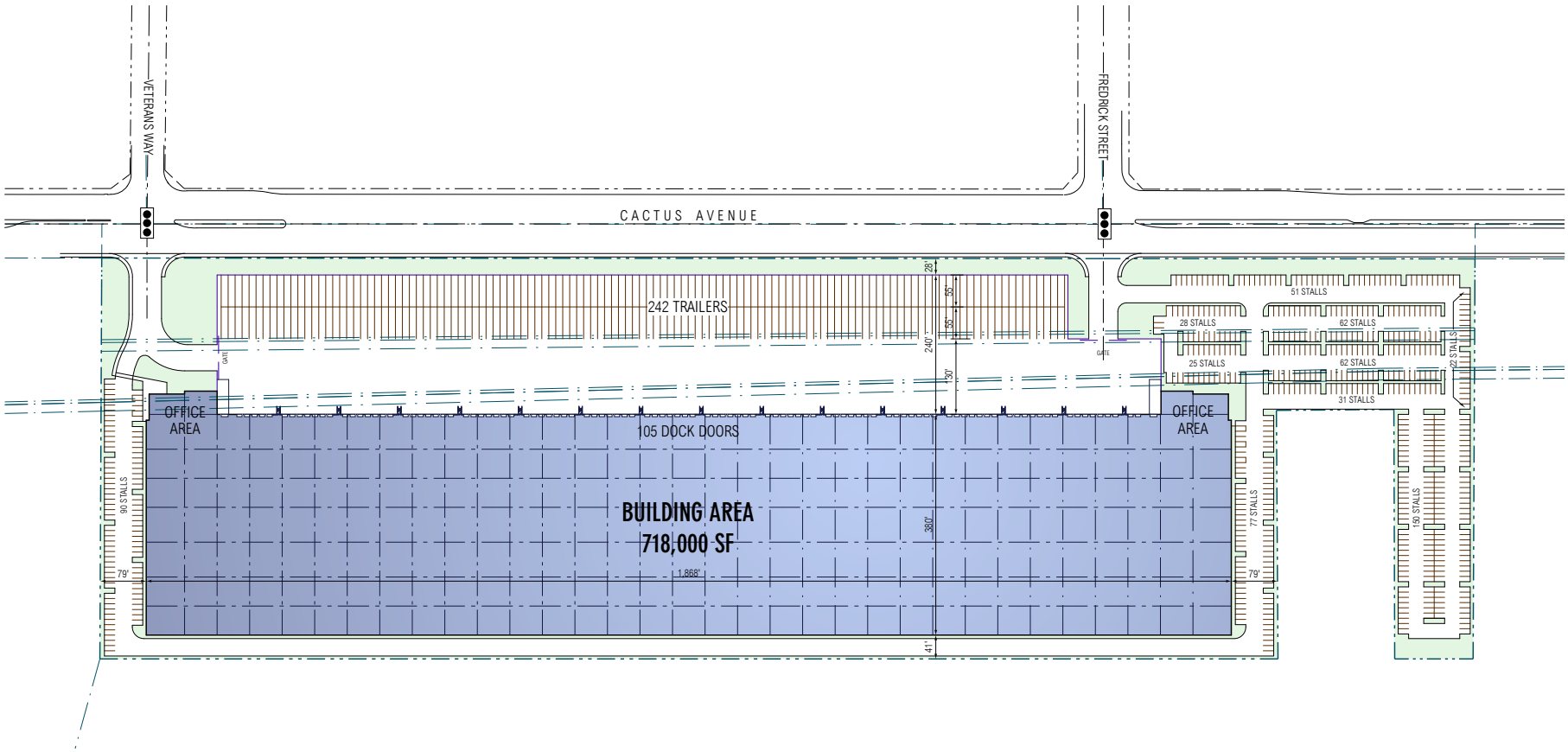
FIGURE 2-3

March JPA Zoning Designations

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: RGA 2018

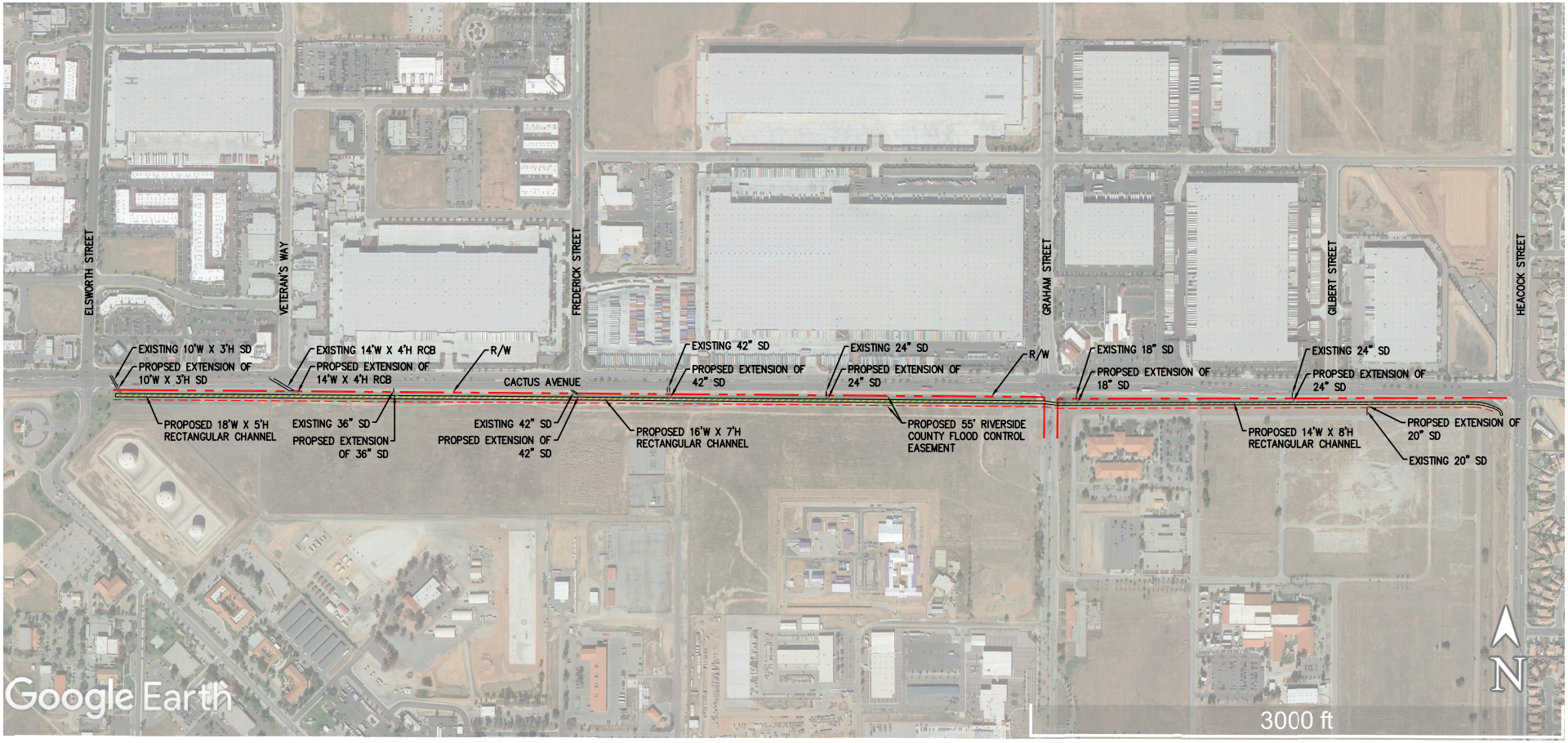
FIGURE 2-4

K4 Warehouse Site Plan

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: DRC Engineering 2018

FIGURE 2-5

Cactus Channel Overview

K4 Warehouse and Cactus Channel Improvements Project EIR

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CHAPTER 3
EFFECTS FOUND NOT TO BE SIGNIFICANT

3.1 EFFECTS FOUND NOT TO BE SIGNIFICANT DURING PREPARATION OF THE INITIAL STUDY/NOTICE OF PREPARATION

The California Environmental Quality Act provides that an environmental impact report (EIR) shall focus on the significant effects on the environment, discussing the effects with emphasis in proportion to their severity and probability of occurrence. Effects dismissed in an Initial Study (Environmental Checklist) as clearly insignificant and unlikely to occur need not be discussed further in the EIR unless information inconsistent with the finding in the Initial Study is subsequently received.

Section 21100 (c) of the Public Resources Code states that an EIR shall contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and were, therefore, not discussed in detail in the EIR (California Public Resources Code, Section 21000 et seq.). Section 15128 of the California Environmental Quality Act Guidelines adds, "Such a statement may be contained in an attached copy of an Initial Study" (14 CCR 15000 et seq.).

The Initial Study prepared and circulated with the Notice of Preparation (both provided in Appendix A, Initial Study and Notice of Preparation) for public review on November 19, 2018, for the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) concluded that the Project would not result in significant impacts to the following areas:

- **Agricultural Resources –** The K4 Parcel and Channel Improvement Site are located in an area designated as Urban and Built-Up Land, not Prime Farmland, Unique Farmland, or Farmland of Statewide Importance by the California Department of Conservation Farmland Mapping and Monitoring Program (DOC 2016). Additionally, the Project site is not utilized for agricultural purposes. As such, the proposed Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The proposed Project site is not zoned for forest land, timberland, or within a designated Timberland Production area and is instead zoned for Business Park and proposed as Industrial use. As such, the proposed Project would not conflict with zoning of forest land, timberland, or timberland production.
- **Mineral Resources** – The K4 Parcel and Channel Improvement Site lie within Mineral Resource Zone 3 as depicted on Figure OS-6 of the Riverside County General Plan (County of Riverside 2015), indicating areas where the available geologic information suggests that mineral deposits are likely to exist, but where the significance of the deposit is undetermined.

Based on the Mineral Resource Zone 3 designation and given that the site is surrounded by existing development (e.g., industrial development immediately to the east), the proposed Project is not likely to result in the loss of a known mineral resource. Additionally, implementation of industrial warehouse buildings with aboveground facilities would not compromise the potential future identification and use of mineral resources found on the K4 Parcel or the Channel Improvement Site. The K4 Parcel's land use designation is Business Park and is proposed as Industrial under the Project. These land use designations do not allow for mining activities (March JPA 2016). Additionally, the K4 Parcel and the Channel Improvement Site are surrounded by commercial, industrial and military land uses in the local vicinity that would be incompatible with a mining operation. Therefore, the proposed Project would not result in the loss of availability of a locally important mineral resource recovery site. Therefore, impacts to known mineral resources would be less than significant.

- **Population/Housing –** The proposed Project involves the development of a new industrial warehouse and associated infrastructure, and regional improvements to the Cactus Avenue Drainage Channel (Cactus Channel) proposed by Riverside County Flood Control and Water Conservation District (District) as part of the District's Master Plan (Riverside County Flood Control and Water Conservation District 2015), which would convert the existing Cactus Channel drainage ditch into a box culvert. The Project would not induce substantial population growth in the area, as no housing is proposed. The majority of the surrounding properties are already developed, planned to be developed, or designated as Military Operations and Aviation under the March Joint Powers Authority (JPA) General Plan. Additionally, implementation of the proposed Project would not require installation of new roadways, public services, or utilities; the site is currently served by existing roadways, utilities, and services, and these services would be maintained as part of the proposed Project. The proposed Cactus Channel improvements and detention basins on site would increase the existing stormwater capacity of the Project site. However, the proposed improvements to stormwater drainage facilities are designed to only control peak flows of the proposed Project. Therefore, the proposed Cactus Channel improvements and detention basins would not induce substantial unplanned population growth. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. Approximately 900 new jobs would be generated by the Project. The proposed industrial development would bring an additional 900 employees, which would be less than 1% of the total employment in the Southern California Association of Governments' Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the Southern California Association of Governments' Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, it is anticipated that these new jobs could be filled by the existing residential population in

the greater Riverside County area. Minor infrastructure improvements would involve the improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, and connections to existing utilities serving areas surrounding the Project site. Based on the above, no adverse impacts related to population growth would result from the Project; impacts would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

The K4 Parcel and Channel Improvement Site do not currently support any housing; therefore, substantial numbers of existing housing or people would not be displaced and the construction of replacement housing would not be necessary as a result of the proposed Project.

- **Public Services –** The Project would be served by the Riverside County Fire Department. As part of standard development practices, prior to construction, Project plans would be reviewed by the Riverside County Fire Department, and the Project would be required to incorporate the Riverside County Fire Department's recommendations into the final Project design. The Project is subject to the payment of a development impact fee related to fire protection. The proposed Project would comply with applicable fire codes, would be consistent with the land use types and activities envisioned, and would pay the required development impact fees; therefore, the Project would not result in the need for new or expanded fire protection facilities, and impacts would be less than significant.

  The Project would be served by the Riverside County Sheriff's Department. Project implementation could result in additional enforcement calls and emergency responses to this location but is not anticipated to increase the overall demand for law enforcement personnel and services in the Project area such that new or improved facilities would be required. With payment of fees, impacts to police protection services as a result of Project implementation would be less than significant.

  As stated under Population/Housing, above, the increase in employment from the Project would be minimal in comparison to the anticipated increase of the Southern California Association of Governments' Growth Forecast. The Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. As such, the proposed Project would not generate substantial population growth, thus there would be no substantial impact to schools, parks, libraries and other public facilities.

- **Recreation –** The proposed Project involves the development of a warehouse building and regional improvements to the Cactus Channel proposed by the District as part of the District's Master Plan, which would convert the existing Cactus Channel drainage ditch into a box culvert. No housing is being proposed with this Project; therefore, the Project would not generate substantial population growth. The proposed Project would not increase the use of existing parks or recreational facilities, and thus no deterioration of existing facilities would

occur. There would not be an increase in use of the parks and recreational facilities from this Project, and thus no deterioration of existing facilities. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. The proposed Project would generate a maximum number of 900 jobs during operations. It is anticipated that these new jobs would be filled by the existing residential population in the greater Riverside County area. Therefore, the proposed Project would not require the construction or expansion of recreational facilities, and impacts would be less than significant. Additionally, March JPA is implementing a parks and open space development impact fee on future development which would require payment of a parks fee for non-residential projects. As such, with payment of fees on a fair share basis, the Project would not result in significant impacts to parkland or recreational facilities.

- **Wildfire –** Topographically, the K4 Parcel and Cactus Channel Improvement Site are relatively flat, draining gently in a southeastern direction. The K4 Parcel is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. Threat from wildfire hazards is determined based on a number of factors, including fuel loading (vegetation); topography; climatic conditions, such as wind, humidity, and temperature; and the proximity of structures and urban development to fire hazards. Wildland fire hazards are most pronounced in wildland-urban interface areas, or where urban development is located close to open space areas where vegetation can serve as fuel. Generally, the periods of greatest risk for wildland fire are the late summer and early fall when vegetation is at its driest. Human activity, including residential and agricultural burning, campfires, and the use of fireworks can all trigger fires. Natural causes such as lightning strikes may also start fires.

  The California Department of Forestry and Fire Protection has mapped fire threat potential throughout California. The California Department of Forestry and Fire Protection ranks fire threat based on the availability of fuel and the likelihood of an area burning (based on topography, fire history, and climate). The Project site is designated as a Federal Responsible Area and not near any state responsible areas or area classified as very high fire hazard severity zones. The majority of the Project is located within previously graded vacant land. Furthermore, implementation of existing policies and regulations included in The March JPA Development Code Section 9.10.070 Fire and Explosive Hazards, as well as policies within the Uniform Fire Code would serve to reduce the availability of fuels to limit the spread of potential wildfires. Construction and operation/maintenance of the Project would be in compliance with the goals, policies, and implementation measures and codes of the California Fire Code and Riverside County Fire Protection Planning Customer Building Matrix Guidelines. Additionally, Project plans will be submitted for review by the Riverside County Fire Department Office of the Fire Marshall.

3.2 EFFECTS FOUND NOT TO BE SIGNIFICANT AS PART OF THE EIR PROCESS

Based on the analysis provided herein, the following areas were found to not have significant impacts:

- Aesthetics
- Geology and soils
- Greenhouse gas emissions
- Hydrology and water quality
- Noise
- Utilities and services systems
- Energy

3.3 EFFECTS FOUND TO BE LESS THAN SIGNIFICANT WITH MITIGATION MEASURES INCORPORATED

Based on the analysis provided herein, the following areas were found to have less-than-significant impacts with the incorporation of mitigation measures:

- Biological resources
- Cultural and tribal cultural resources
- Geology and soils
- Hazards and hazardous materials
- Land use and planning

3.4 EFFECTS FOUND TO BE SIGNIFICANT EVEN WITH MITIGATION MEASURES INCORPORATED

Based on the analysis provided herein, the following areas were found to have potentially significant impacts even after feasible mitigation measures were incorporated:

- Air quality – emissions of oxides of nitrogen during construction
- Transportation

3.5 REFERENCES

County of Riverside. 2015. *Riverside County General Plan – Multipurpose Open Space Element.* https://planning.rctlma.org/Portals/14/genplan/general_Plan_2017/elements/OCT17/Ch05_MOSE_120815.pdf?ver=2017-10-11-102103-833.

DOC (California Department of Conservation). 2016. "California Department of Conservation Important Farmland Finder." https://maps.conservation.ca.gov/DLRP/CIFF/

March JPA. 2016. March Joint Powers Authority Development Code. Ord. #JPA 16-03. Adopted on July 13, 2016. https://marchjpa.com/documents/docs_forms/development_code_2016.pdf.

Riverside County Flood Control and Water Conservation District. Moreno Drainage Plan. Revised April 2015. http://rcflood.org/Downloads/Master%20Drainage%20Plans/Updated/Zone%204/Reports/MorenoMDP_report.pdf.

CHAPTER 4
ENVIRONMENTAL IMPACT ANALYSIS

The purpose of this Environmental Impact Report (EIR) is to evaluate the potential environmental effects of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). The March Joint Powers Authority (JPA) circulated a Notice of Preparation beginning on November 19, 2018, with the public review period ending on January 7, 2019. The Notice of Preparation was transmitted to the State Clearinghouse, responsible agencies, other affected agencies, and property owners immediately adjacent to and across the street from the Project site to solicit issues and concerns related to the Project. The Notice of Preparation, Initial Study, and comment letters are contained in Appendix A, Initial Study and Notice of Preparation, of this EIR.

Sections 4.1 through 4.14 of the EIR contain the potential environmental impacts analysis associated with implementation of the Project and focus on the following issues:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Energy

As noted in Section 3.1, Effects Found Not to be Significant During Preparation of the Initial Study/Notice of Preparation, of this EIR, other potential environmental impact areas, such as agriculture and forestry resources, mineral resources, population and housing, public services, and recreation, were not found to be significant based on the results of the Initial Study. These issues are addressed in Chapter 3, Effects Found Not to Be Significant, of this EIR.

Technical Studies

Technical studies were prepared in order to accurately analyze air quality/greenhouse gas emissions and health risk assessments, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, noise and vibration, transportation, and utilities and service systems impacts, and were used in the preparation of this EIR. These documents are identified in the discussions for the individual environmental issues and included as technical appendices on a CD attached to the EIR. Hard copies are available at the March JPA and will also be available on the March JPA website, www.marchjpa.com.

The Identification and Evaluation of Historic Properties K4 Parcel Project and the Identification and Evaluation of Historic Properties Cactus Avenue Drainage Channel Improvement Project, (Appendices G and H, respectively) contain information that shall not be disclosed or governed by public disclosure requirements of the California Public Records Act. Confidential information shall be kept on record with the March JPA.

Analysis Format

The EIR assesses how the Project would impact each of these issue areas. Each environmental issue addressed in this EIR is presented in terms of the following subsections:

- **Setting**: Provides information describing the existing setting on or surrounding the Project site that may be subject to change as a result of the implementation of the Project. This setting discussion describes the conditions that existed when the Notice of Preparation was sent to responsible agencies and the State Clearinghouse.
- **Relevant Regulations, Plans, Policies, and Ordinances**: Provides a discussion of federal, state, regional, and local regulations, plans, policies, and ordinances applicable to the Project.
- **Thresholds of Significance**: Provides criteria for determining the significance of Project impacts for each environmental issue.
- **Impact Analysis**: Provides a discussion of the characteristics of the Project that may have an effect on the environment, analyzes the nature and extent to which the Project is expected to change the existing environment, and indicates whether the Project impacts meet or exceed the levels of significance thresholds.
- **Mitigation Measures**: Identifies mitigation measures to reduce significant adverse impacts to the extent feasible.
- **Environmental Impacts After Mitigation Is Incorporated**: Provides a discussion of significant adverse environmental impacts that cannot be feasibly mitigated or avoided, significant adverse environmental impacts that can be feasibly mitigated or avoided, adverse environmental impacts that are not significant, and beneficial impacts.

4.1 AESTHETICS

This section describes the existing visual setting of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) site and vicinity, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. During the preparation of the Initial Study, which is included in Appendix A, Initial Study and Notice of Preparation, of this Environmental Impact Report (EIR), potential impacts related to the Project resulting in a substantial adverse effect on a scenic vista, or damage to scenic resources including trees, rock outcroppings, and historic buildings within a State Scenic Highway were found to be less than significant. Therefore, these impacts are not discussed in this EIR. For detailed discussions related to each of these topics, please refer to Appendix A.

The following resources were used in the preparation of this section of the EIR:

- March Joint Powers Authority (JPA) General Plan (March JPA 1999)
- March Joint Powers Authority Approving Amendments to the Development Code (March JPA 2016)

As mentioned in Chapter 2 of this EIR, the Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.1.1 Project Location

The Project site, which collectively consists of the K4 Parcel and the Cactus Avenue Drainage Channel (Cactus Channel), is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The Project site is generally rectangular in shape except for the

exclusion of an existing substation near the eastern end. The Project site is located within an urbanized area of Riverside County, east of Interstate 215, south of Cactus Avenue, and north of March Air Reserve Base (ARB). The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location). The K4 Parcel is comprised of five parcels designated as Assessor's Parcel Numbers 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The latitude and longitude of the approximate center of the site is 33°54′32.14″ North and 117°15′47.05″ West. The K4 Parcel sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, with a land use designation of Business Park, as shown in Figure 2-2, March JPA General Plan Land Use Designations.

The Cactus Channel portion of the Project is located along the south side of Cactus Avenue, extending from Elsworth Street on the west to Heacock Street and Heacock Channel on the west. The portion of the Cactus Channel that would be improved as part of the proposed Project runs a total of 7,900 linear feet.

Surrounding Land Uses

The Project is located in an urbanized area, surrounded by commercial, industrial, residential and federal uses. The Project vicinity is in proximity to the populous communities of Edgemont and Woodcrest, and cities of Moreno Valley and Riverside. Adjacent to the north of the proposed K4 Parcel, across Cactus Avenue, are commercial, office, and industrial uses. Beyond these initial uses to the north, are other office, commercial, and industrial uses within the City of Moreno Valley, such as the Riverside County Waste Management Department, and commercial concrete facility. To the east, the proposed K4 Parcel is bounded by vacant land and an electrical substation. Further east, is the March ARB which previously the March Air Force Base. To the south, the proposed K4 Parcel is bordered by March ARB including the March ARB runway. Lastly, to the west, the proposed K4 Parcel is bordered by a vacant lot and March ARB. Interstate 215 is approximately 0.7 miles west of the K4 Parcel, which intersects the March ARB. Further west is the City of Riverside, along with unincorporated areas of Riverside County.

The Cactus Channel portion of the proposed Project runs along the south side of Cactus Avenue, passing a variety of uses along the Cactus Avenue corridor, primarily consisting of March ARB, Industrial Warehouse, and commercial uses.

4.1.2 Existing Conditions

The EIR evaluates the existing visual character and quality, light and glare conditions. The existing conditions of these resource areas is discussed below.

4.1.2.1 Visual Character and Quality

The K4 Parcel is currently vacant and undeveloped, with exception to several power transmission lines and stockpiles of imported soil found in the eastern portion of the Project site. The approximately 35.4-acre K4 Parcel is characterized by relatively flat terrain crossed by a series of overhead utility lines running north–south, dirt access roads, and the Cactus Channel along the northern boundary of the site. The K4 Parcel primarily consists of upland vegetation communities dominated by disturbed goldenbush/non-native grassland and developed/disturbed land. Mount Russel is visible from the K4 Parcel when facing east, however, according to the March JPA General Plan, this view is not designated as a scenic vista (March JPA 1999; Exhibit 5-5). Additionally, according to the City of Moreno Valley General Plan Conservation Element, and the City of Riverside General Plan Open Space and Conservation Element, there is no designated scenic view or vista in the Project area (City of Moreno Valley 2006; City of Riverside 2012).

The Cactus Channel primarily contains small patches of riparian communities. The developed/disturbed areas within the Cactus Channel Project area (11.06 acres) support little to no native vegetation and are comprised of human-made disturbances. The high level of soil disturbance allows only sparse ruderal (weedy) plant species to occur. Ornamental vegetation within the Project vicinity is located along the Cactus Channel and at the far west end of the Cactus Channel.

The Project site is located in an urbanized area within Riverside County, in proximity to the populous communities of Edgemont and Woodcrest, and the cities of Moreno Valley and Riverside. Vacant undeveloped lands border the K4 Parcel to the immediate east and west. Industrial, large commercial and office spaces border the K4 Parcel to the north, and the March ARB borders the K4 Parcel to the south. The vacant undeveloped lots to the east and west are characterized by relatively flat, previously graded land with dirt access roads bordering the lots. These areas are similar to the existing conditions of the site, in that the vegetation appears to be predominantly disturbed and non-native. There are no trees or large shrubbery on either of these lots, however the Cactus Channel extends east and west from the K4 Parcel onto both of these areas. The vacant land to the east was formerly part of the March ARB and is currently owned by the U.S. Department of Agriculture (Leighton Consulting Inc. 2018). Slightly further east, there are three large circular storage tanks, near the southeast corner of Cactus Avenue and Elsworth Street. The storage tanks are a sandy earth tone and approximately 35 to 40 feet in height. The industrial, commercial, and office uses to the north of the K4 Parcel are generally large-massed buildings, up to three stories tall, with large parking lots surrounding the buildings. These buildings are generally light earth-toned colors with dark glass, with minimal ornamental landscaping bordering the sidewalk. The March ARB located to the south includes multiple uses. Directly south of the K4 Parcel, within the March ARB, appears to support housing, offices, and services facilities. The buildings on the March ARB are predominantly a sandy earth-tone color with terracotta roofing.

4.1.2.2 Light and Glare

Due to the undeveloped character of the K4 Parcel, no sources of daytime glare or nighttime lighting exists at the K4 Parcel. There is lighting in the surrounding area, which consists of street lights on Cactus Avenue, and interior and exterior lighting from commercial and office land uses north of Cactus Avenue. Although the surrounding industrial uses generally do not have windows above the first floor and produce minimal interior light visible off site, the industrial uses do use street lights in the internal parking lots which contributes to nighttime exterior lighting.

4.1.3 Relevant Plans, Policies, and Ordinances

Federal

There are no aesthetic or visual impact federal regulations applicable to the Project.

State

There are no aesthetic or visual impact state regulations applicable to the Project.

Local

March JPA General Plan

The Transportation Element identifies as Van Buren Boulevard as a scenic corridor. Additionally, the Resource Management Element of the March JPA General Plan includes goals and policies related to scenic vistas. The Resource Management Elements states, as development of the planning area occurs, open space and aesthetic amenities will be preserved through site design, site constraints, setbacks and landscape requirements. The planning area contains scenic areas from the architectural value of the historic district to the scenic vistas of the undeveloped rounded ridges in the West March Planning Subarea. Additionally, significant rock outcroppings, riparian areas and other natural features can be preserved as open space within development. The following goals and policies from the March JPA General Plan apply to the Project (March JPA 1999). Consistency with these goals and policies is discussed in Section 4.9, Land Use and Planning.

Goal 4: Develop an identity and foster quality development within the Planning Area.

Policy 4.2: Where practical, enhance and preserve natural and man-made features, such as major roadways, rail lines, drainage courses, utility corridors, groups of rock outcroppings, and tree rows to create boundaries, entryways, and separate entities for distinct geographic portions of the Planning Area.

Policy 4.4: Develop a distinctive community identity for commercial, business park, and industrial developments that reflect the character and atmosphere of March JPA Planning Area through the use of good planning and design principals, and sound development practices which serve as guidelines for building materials, colors, site design and orientation, and landscaping.

Goal 8: Preserve the natural beauty, minimize degradation of the March JPA Planning Area, and provide enhancement of environmental resources, and scenic vistas.

Policy 8.2: Sensitive biological resources and habitats, cultural resources, view shed areas shall be protected where practical.

City of Moreno Valley General Plan

The City of Moreno Valley General Plan provides a comprehensive long-term strategy for the physical development of the City. The Conservation Element includes strategies to address topics such as biological resources, cultural historical resources, archaeological and historic sites, and scenic resources. The following goals and policies from the City of Moreno Valley General Plan apply to the Project (City of Moreno Valley 2006). Consistency with these goals and policies is discussed in Section 4.9.

Policy 7.7.1: Discourage development directly upon a prominent ridgeline.

Policy 7.7.2: Require new electrical and communication lines to be placed underground

Policy 7.7.3: Implement reasonable controls on the size, number and design of signs to minimize degradation of visual quality.

Policy 7.7.4: Gilman Springs Road, Moreno Beach Drive, and State Route 60 shall be designated as local scenic roads

Policy 7.7.5: Require development along scenic roadways to be visually attractive and to allow for scenic views of the surrounding mountains and Mystic Lake.

Policy 7.7.6: Minimize the visibility of wireless communication facilities by the public. Encourage "stealth" designs and encourage new antennas to be located on existing pole, buildings and other structures.

City of Riverside General Plan

Vista points can be found throughout the City both from urban areas toward the hills and from wilderness areas looking onto Riverside. Long-distance views of natural terrain and vegetation can be

found throughout the La Sierra/Norco Hills, Sycamore Canyon Wilderness Park and Box Springs Park. The peaks of Box Springs Mountain, Mt. Rubidoux, Arlington Mountain, Alessandro Heights and the La Sierra/Norco Hills provide scenic viewpoints of the City and the region.

Policy OS-1.15: Recognize the value of major institutional passive open spaces, particularly cemeteries, as important components of the total open space systems and protect their visual character.

Policy OS-2.2: Limit the extent and intensity of uses and development in areas of unstable terrain, steep terrain, scenic vistas, arroyos and other critical environmental areas.

Policy OS-2.4: Recognize the value of ridgelines, hillsides and arroyos as significant natural and visual resources and strengthen their role as features which define the character of the City and its individual neighborhoods.

Policy OS-2.5: Review the feasibility of creating a "night-time sky" ordinance to reduce light pollution.

County of Riverside General Plan

The County of Riverside General Plan includes goals and policies related to scenic resources. The Multipurpose Open Space Element (County of Riverside 2015), Land Use Element (County of Riverside 2017), and Circulation Element (County of Riverside 2016) identify scenic corridors, scenic vistas, and scenic resources including natural landmarks and prominent or unusual features of the landscape. The County General Plan does not identify the proposed Project site to be located within the vicinity of any scenic highway corridors, scenic view corridors, or scenic vistas. The following relevant policies may apply to the Project:

OS 22.5: Utilize contour grading and slope rounding to gradually transition graded road slopes into a natural configuration consistent with the topography of the areas within scenic highway corridors.

LU 14.1: Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.

LU 14.8: Avoid the blocking of public view by solid walls.

4.1.4 Thresholds of Significance

March JPA uses the California Environmental Quality Act (CEQA) Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the Initial

Study prepared for the Project (Appendix A) and the newly adopted CEQA Guidelines Appendix G (December 2018), would the project:

- **AES-1**: In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?
- **AES-2**: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

4.1.5 Impacts Analysis

Threshold AES-1. ***In non-urbanized areas, would the Project substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?***

As discussed in Section 4.1.2, Existing Conditions, the proposed Project collectively consists of constructing a new warehouse on the K4 Parcel and improvements to the Cactus Channel. The Project site is located in an urbanized area within the County of Riverside, with commercial, industrial, residential, and federal uses in the Project vicinity. The K4 Parcel is currently vacant and undeveloped, and characterized by relatively flat terrain crossed by a series of overhead utility lines running north–south, dirt access roads, and the east-west Cactus Channel along the northern boundary of the site. The K4 Parcel primarily consists of upland vegetation communities dominated by disturbed goldenbush/non-native grassland and developed/disturbed land. The developed/disturbed land supports little to no native vegetation and are comprised of human-made disturbances. Immediately east and west of the K4 Parcel are vacant undeveloped lots, characterized by relatively flat, previously graded land with dirt access roads bordering the lots. The industrial, commercial, and office uses to the north of the K4 Parcel are generally large-massed buildings, up to three stories tall, with large parking lots surrounding the buildings. These buildings are generally light earth-toned colors with dark glass, with minimal ornamental landscaping bordering the sidewalks. The March ARB located to the south includes multiple uses including housing, offices, and services facilities. The buildings on the March ARB are predominantly a sandy earth-tone color with terracotta roofing. The K4 Parcel is currently vacant; however, the site was previously disturbed with buildings and unpaved roads utilized under three former military bases, including the former March Air Force Base.

The Cactus Channel portion of the Project is an existing earthen drainage channel that runs along the south side of Cactus Avenue from Elsworth Street on the west to Heacock Avenue and Heacock Channel on the east. The existing earthen drainage channel is depressed below the Cactus Avenue street elevation and contains vegetation.

As the governing regulatory document, the March JPA General Plan includes policies related to scenic quality applicable to the proposed Project. Project consistency with these policies is as follows.

Goal 4: Develop an identity and foster quality development within the Planning Area.

The proposed Project would support this goal as the Project would develop an underutilized, disturbed site, resulting in quality development within the March JPA Planning Area.

Policy 4.2: Where practical, enhance and preserve natural and man-made features, such as major roadways, rail lines, drainage courses, utility corridors, groups of rock outcroppings, and tree rows to create boundaries, entryways, and separate entities for distinct geographic portions of the Planning Area.

The Cactus Channel improvements component of the proposed Project would enhance the existing Cactus Channel, through the construction of a box culvert and rectangular channel. The location of the channel course would remain in its current location. As later discussed in Section 4.3, Biological Resources, the existing K4 Parcel supports non-native grassland and developed land. Developed/disturbed land support little to no native vegetation and are comprised of human-made disturbances (agriculture, construction, or other land-clearing activities) or structures such as buildings and roads. No natural or constructed features are located on the K4 Parcel, thus no enhancements or preservation is necessary. As such, the Cactus Channel improvements and K4 Parcel would be consistent with this policy.

Policy 4.4: Develop a distinctive community identity for commercial, business park, and industrial developments that reflect the character and atmosphere of March JPA Planning Area through the use of good planning and design principals, and sound development practices which serve as guidelines for building materials, colors, site design and orientation, and landscaping.

The proposed Project would be consistent with the commercial, business park, and industrial uses in the March JPA Planning Area. The Project would be designed to use building materials, colors, and landscaping complimentary of those in the March JPA Planning Area. As shown in Appendix B, K4 Warehouse Rendering, the warehouse facade would consist of a gradient of tan-painted walls with a stucco finish, and reflective windows. The Project would include approximately 156,000 square feet of landscaping bordering the Project boundary, parking areas, and warehouse

footprint. As such, the proposed Project would support this policy through the use of good planning and design principals.

Goal 8: Preserve the natural beauty, minimize degradation of the March JPA Planning Area, and provide enhancement of environmental resources, and scenic vistas.

As previously discussed, the existing K4 Parcel supports non-native grassland and developed land. Developed/disturbed land support little to no native vegetation and are comprised of human-made disturbances (agriculture, construction, or other land-clearing activities) or structures such as buildings and roads. No natural or constructed features are located on the K4 Parcel, thus no enhancements or preservation is necessary. The Cactus Channel improvements include the construction of a box culvert and rectangular channel. The proposed Project would develop an underutilized, disturbed site, resulting in quality development within the March JPA Planning Area.

Policy 8.2: Sensitive biological resources and habitats, cultural resources, view shed areas shall be protected where practical.

Protection of biological resources and habitats is discussed in Section 4.3, and protection of cultural resources is discussed in Section 4.4, Cultural Resources. The March JPA General Plan designates the area looking east and northeast of the March JPA Planning Area toward the Box Springs Mountains and San Jacinto Mountains as a scenic vista (Exhibit 5-5, Scenic & View Shed Areas, March JPA 1999). While distant scenic vistas of the Box Springs Mountains and San Jacinto Mountains are visible from the Project site, north and northeast of the Project site are existing warehouse developments within the City of Moreno Valley. Viewers to the south and west of the Project site would be people located on the March ARB. The construction of a new 46-foot tall warehouse building on the K4 Parcel would introduce a new warehouse building closer to the ARB, but given that there are existing warehouse developments immediately north and northeast of the Cactus Channel Improvement Site, the introduction of this new warehouse building would not significantly obstruct distant views of the Box Springs Mountains and San Jacinto Mountains. Additionally, according to the City of Moreno Valley General Plan Conservation Element, no corridors within the western portion of the city boundary (which abuts the Project site to the north) are designated as scenic view areas (City of Moreno Valley 2006). Installation of the proposed box culvert within the Cactus Channel would require the placement of the culvert below grade and as such, the improvements within the Channel would not be visible or affect scenic vistas. As concluded in this section, as well as Sections 4.3 and 4.4, the proposed Project would protect sensitive biological resources, cultural resources, and view shed areas where practical. Thus, the proposed Project is consistent with this policy.

Construction

The proposed Project includes the construction of a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use and installing a new box culver within the Cactus Channel. Generally, Project construction would include site grading, utility relocation/installation, and building construction. Rough grading and utility installation would last approximately 25 days, and building construction, including pad/site-specific grading activities, would occur over approximately 11 months. Construction of the proposed Project would result in temporary changes to the visual character of the K4 Parcel and surrounding areas. Heavy construction equipment visible from surrounding areas looking toward the K4 Parcel would include flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks, and bobcats. Construction activities would also require the presence of construction workers; however, construction activities and the influx of workers would not be permanent. Heavy equipment would be delivered and removed from the K4 Parcel throughout the construction phase. Construction equipment would only be used intermittently depending on the construction phase, over a 12-month period of time.

While equipment such as cranes would display a tall, vertical profile that would rise above the K4 Parcel and roofline and frames of proposed structures, the height of construction equipment would not obstruct any existing scenic views. However, the construction staging area would be located in areas that would create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the K4 Parcel during all Project construction. Therefore, Project construction staging on the K4 Parcel would be setback from Cactus Avenue. At the completion of construction, all equipment would be removed from the K4 Parcel.

The Project would also include improvements to the drainage channel that runs along the south side of Cactus Avenue from just east of Elsworth Street, then along the K4 Parcel frontage, and further to the east ending at the Heacock Channel. The drainage improvements are proposed to be an underground box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). The installation of the box culvert would require trenching through the existing swale behind the Cactus Avenue right-of-way. It is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale.

Although the presence of heavy construction equipment associated with the proposed Project would alter the visual character and quality of the site, the visual character in the Project vicinity would change daily throughout the course of the construction phase. As activities progress, the graded K4 Parcel would begin to resemble industrial and commercial developments located immediately to the north of Cactus Avenue. Although the presence of construction activities

associated with the proposed Project would alter the visual character and quality of the site, the visual presence of vehicles, equipment, and workers would be present on site up to 12 months. Additionally, the proposed Project would adhere to all applicable building regulations and ordinances that would ensure staging areas be sited and/or screened to minimize impacts on public views to the maximum extent practicable. Since construction activities would be temporary, no substantial degradation of views would occur during construction, and ultimately the Project would be developed in a manner consistent the visual character of existing development in the immediate vicinity. Therefore, construction impacts associated with substantial degradation of existing visual character and quality would be **less than significant**.

Operations

Upon completion of construction, the Project would involve the use of the K4 Parcel as a warehouse, and the Cactus Channel would be underground within a box culvert. The K4 Parcel is currently undeveloped, and the proposed Project would result in a permanent change in the visual appearance of the proposed K4 Parcel. The proposed Project would change the topography of the site due to site grading, and introduce new landscaping, architectural design, and density. The proposed Project would result in the construction of a 718,000 square-foot building, with 289 automobile parking stalls, 317 truck trailer parking stalls, and 105 loading dock positions for trucks. The maximum exterior building height would be 46 feet at the parapet. As shown in Appendix B, the proposed warehouse would include architectural elements emphasizing the windows and entrance on the northeastern corner of the warehouse. The building façade along the remainder of the proposed warehouse would incorporate similar architectural elements, including a complementary neutral color palette and a variety of building materials, to existing development located in the Project area.

The proposed warehouse was designed to include vertical and horizontal elements that would break up the overall massing of the building and provide visual interest. The building mass and landscaping create a sense of unity and visual consistency both on and off. Setback landscape areas along the K4 Parcel frontages, as shown in Appendix B, would also soften views of the K4 Parcel and enhance the visual quality of the proposed Project. Design concepts and considerations such as building orientation, screening, and lighting were also incorporated into site design. All lighting would be directed downward or at a narrow beam angle, in order to focus all light only on the desired area. As a condition of approval, March JPA requires full screening of all parking by mounding and contouring of landscaped areas, by landscape shrubs, by screening walls, or by a combination of these techniques. As such, the proposed drainage improvements would result in only minor changes to the existing visual character or quality of the site.

The Project would also include improvements to a portion of Cactus Channel, extending from Elsworth Street on the west to Heacock Channel on the east. The drainage improvements are proposed to be an

underground box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). It is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale. The proposed drainage improvements would result in noticeable visual changes from nearby public uses due to the removal of existing in-channel vegetation and replacement with a closed, yet depressed, box culvert. These changes would also affect the expectation of nearby casual observers that are accustomed to views of natural-appearing and unmaintained in-channel vegetation. However, the proposed approximately 19-foot underground box culvert would be concealed through irrigated landscaping contoured mounds. Any future maintenance required to the Cactus Channel would be temporary in nature and any equipment would be located on site. Should any major maintenance of the Cactus Channel be required, additional environmental analysis under CEQA may be required.

Therefore, given that the new warehouse on the K4 Parcel would be generally consistent and compatible with the visual character along the Cactus Avenue corridor and that the underground box culvert with be relatively non-visible and concealed through irrigated landscaping, long-term operational impacts associated with the existing visual character and quality would be **less than significant**.

Threshold AES-2. Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The proposed Project involves the development of a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use and improvements to the Cactus Channel. The maximum exterior building height on the K4 Parcel would be 46 feet at the parapet. Construction of the proposed warehouse would occur over a 12-month period of time. Construction would include site grading, utility relocation/installation, and installation improvements to the drainage ditch that runs along the south side of Cactus Avenue from just east of Elsworth Street, then along the K4 Parcel frontage, and further to the east ending at the Heacock Channel.

The K4 Parcel is currently undeveloped and does not contain lighting or reflective building materials. However, as discussed above, there is lighting in the surrounding area consisting of street lights on Cactus Avenue, and interior and exterior lighting from commercial and office land uses. Structures in the surrounding area are constructed with low reflective building materials. Implementation of the proposed Project would include installation of new lighting along the interior roadways, building exteriors, and along walkways and landscaped areas. The proposed lighting would have a maximum of 750-watt, with a maximum light fixture height of 25 feet above finished grade. Lighting associated with the proposed Project would be of a similar nature to the daytime and nighttime illumination currently generated by surrounding commercial, and industrial developments, as well as existing light associated vehicle traffic. There would be no lighting

associated with the Cactus Channel improvements; therefore, that portion of the Project would have no impact in regards to substantial light or glare.

All lighting proposed for the Project would be subject to compliance with the provisions of March JPA Development Code Section 0.080.100 Lighting, which requires all outdoor lights with nonresidential uses to not exceed 0.5 candle per foot at the property line and shall not blink, flash, oscillate or be of unusually high intensity or brightness (March JPA 2016). Additionally, with compliance with March JPA Development Code Section 9.10.110 Light and Glare, all Project lighting would project downward and would not create glare on adjacent properties. Therefore, compliance with applicable design guidelines would ensure proper design, installation, and operation of all exterior lighting, thereby reducing the potential for glare effects and light spillover onto adjacent properties. Therefore, impacts related to light and glare would be **less than significant**.

4.1.6 Mitigation Measures

The proposed Project would not result in any significant impacts related to visual resources. No mitigation measures are required.

4.1.7 Level of Significance After Mitigation

With compliance of applicable design guidelines and standards, impacts related to aesthetics were found to be less than significant; therefore no mitigation is included herein.

4.1.8 References

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4.10 NOISE

This section describes the existing noise setting of the Project site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). This section evaluates whether the Project would expose persons to or generate noise levels in excess of standards established in the local General Plan or Noise Code, or applicable standards of other agencies; whether the proposed Project expose persons to or generate ground-borne noise levels; whether the proposed Project would create a permanent or substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project; whether the Project is located within an airport land use plan, within two miles of a public airport, or being located within the vicinity of a private airstrip such that the Project would expose people residing or working in the Project area to excessive noise levels resulting from implementation of the Project.

The following references were used in the preparation of this section of the EIR:

- *K4 Parcel Noise Impact Analysis* (Appendix Q)
- *Health Risk Assessment Technical Report* (Appendix D)

As mentioned in Chapter 2, Project Description, of this EIR, the Project includes the development of the five parcels on approximately 35.4-acre site (K4 Parcel) with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel (Cactus Channel Improvement Site). The proposed Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The proposed Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000 square foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.10.1 Existing Conditions

The Project site, collectively consisting of the K4 Parcel and Cactus Channel Improvement Site, is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California. The adjacent properties to the north, are located in the City of Moreno Valley. The Project site is located in an urbanized environment and is subject to typical urban noises, such as noise generated by traffic, industrial/business park operations, and day-to-day outdoor activities. The predominant noise sources at the site include weed abatement activities as the site is currently vacant and undeveloped. "Transportation noise" typically refers to noise from automobile use, trucking, airport operations, and rail operations. "Stationary noise" typically refers to noise from sources such as heating, ventilation, and air conditioning (HVAC) systems, compressors, landscape maintenance equipment, or machinery associated with local industrial or commercial activities. Site-specific ambient noise measurements are discussed later in this section.

The Project site is located directly north of the March Air Reserve Base (ARB). Based on the Riverside County Airport Land Use Compatibility Plan (ALUCP) noise level contours of the March ARB/Inland Port Authority, the Project is partially located in the C1 Primary Approach/Departure Zone, which represents areas of moderate to high noise and moderate accidental potential risk. The noise contour boundaries are used to determine the potential aircraft-related noise impacts at the Project.

Noise Characteristics

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Table 4.10-1 presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

Range of Noise

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

Noise Descriptors

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Table 4.10-1
Typical Noise Levels

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974, as cited in Appendix Q.

To describe the time-varying character of environmental noise, the statistical or percentile noise descriptors L_{50}, L_{25}, L_8 and L_2, are commonly used. The percentile noise descriptors are the noise levels equaled or exceeded during 50%, 25%, 8%, and 2% of a stated time. Sound levels associated with the L_2 and L_8 typically describe transient or short-term events, while

levels associated with the L_{50} describe the steady state (or median) noise conditions. While the L_{50} describes the mean noise levels occurring 50% of the time, the L_{eq} accounts for the total energy (average) observed for the entire hour. Therefore, the L_{eq} noise descriptor is generally 1–2 dBA higher than the L_{50} noise level.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the CNEL, representing a composite 24-hour noise level is utilized. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 PM to 10:00 PM, and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 PM and 7:00 AM. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The March JPA relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (e.g., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (e.g., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground

attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source.

Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (e.g., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

Shielding

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure.

Traffic Noise Prediction

Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires on the roadway. Per the *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, provided by the Federal Highway Administration (FHWA), the level of traffic noise depends on three primary factors: the volume of the traffic, the speed of the traffic, and the vehicle mix within the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and a greater number of trucks. A doubling of the traffic volume, if the speed and vehicle mix do not change, results in a noise level increase of 3 dBA. The vehicle mix on a given roadway may also influence on community noise levels. As the number of medium and heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise level impacts will increase.

Noise Control

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept

is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source.

Land Use Compatibility with Noise

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages state and local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized.

Community Response to Noise

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

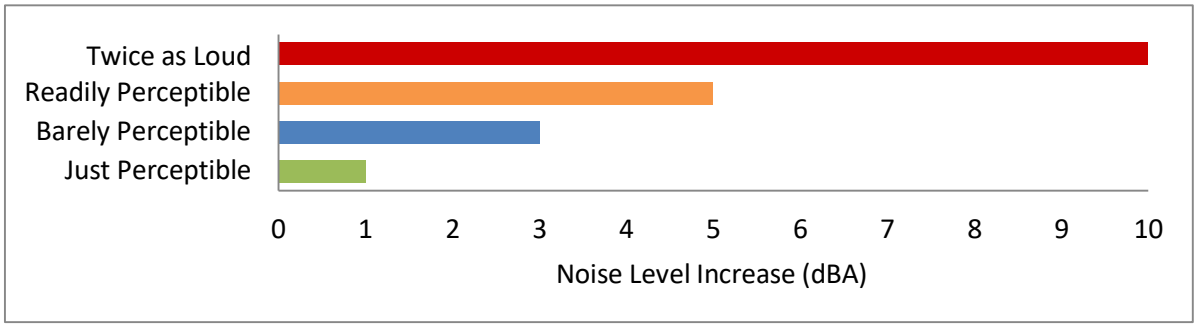
- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately 10% of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another 25% of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. Surveys have shown that about 10% of the people exposed to traffic noise of 60 dBA will report

being highly annoyed with the noise, and each increase of one dBA is associated with approximately 2% more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain.

Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Table 4.10-2. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*.

Table 4.10-2
Noise Level Increase Perception



Sources: Caltrans 2013a; Appendix Q.

Vibration Characteristics

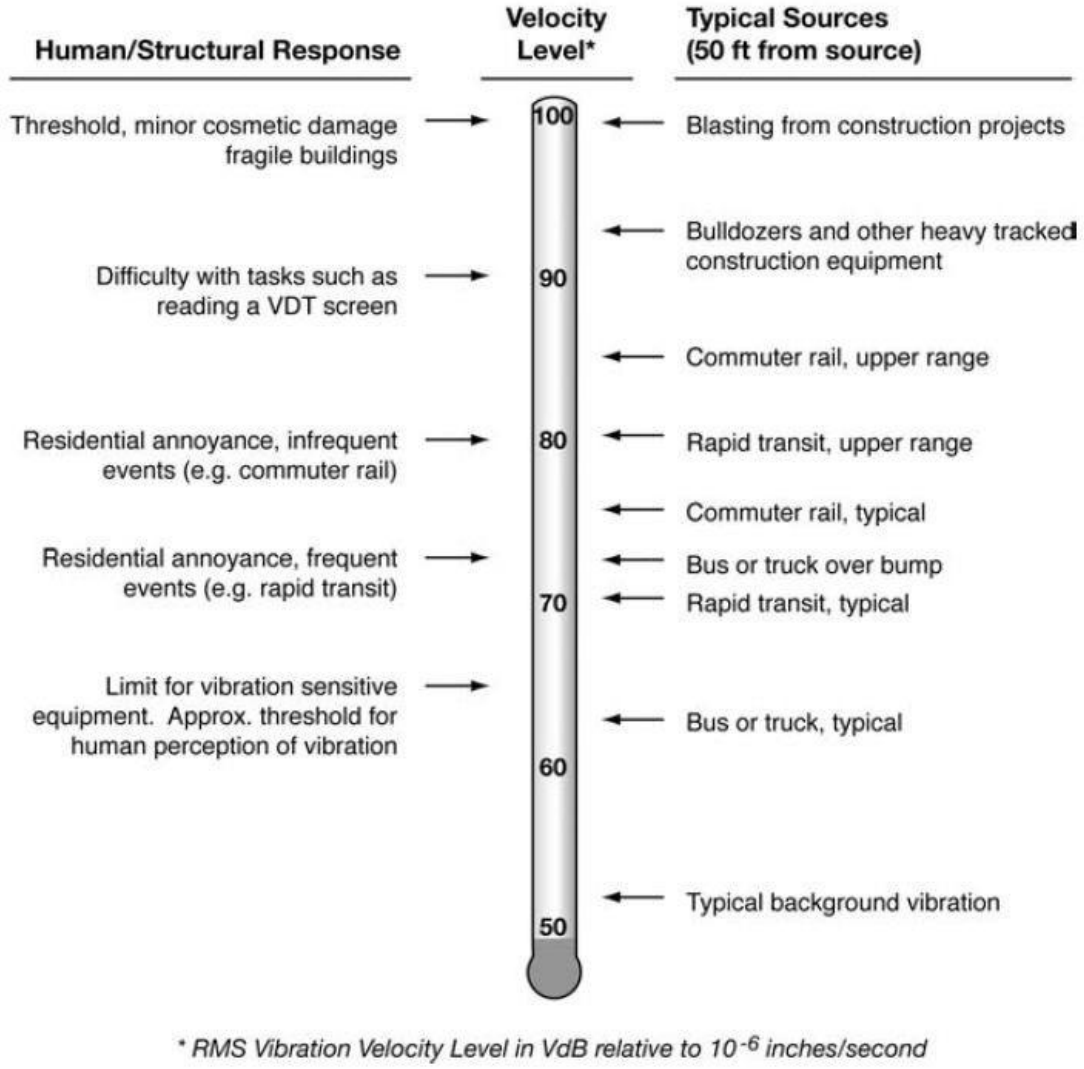
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment*, vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings, but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal, and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to

vibration. Typically, ground-borne vibration generated by human-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Table 4.10-3 illustrates common vibration sources and the human and structural response to ground-borne vibration.

Table 4.10-3
Typical Levels of Ground-Borne Vibration



Source: Appendix Q.

Sensitive Receptors

Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would be considered noise- and vibration-sensitive and may warrant unique measures for protection from intruding noise. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals. Sensitive receptors are located within City of Moreno Valley.

As discussed in the Noise Technical Report (Appendix Q), noise measurements were taken as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. The noise measurement locations uses represent a location of noise sensitive areas and were used to estimate to future noise level impacts, and generally include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. No sensitive receiver locations are located closer than the non-noise sensitive receiver locations identified below; however, existing noise-sensitive residential homes, represented by receiver location R6, are located east of the Project site at roughly 4,777 feet adjacent to Heacock Street and the off-site channel construction associated with the Project, within the City of Moreno Valley. Noise levels that would be experienced at these residential homes would be less than those identified at receiver location, R5, which represent a closer receiver location with direct line-of-sight to the Project site.

As shown on Figure 4.10-1, Receiver Locations, receiver location (R1) represents receivers near the existing office and commercial uses north of Cactus Avenue (approximately 0.03 miles from the Project boundary). Receiver location, R2, represents the existing non-noise sensitive March ARB facilities (approximately 0.02 miles from the Project boundary). Receiver location, R3, represents the existing non-noise-sensitive office uses on Fredrick Street (approximately 0.15 miles from the Project boundary). Receiver location, R4, represents the non-noise-sensitive uses at the existing Marine Corps Recruiting Station building on Riverside Drive (approximately 0.42 miles from the Project boundary). Receiver location, R5, represents the non-noise-sensitive uses at the existing March ARB buildings on Castle Street (approximately 0.13 miles from the Project boundary). Lastly, receiver location, R6, represents existing noise-sensitive residential uses approximately 0.9 miles from the Project boundary. As stated in the Health Risk Assessment Technical Report (Appendix D), four sensitive receptors were identified within a one-quarter mile radius from the Project boundary. These include:

- Emagine U At Play, Daycare Center, Moreno Valley CA (approximately 0.18 miles from the Project boundary)
- Think Together Learning Center, Moreno Valley, CA (approximately 0.18 miles from the Project boundary)
- Innovation High School San Diego – Moreno Valley, Moreno Valley, CA (approximately 1 mile from the Project boundary)
- Serrano Elementary School, Moreno Valley, CA (approximately 0.95 miles from the Project boundary)

Considering noise measurement location L1 was taken at a distance of approximately 0.10 miles from the Project boundary and the nearest identified sensitive receptor is 0.18 miles away from the Project, this noise measurement therefore represent a conservative approach. Additional sensitive receptors

within the City and County are located farther from the Project site in the surrounding community and would be less impacted by noise and vibration levels than the nearest sensitive receptor.

Non-noise-sensitive receivers near the Project site include existing office uses in the City of Moreno Valley and March ARB facilities, as described below. No sensitive receiver locations are located closer than the non-noise sensitive receiver locations identified below; however, existing noise-sensitive residential homes are located east of the Project site adjacent to Heacock Street and the off-site channel construction associated with the Project. Additional noise-sensitive receiver locations in the Project study area include residential homes located roughly 0.5 miles southeast of the Project site, south of Meyer Drive. However, receiver locations which are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Therefore, noise levels that would be experienced at these residential homes would be less than a closer receiver location with direct line-of-sight to the Project site.

Existing Noise Conditions

To assess the existing noise level environment, four 24-hour noise level measurements were taken at potential receiver locations in the Project study area. The Project study area is based on the measurement locations discussed in this section, in addition to the receiver locations used. The receiver locations were selected to describe and document the existing noise environment within the Project area, as shown in Figure 4.10-1. The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network and March ARB/Inland Port Airport (March ARB/IPA). This includes the auto and heavy truck activities near the noise level measurement locations and aircraft overflight noise from the March ARB/IPA. The 24-hour existing noise level measurements are shown on Table 4.10-4. Noise measurement were taken from the following four locations:

- Location L1 represents the north of the Project site on Goldencrest Drive near existing office and commercial uses.
- Location L2 represents the noise levels south of Cactus Avenue near the northern Project site boundary, north of March Air Reserve Base.
- Located north of the Project site, location L3 represents the noise levels near existing office uses on Calle San Juan De Los Lagos.
- Location L4 represents the noise levels east of the Project site near an existing Marine Corps Recruiting Station building on Riverside Drive.

Table 4.10-4
Existing 24-Hour Ambient Noise Level Measurements

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	*Nighttime*	
L1	530'	Located north of the Project site on Goldencrest Drive near existing office and commercial uses.	58.5	56.2	62.6
L2	0'	Located south of Cactus Avenue near the northern Project site boundary, north of March Air Reserve Base.	60.3	59.6	66.2
L3	1,420'	Located north of the Project site near existing office uses on Calle San Juan De Los Lagos.	52.9	49.9	56.8
L4	2,100'	Located east of the Project site near an existing Marine Corps Recruiting Station building on Riverside Drive.	61.7	57.2	64.2

Notes: dBA = A-weighted decibel; Leq = energy equivalent level; CNEL = Community Noise Equivalent Level.
1 See Figure 4.10-1, Receiver Locations, for the noise level measurement locations.
2 Energy (logarithmic) average hourly levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2 of Appendix Q. "Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.

The Project site is partially located in the C1 Primary Approach/Departure Zone C1, which represents areas of moderate to high noise and moderate accidental potential risk. The noise contour boundaries used to determine the potential aircraft-related noise impacts at the Project are presented in Figure 4.10-2, MARB IPA Future Airport Noise Contours. As shown in Figure 4.10-2, the Project site is located in the Unmitigated 60 dBA CNEL Noise Level Contour Boundary.

4.10.2 Relevant Plans, Policies, and Ordinances

Federal

Title 40 of the Code of Federal Regulations, Part 205, Subpart B

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under Title 40 of the Code of Federal Regulations, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 50 feet from the vehicle pathway centerline, under specific test procedures. These controls are implemented through regulatory controls on truck manufacturers. There are no comparable standards for vibration, which tend to be specific to the roadway surface, the vehicle load, and other factors.

In 1972, the Noise Control Act (42 USC Section 4901 et seq.) was passed by Congress to promote noise environments in support of public health and welfare. It also established the U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control to coordinate federal noise control activities. The U.S. EPA established guidelines for noise levels that would be considered safe for community exposure without the risk of adverse health or welfare effects. The

U.S. EPA found that to prevent hearing loss over the lifetime of a receptor, the yearly average Leq should not exceed 70 dBA, and the L_{dn} should not exceed 55 dBA in outdoor activity areas or 45 dBA indoors to prevent interference and annoyance. However, in 1982, the U.S. EPA phased out the office's funding as part of a shift in federal noise control policy to transfer the primary responsibility of regulating noise to state and local governments. The U.S. EPA retains authority to investigate and study noise and its effects, disseminate information to the public regarding noise pollution and its adverse health effects, respond to inquiries on matters relating to noise, and evaluate the effectiveness of existing regulations for protecting the public health and welfare.

State

State of California Noise Requirements

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research (OPR). The purpose of the Noise Element is to limit the exposure of the community to excessive noise levels.

State of California Building Code

The 2014 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.506 on Environmental Comfort. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available and the noise level exceeds 65 dBA Leq for any hour of operation, a wall and roof-ceiling STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

State of California Green Building Standards Code

The 2016 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must

be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA Leq for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

Government Code Section 65302(g)

California Government Code Section 65302(g) requires the preparation of a Noise Element in a General Plan, which shall identify and appraise the noise problems in the community. The Noise Element shall recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources:

- Highways and freeways
- Primary arterials and major local streets
- Passenger and freight on-line railroad operations and ground rapid transit systems
- Aviation and airport-related operations
- Local industrial plants
- Other ground stationary noise sources contributing to the community noise environment.

California General Plan Guidelines

The California General Plan Guidelines, published by the Governor's Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. Table 4.10-5 presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. OPR guidelines are advisory in nature.

Table 4.10-5
Land Use Compatibility for Community Noise Environments

	Community Noise Exposure (dBA CNEL)			
	Normally Acceptable[1]	*Conditionally Acceptable*[2]	*Normally Unacceptable*[3]	*Clearly Unacceptable*[4]
Residential-low density, single-family, duplex, mobile homes	50–60	55–70	70–75	75–85
Residential – multiple-family	50–65	60–70	70–75	70–85
Transit lodging – motel, hotels	50–65	60–70	70–80	80–85
Schools, libraries, churches, hospitals, nursing homes	50–70	60–70	70–80	80–85
Auditoriums, concert halls, amphitheatres	NA	50–70	NA	65–85
Sports arenas, outdoor spectator sports	NA	50–75	NA	70–85
Playgrounds, neighborhood parks	50–70	NA	67.5–77.5	72.5–85
Golf courses, riding stables, water recreation, cemeteries	50–70	NA	70–80	80–85
Office buildings, business commercial and professional	50–70	67.5–77.5	75–85	NA
Industrial, manufacturing, utilities, agriculture	50–75	70–80	75–85	NA

Source: OPR 2017.
Notes: dBA = A-weighted decibel; CNEL = community noise equivalent level; NA = not applicable.
1 Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
2 Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
3 Normally Unacceptable: New construction or development should be discouraged. If new construction of development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.
4 Clearly Unacceptable: New construction or development should generally not be undertaken.

Local

March Joint Powers Authority Adopted 1999 General Plan Noise/Air Quality Element

The March JPA Adopted 1999 General Plan Noise/Air Quality Element identifies several goals and policies to protect and enhance the quality of life for those who live and work in the March JPA jurisdiction. The March JPA Adopted 1999 General Plan Noise/Air Quality Element contains the following three goals (March JPA 1999):

Goal 1: Ensure that land uses are protected from excessive and unwanted noise.

Goal 2: Minimize incompatible noise level exposures throughout the Planning Area, and where possible, mitigate the effect of noise incompatibilities to provide a safe and healthy environment.

Goal 3: Work toward the reduction of noise impacts from vehicular traffic, and aviation and rail operations.

The noise policies specified in the March JPA Adopted 1999 Noise/Air Quality Element provide the guidelines necessary to satisfy these goals. The policies are provided below.

Policy 1.1: Establish acceptable limits of noise for various land uses throughout the March JPA Planning Area. Future development that could increase ambient noise levels shall be required to mitigate the anticipated noise increase, to the extent possible.

Policy 1.2: Noise sensitive uses (such as schools, libraries, hospitals, medical facilities, residential uses, etc.) shall be discouraged in areas where noise levels exceed acceptable limits.

Policy 1.3: Encourage good acoustical design in new construction.

Policy 1.4: Provide buffer areas between noise sources and other developments, where practical.

Policy 2.1: Avoid placing noise sensitive land uses in proximity to areas devoted to noise generating facilities such as areas of aviation related activities, industrial parks, transportation facilities, and other noise generating land uses.

Policy 2.2: Noise generating facilities shall be located in areas with compatible noise generating land uses (i.e., airport noise contour areas) to minimize land use incompatibilities, noise abatement and mitigation measures needed.

Policy 2.3: Noise sensitive land uses shall not be located in areas influenced by noise generating land uses, in particular the noise contours associated with the joint use airfield, unless appropriate mitigation is utilized.

Policy 2.4: March JPA shall evaluate noise sensitivity and noise generation when considering land use projects and transportation improvement projects, and where appropriate mitigation measures shall be employed.

Policy 2.5: March JPA shall utilize and comply with the CALTRANS standards for noise compatibility for aviation generated noise to proposed land use development.

Policy 3.1: Include mitigating measures such as landscaping, berming and site orientation, in the design of projects located near noise generating sources such as arterial roadways.

Policy 3.2: Coordinate with adjacent cities and county agencies for noise abatement.

Policy 3.3: Adhere to the adopted AICUZ and Comprehensive Land Use Plan standards and promote the use of newer and quieter aircraft and support equipment.

Policy 3.4: Where appropriate, noise mitigation measures shall be incorporated in the design and approval of development on property located adjacent to aviation and rail facilities.

Policy 3.5: Where appropriate, development in areas adjacent to freeways, arterial streets, and other noise source shall be designed to reduce the potential for noise impacts.

Policy 3.6: Regulate the use of local streets by trucks, trailers, and construction vehicles, to the extent possible.

Policy 3.7: Limit trucking operations to appropriate routes, times and speeds.

Policy 3.8: Appropriate muffling systems for construction equipment and operations shall be required, as necessary.

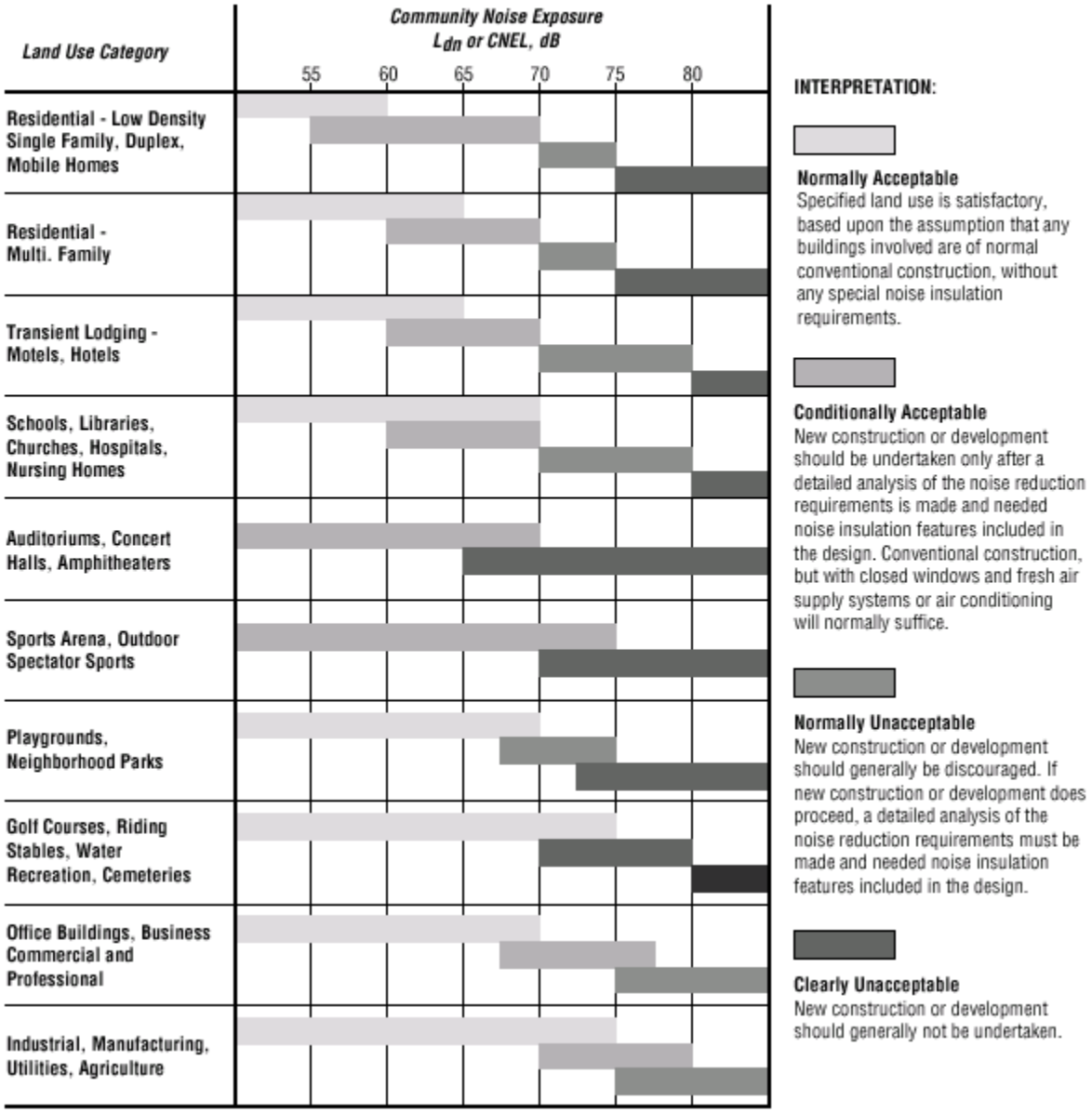
Policy 3.9: March JPA shall encourage and facilitate the use of mass transit services and alternative transportation systems to minimize dependence of the automobile within the Planning Area, thereby minimizing the level of noise generated by surface transportation.

Land Use Compatibility

The State of California OPR published recommendations for noise exposure levels applicable to various land uses, which form the basis of community noise planning activities (OPR 2017). These recommendations, as shown in Table 4.10-6, provide March JPA with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The State Land Use Compatibility guidelines indicate that industrial and manufacturing land uses, such as the Project, are considered normally acceptable with noise levels below 70 dBA CNEL and conditionally acceptable with noise levels of less than 75 dBA CNEL.

Table 4.10-6
State Land Use Compatibility

FIGURE 2



Source: OPR 2017.

March Joint Powers Authority Construction Noise Standards

The March JPA Development Code Section 9.10.030, Exemptions, states that construction activities are considered exempt from the noise performance standards if they occur within the permitted hours of 7:00 AM to 7:00 PM. The March JPA Development Code does not identify a specific noise level standard for construction activity.

March Joint Powers Authority Operational Noise Standards

Section 9.10.140 of the March JPA Development Code identifies the exterior stationary-source noise level standards for commercial and industrial land uses. Based on Section 9.10.140 of the March JPA Development Code, the exterior noise level shall not exceed 55 dBA Leq at any time.

City of Moreno Valley Construction Noise Standards

The City of Moreno Valley Municipal Code noise standards for construction are described below to determine the potential noise impacts at nearby sensitive receiver locations. As a subset of its stationary-source noise regulations, the City Municipal Code establishes permitted hours of construction activity. More specifically, Municipal Code Section 11.80.030 (D)(7), Construction and Demolition, provides the following:

> No person shall operate, or cause operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee.

Therefore, based on the Section 11.80.030 (D)(7) construction regulations, a construction related noise disturbance occurs if Project construction activity occurs outside of the permitted hours. For this analysis, both the more restrictive daytime and nighttime City of Moreno Valley noise level limits of 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, and the 90 dBA L_{eq} 8-hour limit are used as appropriate thresholds for the nearby sensitive land uses (e.g., residential homes) in the Project study area. The City of Moreno Valley construction noise standards are shown on Table 4.10-7. As previously discussed, the construction noise level threshold used in this noise study represents a conservative approach, since it is more restrictive than the continuous sound level limits of Table 11.80.030-1 of the City of Moreno Valley Municipal Code.

Table 4.10-7
City of Moreno Valley Construction Noise Standards

Jurisdiction	Permitted Hours of Construction Activity	Construction Noise Level Standard (dBA L_{eq})[1]	
		Daytime	*Nighttime*
March JPA	7:00 a.m. to 7:00 p.m.	n/a	
City of Moreno Valley	General Activity: 7:00 a.m. to 8:00 p.m. on any day. Grading is limited to 7:00 a.m. to 6:00 p.m. Monday to Friday; 8:00 a.m. to 4:00 p.m. on weekends and holidays.	65	60[2]
		90 (anytime)	

Source: Appendix Q.
Notes: dBA = A-weighted decibel; L_{eq} = energy equivalent level; JPA = Joint Powers Authority.

[1] Acceptable threshold for determining the relative significance of short-term Project construction noise levels, based on the City of Moreno Valley stationary noise standards shown on Table 3-1 of Appendix Q.

[2] Any nighttime construction activity requires an exemption from the City of Moreno Valley Municipal Code as indicated in Section 11.80.030 (E) (8) for a special event permit (Section 11.80.040). The special event permit application shall be submitted to the City of Moreno Valley Planning Department for approval and meet the requirements of Municipal Code Section 11.80.040.

"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.; "n/a" = The March JPA Development Code does not identify construction-specific noise level limits.

City of Moreno Valley Operational Noise Standards

The City of Moreno Valley Municipal Code defines Maximum Sound Levels (in dB(A)) for Source Land Uses in Table 11.80.030-2 for Residential and Commercial land uses. As defined by the Municipal Code, Section 11.80.020 Definitions, Commercial land use means all uses of land not otherwise classified as residential, and Residential land use means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly. For the purpose of this analysis, the K4 Parcel is considered Commercial land use since it is not classified as residential. Based on this standard, the operational noise level limits for commercial land use, from Table 11.80.030-2, of 65 dBA Leq during the daytime (8:00 a.m. to 10:00 p.m.) hours and 60 dBA Leq during the nighttime (10:01 p.m. to 7:59 a.m.) hours shall apply to the operational noise from the Project.

Further, Section 11.80.030(C) Prohibited Acts, Nonimpulsive Sound Decibel Limits, states: No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of 200 feet or more from the real property line of the source of the sound, if the sound occurs on a privately owned property. Therefore, at a distance of 200 feet from the property line, the Project's operational noise levels shall not exceed the 65 dBA Leq daytime and 60 dBA Leq nighttime noise level standards for commercial land uses, as shown on Table 4.10-8.

The City of Moreno Valley Municipal Code also identifies continuous sound level limits in Table 11.80.030-1 based on the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) noise exposure guidelines. A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The City of Moreno Valley noise level threshold starts at 90 dBA for more than eight hours per day, and for every increase, the exposure time is reduced. The City of Moreno Valley identifies noise level thresholds of 92 dBA for more than 6 hours per day, 95 dBA for more than 4 hour per day, 97 dBA for more than 3 hours per day, and up to 100 dBA for more than 2 hours per day. The noise study uses both the more restrictive daytime and nighttime City of Moreno Valley noise level limits of 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, and the 90 dBA L_{eq} 8-hour limit, shown on Table 4.10-8 of this report, to evaluate the potential operational noise levels due to the operation of the Project.

Table 4.10-8
City of Moreno Valley Operational Noise Standards

Jurisdiction	Source Land Use	Time Period	Exterior Noise Level Standards (dBA L_{eq})[2]
March JPA	Commercial/ Industrial	Any Time	55
City of Moreno Valley	Commercial (at 200 feet)	Daytime (8:00 a.m.–10:00 p.m.)	65
		Nighttime (10:01 p.m.–7:59 a.m.)	60
	Any	8 Hours per Day	90

Source: Appendix Q.
Notes: dBA = A-weighted decibel; L_{eq} = energy equivalent level; JPA = Joint Powers Authority.

County of Riverside Construction Noise Standards

Noise-sensitive receivers potentially impacted by the Project's construction noise activities are located in the County of Riverside. Therefore, to accurately describe the potential Project -related construction noise level contributions, this analysis presents the County of Riverside's construction noise standards.

Section 9.52.020 of the County's Noise Regulation ordinance indicates that noise associated with any private construction activity located within one-quarter of a mile from an inhabited dwelling is considered exempt between the hours of 6:00 AM and 6:00 PM, during the months of June through September, and 7:00 AM and 6:00 PM, during the months of October through May. Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what California Environmental Quality Act (CEQA) constitutes a substantial temporary or periodic noise increase (County of Riverside 2015).

To allow for a quantified determination of what the Noise Control Ordinance constitutes as noise that may jeopardize the health, safety or general welfare of Riverside County residents and degrade their quality of life due to Project construction activity, relevant quantified stationary source noise standards established in the General Plan, Policy N 4.1, are used in this analysis to assess the Project construction noise levels at nearby sensitive receivers. Therefore, the daytime noise level standard of 65 dBA Leq and nighttime noise level standard of 45 dBA Leq are used to evaluate the potential Project -related construction noise impacts.

County of Riverside Operational Noise Standards

Noise-sensitive receivers potentially impacted by the Project's operational noise activities are located in the County of Riverside. Therefore, to accurately describe the potential Project -related operational noise level contributions, this analysis presents the County of Riverside's operational noise standards.

The County of Riverside has set exterior noise limits to control community noise impacts from non-transportation noise sources (such as playgrounds, trash compactors, air-conditioning units, etc.). Policy N 4.1 of the County's Noise Element sets an exterior noise limit not to be exceeded for a cumulative period of more than ten minutes in any hour of 65 dBA Leq for daytime hours of 7:00 AM to 10:00 PM, and 45 dBA Leq during the noise-sensitive nighttime hours of 10:00 PM to 7:00 AM. These stationary-source noise level standards are consistent with the County of Riverside Office of Industrial Hygiene guidelines for noise studies within the County.

March Air Reserve Base/Inland Port Airport Land Use Compatibility

The March ARB/Inland Port Airport is located approximately 0.7 mile southwest of the Project site. The Riverside County (RC) ALUCP Policy Document includes the policies for determining the land use compatibility of the Project since it is located within 2 miles of an airport runway. Policy 4.1.5, Noise Exposure for Other Land Uses of the Riverside County ALUCP requires that land uses, such as the Industrial land use of the Project site, demonstrate compatibility with the acceptable noise levels as shown on Table 4.10-9. Table 4.10-9 indicates that clearly compatible business park land uses experience exterior noise levels below 55 dBA CNEL, which industrial land uses experience clearly compatible exterior noise levels below 60 dBA CNEL. Normally acceptable noise levels for Industrial land uses range from 60 to 65 dBA CNEL. Marginally acceptable noise levels at Industrial land uses range from 65 to 70 dBA CNEL. For marginally acceptable noise levels, the indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.

Vibration Standards

The March JPA and City of Moreno Valley General Plans and Municipal Codes do not identify specific vibration level standards. However, the United States Department of Transportation FTA provides guidelines for maximum acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. Operational and construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates

little or no ground vibration. Large bulldozers and loaded trucks can cause perceptible vibration levels to proximate receptors. The FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Project -related vibration impacts due to on-site operational and construction activities.

Table 4.10-9
Riverside County Airport Land Use Compatibility Criteria: Noise

Land Use Category	CNEL (dB) 50–55	55–60	60–65	65–70	70–75
Residential *					
single-family, nursing homes, mobile homes	++	o	–	– –	– –
multi-family, apartments, condominiums	++	+	o	– –	– –
Public					
schools, libraries, hospitals	+	o	–	– –	– –
churches, auditoriums, concert halls	+	o	o	–	– –
transportation, parking, cemeteries	++	++	++	+	o
Commercial and Industrial					
offices, retail trade	++	+	o	o	–
service commercial, wholesale trade, warehousing, light industrial	++	++	+	o	o
general manufacturing, utilities, extractive industry	++	++	++	+	+
Agricultural and Recreational					
cropland	++	++	++	++	+
livestock breeding	++	+	o	o	–
parks, playgrounds, zoos	++	+	+	o	–
golf courses, riding stables, water recreation	++	++	+	o	o
outdoor spectator sports	++	+	+	o	–
amphitheaters	+	o	–	– –	– –

Land Use Acceptability		Interpretation/Comments
++	*Clearly Acceptable*	The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.
+	*Normally Acceptable*	Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.
o	*Marginally Acceptable*	The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.
–	*Normally Unacceptable*	Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.
– –	*Clearly Unacceptable*	Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.

* Subtract 5 dB for low-activity outlying airports (Chiriaco Summit and Desert Center)

4.10.3 Thresholds of Significance

March JPA uses the CEQA Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted CEQA Guidelines Appendix G (December 2018), the Project could have a significant noise impact if the Project would result in:

- **NOI-1**: Generation of substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- **NOI-2**: Generation of excessive groundborne vibration or groundborne noise levels.
- **NOI-3**: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

Noise Significance Criteria

Classification of Substantial Noise Increases

Permanent Noise Level Increase (Operational Related)

There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, one way to measure a person's subjective reaction to a new noise is to compare the new noise to the existing ambient environment.

The Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of Project -generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (e.g., CNEL).

For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, or this analysis, FICON identifies a readily perceptible 5 dBA or greater Project -related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without Project noise levels range from 60 to 65

dBA, a 3 dBA barely perceptible noise level increase appears to be appropriate for most people. When the without Project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4.10-10 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON, which inform the Significance Thresholds.

Table 4.10-10
Significance of Noise Impacts at Noise-Sensitive Receivers

Without Project Noise Level	Potential Significant Impact
<60 dBA	5 dBA or more
60–65 dBA	3 dBA or more
>65 dBA	1.5 dBA or more

Source: FICON 1992.
Notes: dBA = A-weighted decibel.

Temporary Noise Level Increase (Construction Related)

Due to the temporary, short-term nature of noise-generating construction activities, the temporary or periodic noise level increases over the existing ambient conditions must be considered under threshold Noise-4. Therefore, the 12 dBA L_{eq} noise increase threshold from Caltrans Traffic Noise Analysis Protocol is used in this analysis to assess temporary noise level increases (Caltrans 2013b). If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a potentially significant impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions.

Noise-Sensitive Land Uses

Noise sensitive land uses generally include residences, hospitals, nursing care facilities, and lodging. The OPR guidance on noise exposure is used as the basis for determining acceptable exposure limits for noise sensitive land uses in the Project study area (Table 4.10-6). The normally acceptable noise level for residential is up to 60 dB CNEL.

Non-Noise-Sensitive Land Uses

Land use compatibility criteria outlined in the OPR guidance on noise exposure are also used to identify thresholds for non-noise-sensitive land uses; the exterior noise level criteria for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA

CNEL are considered conditionally acceptable per the State Land Use Compatibility matrix, previously shown on Table 4.10-6.

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, the readily perceptible 5 dBA and barely perceptible 3 dBA criteria are used. When the noise levels at the non-noise-sensitive land uses without the Project are below the normally acceptable 70 dBA CNEL compatibility criteria, a readily perceptible 5 dBA or greater noise level increase is considered a significant impact. When the noise levels without the Project are greater than the normally acceptable 70 dBA CNEL land use compatibility criteria, a barely perceptible 3 dBA or greater noise level increase is considered a significant impact. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the March JPA General Plan Noise/Air Quality Element, Policy 1f 70 dBA CNEL exterior noise level criteria.

As such, noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development.

Off-Site Traffic Noise

A significant impact would occur when the noise levels at existing and future noise-sensitive land uses (e.g., residential):

- Are less than 60 dBA and the Project creates a readily perceptible 5 dBA or greater Project -related noise level increase; or
- Range from 60 to 65 dBA and the Project creates a barely perceptible 3 dBA or greater Project-related noise level increase; or
- Already exceed 65 dBA, and the Project creates a community noise level impact of greater than 1.5 dBA.

A significant impact would occur when the noise levels at existing and future non-noise-sensitive land uses (e.g., industrial, etc.) are:

- Less than the March JPA General Plan Noise/Air Quality Element, Policy 1f, 70 dBA and the Project creates a readily perceptible 5 dBA or greater Project-related noise level increase; or
- Greater than the March JPA General Plan Noise/Air Quality Element, Policy 1f, 70 dBA and the Project creates a barely perceptible 3 dBA or greater Project -related noise level increase.

Construction Noise and Vibration

Noise impacts shall be considered significant if Project-related construction activities:

- create noise levels at sensitive residential receivers in the City of Moreno which exceed the short-term construction noise level threshold of 65 dBA Leq during the daytime hours, or 60 dBA Leq during the nighttime hours, or the continuous noise level limit of 90 dBA Leq, as shown in Table 4.10-10 (based on the City of Moreno Valley Municipal Code, Table 11.80.030-2 source land use noise level limits, and the Table 11.80.030-1 continuous noise level limits); or
- generate temporary Project construction-related noise level increases which exceed the 12 dBA Leq substantial noise level increase threshold at noise-sensitive receiver locations (Caltrans 2013b).
- generate construction source vibration levels could exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations.

Operational Noise

A significant impact would occur if Project-related operational (i.e., on-site activities and stationary-sources) noise levels:

- Exceed the exterior 55 dBA Leq noise level standards at nearby sensitive residential land uses within the March Joint Powers Authority jurisdiction (March Joint Powers Authority Development Code, Section 9.10.140); or
- Exceed the 65 dBA Leq daytime or 60 dBA Leq nighttime noise level standards at 200 feet from the property line of the noise source (City of Moreno Valley Municipal Code, Table 11.80.030-2); or
- Exceed the 65 dBA Leq daytime or 60 dBA Leq nighttime noise level standards at residential receivers in the City of Moreno Valley (City of Moreno Valley Municipal Code, Table 11.80.030-2);
- To present a conservative approach, the adjacent office uses in the Project study area are also analyzed based on the more conservative operational noise level limits required for noise-sensitive residential receiver locations.

A significant impact would occur if the existing ambient noise levels at the noise-sensitive land uses near the Project site:

- Are less than 60 dBA Leq and the Project creates a readily perceptible 5 dBA Leq or greater Project -related noise level increase; or

- Range from 60 to 65 dBA L_{eq} and the Project creates a barely perceptible 3 dBA L_{eq} or greater Project -related noise level increase; or
- Already exceed 65 dBA L_{eq}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{eq}.

Table 4.10-11 illustrates the noise significance criteria described above.

Table 4.10-11
Significance Criteria Summary

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	*Nighttime*
Off-Site	Noise-Sensitive	if ambient is <60 dBA CNEL	≥5 dBA CNEL project increase	
		if ambient is 60–65 dBA CNEL	≥3 dBA CNEL project increase	
		if ambient is >65 dBA CNEL	≥1.5 dBA CNEL project increase	
	Non-Noise-Sensitive	if ambient is <70 dBA CNEL	≥5 dBA CNEL project increase	
		if ambient is >70 dBA CNEL	≥3 dBA CNEL project increase	
Operational	Noise-Sensitive	Exterior Noise Level Standards		
		if ambient is <60 dBA L_{eq}[1]	≥5 dBA L_{eq} project increase	
		if ambient is 60–65 dBA L_{eq}[1]	≥3 dBA L_{eq} project increase	
		if ambient is >65 dBA L_{eq}[1]	≥1.5 dBA L_{eq} project increase	
		Vibration Level Threshold[3]	80 VdB	
		At residential land use[4]	65 dBA L_{eq}	60 dBA L_{eq}
Construction	Noise-Sensitive		90 dBA L_{eq}	
		Vibration Level Threshold[3]	80 VdB	

Source: Appendix Q.
Notes: dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level; L_{eq} = energy equivalent level; VdB = vibration velocity decibel.
1 Source: FICON 1992
2 Based on the FICON thresholds and March JPA General Plan Noise Element, Figure III-1, criteria for non-noise-sensitive land uses.
3 Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.
4 Based on the City of Moreno Valley Municipal Code, Chapter 11.80 Noise Regulation (Appendix 3.2).
"Daytime" = 8:00 a.m.–10:00 p.m.; "Nighttime" = 10:01 p.m.–7:59 a.m.

Methodology

On-Site Traffic Noise

The expected on-site roadway noise level increases from vehicular traffic were calculated by Urban Crossroads using a computer program that replicates the FHWA Traffic Noise Prediction Model—FHWA-RD-77-108.

Off-Site Traffic Noise

To assess the off-site traffic CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *Traffic Impact Analysis* Report (Appendix R), prepared by

Urban Crossroads. Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without/With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year 2023 Without/With the Project: This scenario refers to Opening Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the *Traffic Impact Analysis*.
- Horizon Year 2040 Without/With the Project: This scenario refers to Horizon Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the *Traffic Impact Analysis*.

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not take into account the effect of any existing noise barriers or topography that may attenuate ambient noise levels and therefore present a conservative scenario for purposes of this analysis.

Vibrations

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA (Table 4.10-12).

Table 4.10-12
Vibration Source Levels for Construction Equipment

Equipment	Vibration Decibels (VdB) at 25 feet
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.
Notes: VdB = velocity vibration decibel.

Receiver Locations

To assess the potential for long-term operational and short-term construction noise impacts, the following receiver locations, as shown on Figure 4.10-1, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land.

4.10.4 Impacts Analysis

Threshold NOI-1. Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

The March Joint Powers Authority Development Code, Section 9.10.030 Exemptions, states that construction activities are considered exempt from the noise performance standards if they occur within the permitted hours of 7:00 a.m. to 7:00 p.m. The March Joint Powers Authority Development Code does not identify a specific noise level standard for construction activity. The City of Moreno Valley Municipal Code noise standards for construction restrict construction activities to the hours of 7:00 a.m. to 8:00 p.m. For this analysis, both the more restrictive daytime and nighttime City of Moreno Valley noise level limits of 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, and the 90 dBA L_{eq} 8-hour limit are used as appropriate thresholds for the nearby sensitive land uses (e.g., residential homes) in the Project study area (Appendix Q).

Noise generated by the Project construction equipment would include a combination of trucks, power tools, concrete mixers and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating
- Off-Site Channel (Cactus Avenue)
- Nighttime Concrete Pours

The construction noise analysis included in Appendix Q was prepared consistent with the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018) for general construction noise assessment which states, "Compare the combined $L_{eq.equip(1hr)}$ for the two noisiest pieces of equipment for each phase of construction". Since the reference construction activity noise level measurements already include multiple pieces of equipment operating simultaneously, the highest reference noise level from all reference activities associated with the given stage of Project construction is used to present a conservative approach. Moreover, the highest reference noise level of each stage is analyzed as operating at the closest point from primary construction activities to each receiver location.

Noise levels generated by heavy construction equipment could range from approximately 68 dBA to in excess of 80 dBA, when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver. Table 4.10-13 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 4.10-13 have been adjusted for consistency to describe a common reference distance of 50 feet.

Table 4.10-13
Construction Reference Noise Levels

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels at Reference Distance (dBA L_{eq})	Reference Noise Levels at 50 Feet (dBA L_{eq})[1]
1	Truck Pass-Bys and Dozer Activity (Single Dozer)	30	63.6	59.2
2	Dozer Activity (Multiple Dozers)	30	68.6	64.2
3	Construction Vehicle Maintenance Activities	30	71.9	67.5
4	Foundation Trenching	30	72.6	68.2
5	Rough Grading Activities	30	77.9	73.5
6	Framing	30	66.7	62.3
7	Concrete Mixer Truck Movements	50	71.2	71.2
8	Concrete Paver Activities	30	70.0	65.6
9	Concrete Mixer Pour and Paving Activities	30	70.3	65.9
10	Concrete Mixer Backup Alarms and Air Brakes	50	71.6	71.6
11	Concrete Mixer Pour Activities	50	67.7	67.7

Notes: dBA = A-weighted decibel; L_{eq} = energy equivalent level.
[1] **Reference** noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

As shown on Table 4.10-13, above, the unmitigated Project daytime and nighttime construction noise levels satisfy the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime City of Moreno Valley Municipal Code thresholds, respectively, during Project construction activity at all receiver locations, including the off-site Cactus Channel construction. Project daytime and nighttime construction noise levels would satisfy the nighttime City of Moreno Valley Municipal Code thresholds 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code. As described in Section 4.10.1, Existing Conditions, sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals. No sensitive receiver locations are located closer than the non-noise sensitive receiver locations identified below. Table 4.10-14 provides a summary of the construction noise levels by stage at the noise receiver locations (Figure 4.10-1). Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations.

Table 4.10-14
Unmitigated Construction Equipment Noise Level Summary

Receiver Location	Daytime Construction Noise Levels (dBA L_{eq})							Nighttime Concrete Pour Noise Levels (dBA L_{eq})	Threshold Exceeded?	
	Site Preparation	*Grading*	*Building Construction*	*Paving*	*Architectural Coating*	*Off-Site Channel*	*Highest Construction Noise Levels*		*Daytime (65 dBA L_{eq})*	*Nighttime (60 dBA L_{eq})*
R1	51.1	60.4	55.1	58.5	54.4	51.1	60.4	58.5	No	n/a
R2	51.7	61.0	55.7	59.1	55.0	46.7	61.0	54.1	No	n/a
R3	40.2	49.5	44.2	47.6	43.5	40.2	49.5	47.6	No	n/a
R4	31.1	40.4	35.1	38.6	34.4	50.4	50.4	38.6	No	n/a
R5	41.2	50.5	45.2	48.6	44.5	39.9	50.5	48.6	No	n/a
R6	24.5	33.8	28.5	31.9	27.8	47.3	47.3	31.9	No	No

Notes: dBA = A-weighted decibel; L_{eq} = energy equivalent level; n/a = receiver location represents a use that would be unoccupied during nighttime construction activity.

As discussed previously, based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. As shown on Table 4.10-14, above, the unmitigated Project daytime and nighttime construction noise levels satisfy the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime City of Moreno Valley Municipal Code thresholds, respectively, during Project construction activity at all receiver locations, including the off-site Cactus Channel construction. Further, the closest receiver locations represent office uses that are typically unoccupied during the hours when nighttime concrete pours would take place, and as such, are not analyzed against the nighttime noise level standards. Temporary noise level increases due to Project construction at noise-sensitive receiver locations are shown to range from 0.0 to 0.2 dBA L_{eq} and will remain below the Caltrans 12 dBA L_{eq} threshold. Further, the unmitigated Project-related construction noise levels would satisfy the less restrictive 90 dBA L_{eq} 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code.

To quantify the off-site traffic noise levels during construction, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. Therefore, impacts related to ambient Project construction noise would be considered **less than significant**.

Implementation of the proposed improvements to the seven-acre Cactus Channel drainage ditch would either be constructed contemporaneously with the Project or built separately depending on permitting and timing.

As shown on Table 4.10-14, above, the unmitigated Project daytime and nighttime construction noise levels would not exceed the applicable threshold and would therefore not result in a significant impact. However, as conditions of approval to further reduce noise and vibration levels produced by the construction of the proposed Project, the following Best Management Practices (BMPs) would reduce noise and vibration levels produced by the construction equipment to the nearby receiver locations:

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction.
- The construction contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

Therefore, construction activities would result in exposure of persons to or generation of noise levels that are **less than significant**.

Operations

The Cactus Channel improvements would result in improvements to the Cactus Channel, including an underground box culvert that would run approximately 7,900 linear feet. The existing channel is an open-air drainage channel, therefore, with implementation of the Cactus Channel improvements, there would be no increase in operational noise. Therefore, the Cactus Channel improvements are not anticipated to include operational noise sources requiring analysis because, and as such, are not included in the Project operational noise sources analyzed herein.

Operational on-site noise-generating activities associated with proposed Project would include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. To present the potential worst-case operational noise conditions, the models and analysis contained in the Noise Impact Analysis (Appendix Q) assume the Project would operation 24 hours per day, seven days a week. The operational noise level calculations, shown on Table 4.10-15, account for the distance attenuation provided due to geometric spreading when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source. Further, existing non-noise-sensitive March ARB facilities located south of the Project site will benefit from additional barrier attenuation/shielding provided by the Project building and site design, which locates all truck activity north of the Project site building. For the purpose of the operational noise analysis, the Project building is modeled at a height of 30 feet.

Table 4.10-15 presents the combined total operational noise level projections at 200 feet consistent with the City of Moreno Valley Municipal Code. The Project operational noise levels at 200 feet are estimated at 51.5 dBA L_{eq}. Based on the results of this analysis, the Project operational noise levels associated with operations would satisfy the City of Moreno Valley Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards at 200 feet from the source land use. The Project would contribute a daytime operational noise level increase of up to 0.3 dBA Leq and a nighttime operational noise level increase of up to 0.5 dBA Leq at the sensitive receiver locations. Further, it should be noted that the land uses within 200 feet of the Project site boundary are designated as business park, office, and commercial land use.

Table 4.10-15
Operational Noise Levels at 200 Feet

Noise Source	Ref. Noise Level (dBA L_{eq})	Distance Atten. at 200 feet (dBA L_{eq})[1]	Hourly Activity (Mins.)[2]	Hourly Activity Adjustment (dBA L_{eq})	Noise Level at 200 feet (dBA L_{eq})
Truck Unloading/Docking Activity	67.2	-16.5	60	0.0	50.7
Roof-Top Air Conditioning Units	77.2	-32.0	39	-1.9	43.3
Parking Lot Vehicle Movements	52.2	-19.5	60	0.0	32.7
Combined Total:	**51.5**				

Notes: dBA = A-weighted decibel; Leq = energy equivalent level.
1 Drop off rate of 6 dBA per doubling of distance (point source) and 4.5 dBA per doubling of distance (line source).
2 Anticipated duration (minutes within the hour) of noise activity during peak hourly conditions expected at the Project site.

Table 4.10-16 indicates that the unmitigated hourly noise levels associated with the K4 Parcel at the nearby sensitive receiver locations are expected to range from 30.4 to 46.7 dBA Leq. The Project -related operational noise levels, as shown on Table 4.10-16, would satisfy the March JPA and City of Moreno Valley exterior noise level standards at all nearby sensitive receiver locations. March ARB facilities south of the Project site are not included in this analysis since they would experience lower noise levels than those presented at the closest receiver locations, below applicable thresholds, due to additional benefit from additional barrier attenuate on and shielding provided by the Project building and site design, which locates all truck activity north of the Project site building which reduces the line-of-sight to Project noise sources.

Table 4.10-16
Unmitigated Operational Noise Levels at Receiver Locations

Receiver Location[1]	Land Use	Noise Levels by Noise Source (dBA L_{eq})			Combined Operational Noise Levels (dBA L_{eq})	Threshold Exceeded?		
						March JPA	*Moreno Valley*	
		Unloading/ Docking Activity	*Roof-Top Air Conditioning Unit*	*Parking Lot Vehicle Movements*		*Any Time (55 dBA L_{eq})*	*Daytime (65 dBA L_{eq})*	*Nighttime (60 dBA L_{eq})*
R1	Office	46.2	36.1	28.0	46.7	No	No	No
R2	Office	49.3	36.3	27.2	49.5	No	No	No
R3	Office	38.6	29.1	21.9	39.1	No	No	No
R4	Office	29.7	20.7	16.9	30.4	No	No	No
R5	Office	37.3	27.4	24.2	37.9	No	No	No

Notes: dBA = A-weighted decibel; Leq = energy equivalent; JPA = Joint Powers Authority.
1 See Figure 4.10-1 for the receiver and noise source locations.

As indicated in Tables 4.10-17 and Table 4.10-18, the Project would contribute a daytime operational noise level increase of up to 0.3 dBA L_{eq} and a nighttime operational noise level increase of up to 0.5 dBA L_{eq} at the sensitive receiver locations.

Table 4.10-17
Project Daytime Noise Level Contributions

Receiver Location	Total Project Operational Noise Level	Measurement Location	Reference Ambient Noise Levels	Combined Project and Ambient[1]	Project Increase	Threshold Exceeded?
R1	46.7	L1	58.5	58.8	0.3	No
R2	49.5	L2	60.3	60.6	0.3	No
R3	39.1	L3	52.9	53.1	0.2	No
R4	30.4	L4	61.7	61.7	0.0	No
R5	37.9	L4	61.7	61.7	0.0	No

Source: Appendix Q.
Notes:
1 Represents the combined ambient conditions plus the Project activities.

Table 4.10-18
Project Nighttime Noise Level Contributions

Receiver Location	Total Project Operational Noise Level	Measurement Location	Reference Ambient Noise Levels	Combined Project and Ambient	Project Increase	Threshold Exceeded?[1]
R1	**46.7**	**L1**	**56.2**	**56.7**	**0.5**	**No**
R2	**49.5**	**L2**	**59.6**	**59.6**	**0.0**	**No**
R3	**39.1**	**L3**	**49.9**	**50.3**	**0.4**	**No**
R4	**30.4**	**L4**	**57.2**	**57.2**	**0.0**	**No**
R5	**37.9**	**L4**	**57.2**	**57.3**	**0.1**	**No**

Source: Appendix Q.
Notes:
1 City of Moreno Valley 2017.

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not take into account the effect of any existing noise barriers or topography that may attenuate ambient noise levels and therefore present a conservative scenario for purposes of this analysis. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area (Appendix Q). The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model—FHWA-RD-77-108. To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The average daily trips (ADT) volumes used for the following

traffic scenarios: Existing, Opening Year 2023, and Horizon Year 2040 conditions. Table 4.10-19 presents a summary of the existing exterior traffic noise levels, with the addition of the proposed Project. As shown in Table 4.10-19, the Project is expected to generate an exterior noise level increase of up to 0.6 dBA CNEL at adjacent land uses, which would satisfy the significance thresholds. Furthermore, Table 4.10-20 and Table 4.10-21 present a comparison of the Opening Year 2023 and Horizon Year 2040 respectively, without and with Project conditions CNEL noise levels. As shown in Tables 4.10-20 and 4.10-21, the Project is expected to generate an exterior noise level increase up to 0.5 dBA CNEL at adjacent land uses, which will satisfy the significance threshold. Therefore, the off-site Project -related traffic noise level increase is considered a **less than significant** impact.

Table 4.10-19
Existing Condition Off-Site Project-Related Traffic Noise Impact

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?[2]	Threshold (dBA CNEL)[3]	Threshold Exceeded?[3]
			No Project	*With Project*	*Project Addition*			
1	Alessandro Bl.	n/o Trautwein Rd.	81.9	81.9	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	75.2	75.2	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	68.3	68.4	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	72.7	72.9	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	71.9	72.0	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	74.6	74.7	0.1	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	77.5	77.5	0.0	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	81.5	81.5	0.0	Yes	1.5	No
9	Alessandro Bl.	e/o Barton St.	80.7	80.7	0.0	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	76.7	76.7	0.0	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	77.1	77.1	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	77.1	77.1	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	75.1	75.2	0.1	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	79.1	79.7	0.6	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	79.3	79.9	0.6	No	1.5	No
16	Cactus Av.	e/o Frederick St.	79.9	80.0	0.1	No	1.5	No
17	Cactus Av.	e/o Graham St.	79.5	79.5	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	77.2	77.3	0.1	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	79.8	79.8	0.0	No	1.5	No

Notes: CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel.
1 The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
2 "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
3 Significance Criteria (FICON 1992).

Table 4.10-20
Opening Year 2023 Off-Site Project-Related Traffic Noise Impacts

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)1			Noise-Sensitive Land Use?2	Threshold (dBA CNEL)	Threshold Exceeded?
			No Project	*With Project*	*Project Addition*			
1	Alessandro Bl.	n/o Trautwein Rd.	82.4	82.4	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	76.4	76.4	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	68.7	68.8	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	73.2	73.4	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	72.5	72.6	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	75.2	75.2	0.0	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	77.9	78.0	0.1	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	82.2	82.2	0.0	Yes	1.5	No
9	Alessandro Bl.	e/o Barton St.	81.4	81.4	0.0	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	77.6	77.7	0.1	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	77.7	77.7	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	77.7	77.7	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	76.9	76.9	0.0	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	80.0	80.5	0.5	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	80.1	80.6	0.5	No	1.5	No
16	Cactus Av.	e/o Frederick St.	80.8	80.8	0.0	No	1.5	No
17	Cactus Av.	e/o Graham St.	80.4	80.4	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	78.3	78.3	0.0	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	81.6	81.6	0.0	No	1.5	No

Notes: CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel.
1 The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
2 "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.

Table 4.10-21
Horizon Year Off-Site Project-Related Traffic Noise Impacts

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)1			Noise-Sensitive Land Use?2	Threshold (dBA CNEL)	Threshold Exceeded?
			No Project	*With Project*	*Project Addition*			
1	Alessandro Bl.	n/o Trautwein Rd.	82.8	82.8	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	76.8	76.8	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	69.1	69.2	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	73.6	73.8	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	73.2	73.3	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	75.6	75.6	0.0	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	78.4	78.4	0.0	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	82.2	82.3	0.1	Yes	1.5	No

Table 4.10-21
Horizon Year Off-Site Project-Related Traffic Noise Impacts

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)1			Noise-Sensitive Land Use?2	Threshold (dBA CNEL)	Threshold Exceeded?
			No Project	*With Project*	*Project Addition*			
9	Alessandro Bl.	e/o Barton St.	82.2	82.3	0.1	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	77.9	77.9	0.0	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	78.1	78.1	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	78.1	78.1	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	77.3	77.3	0.0	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	80.4	80.9	0.5	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	80.6	81.0	0.4	No	1.5	No
16	Cactus Av.	e/o Frederick St.	81.2	81.2	0.0	No	1.5	No
17	Cactus Av.	e/o Graham St.	80.8	80.8	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	78.7	78.7	0.0	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	82.0	82.0	0.0	No	1.5	No

Notes: CNEL = Community Noise Equivalent Level; dBA = A-weighted decibel.
1 The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
2 "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
3 Significance Criteria (Section 4).

Since the 24-hour seven days per week Project-related operational noise level contributions would satisfy the significance criteria discussed in Section 4.10.3, Thresholds of Significance, the increases at the sensitive receiver locations would be **less than significant**. In addition, there would not be a substantial permanent increase in ambient noise levels in the Project vicinity above the levels existing without the Project.

Threshold NOI-2. Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Construction

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.

- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the FTA. Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 4.10-22 presents the expected Project related vibration levels at the nearby receiver locations.

Table 4.10-22
Construction Equipment Vibration Levels

Receiver Location	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold Exceeded?[1]
		Small Bulldozer	*Jackhammer*	*Loaded Trucks*	*Large Bulldozer*	*Highest Vibration Level*	
R1	225'	29.4	50.4	57.4	58.4	58.4	No
R2	210'	30.3	51.3	58.3	59.3	59.3	No
R3	792'	13.0	34.0	41.0	42.0	42.0	No
R4	244'	28.3	49.3	56.3	57.3	57.3	No
R5	703'	14.5	35.5	42.5	43.5	43.5	No
R6	350'	23.6	44.6	51.6	52.6	52.6	No

Source: Appendix Q.
Notes: VdB = vibration velocity decibel.
1 Does the peak vibration exceed the Federal Transit Administration (FTA) maximum acceptable vibration standard of 80 VdB? (City of Moreno Valley 2017).

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at 25 feet. At distances ranging from 140 to 4,823 feet from the Project construction activities, construction vibration levels are expected to range from 42.0 to 64.6 VdB. Using the construction vibration assessment methods provided by the FTA, Project construction vibration levels would remain below the FTA 80 VdB threshold at all sensitive receiver locations, and therefore construction vibration would be considered a less than significant impact; no mitigation measures are required. Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but would occur rather only during the times that heavy construction equipment is operating at the Project site perimeter. Though construction noise is temporary, intermittent and of short duration,

and would not present any long-term impacts, the following BMPs would reduce noise and vibration levels produced by the construction equipment to the nearby receiver locations:

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction.
- The construction contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

Therefore, construction-related vibration impacts are considered **less than significant** and would be further reduced with implementation of the BMPs described above.

Operations

Although the human threshold of perception for vibration is around 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement condition. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, would result in a less than significant impact as vibration levels would remain below the FTA vibration threshold of 80 VdB at nearby receiver locations. Therefore, no mitigation is required; operational impacts would be **less than significant**.

Threshold NOI-3. ***For a Project located within the vicinity of a private airstrip an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?***

The Project site is not within the vicinity of a private airstrip. March Air Reserve Base/Inland Port Airport (March ARB/IPA) is considered a joint-use airport utilized for both commercial and military purposes. As such, no impacts associated with exposing people residing or working within the vicinity of a private airstrip to excessive noise levels would result from Project implementation. The March ARB/IPA runway is located approximately 0.7 miles southwest of the Project site. The Project site is located within the C1 compatibility zone, as depicted in the March ARB/Inland Port Airport Land Use Compatibility Plan (Mead & Hunt 2014). Zone C1, Primary Approach/Departure Zone, encompasses areas of moderate to high noise

and moderate accidental potential risk. The Riverside County Airport Land Use Compatibility Plan Policy Document (RC ALUCP) includes the policies for determining the land use compatibility of the Project since it is located within 2 miles of an airport runway. Policy 4.1.5 Noise Exposure for Other Land Uses of the RC ALUCP requires that land uses, such as the industrial land use of the Project site, demonstrate compatibility with the acceptable noise levels on Table 2B of the RC ALUCP. The Table 2B Supporting Compatibility Criteria: Noise matrix, shown in Table 4.10-9, indicates that normally acceptable industrial land uses experience exterior noise levels between 60 to 65 dBA CNEL. Normally acceptable noise levels for industrial land uses indicate that noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities. The noise contour boundaries used to determine the potential aircraft-related noise impacts at the Project site are found in the RC ALUCP and are presented in Table 4.10-9.

The Project site is partially located within the 60 to 65 dBA CNEL noise level contour boundaries of March ARB/IPA. Based on the RC ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the RC ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. Therefore, construction and operational noise impacts associated with exposing people residing or working within the vicinity of a public airport would be considered **less than significant**.

4.10.5 Mitigation Measures

No significant impacts would occur; therefore, no mitigation is required.

4.10.6 Level of Significance After Mitigation

No significant impacts would result from implementation of the proposed Project, and no mitigation is required.

4.10.7 References

Caltrans (California Department of Transportation). 2013a. Technical Noise Supplement to the Traffic Noise Protocol. http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf.

Caltrans. 2013b. *Transportation and Construction Vibration Guidance Manual.* September 2013. http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf.

City of Moreno Valley. 2017. Municipal Code, Chapter 11.80 Noise Regulation.

County of Riverside. 2015. *County of Riverside General Plan – Noise Element.* http://planning.rctlma.org/Portals/0/genplan/general_plan_2016/elements/Ch07_Noise_120815.pdf?ver=2016-04-01-100805-193.

FICON (Federal Interagency Committee on Noise). 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. September 2018. https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

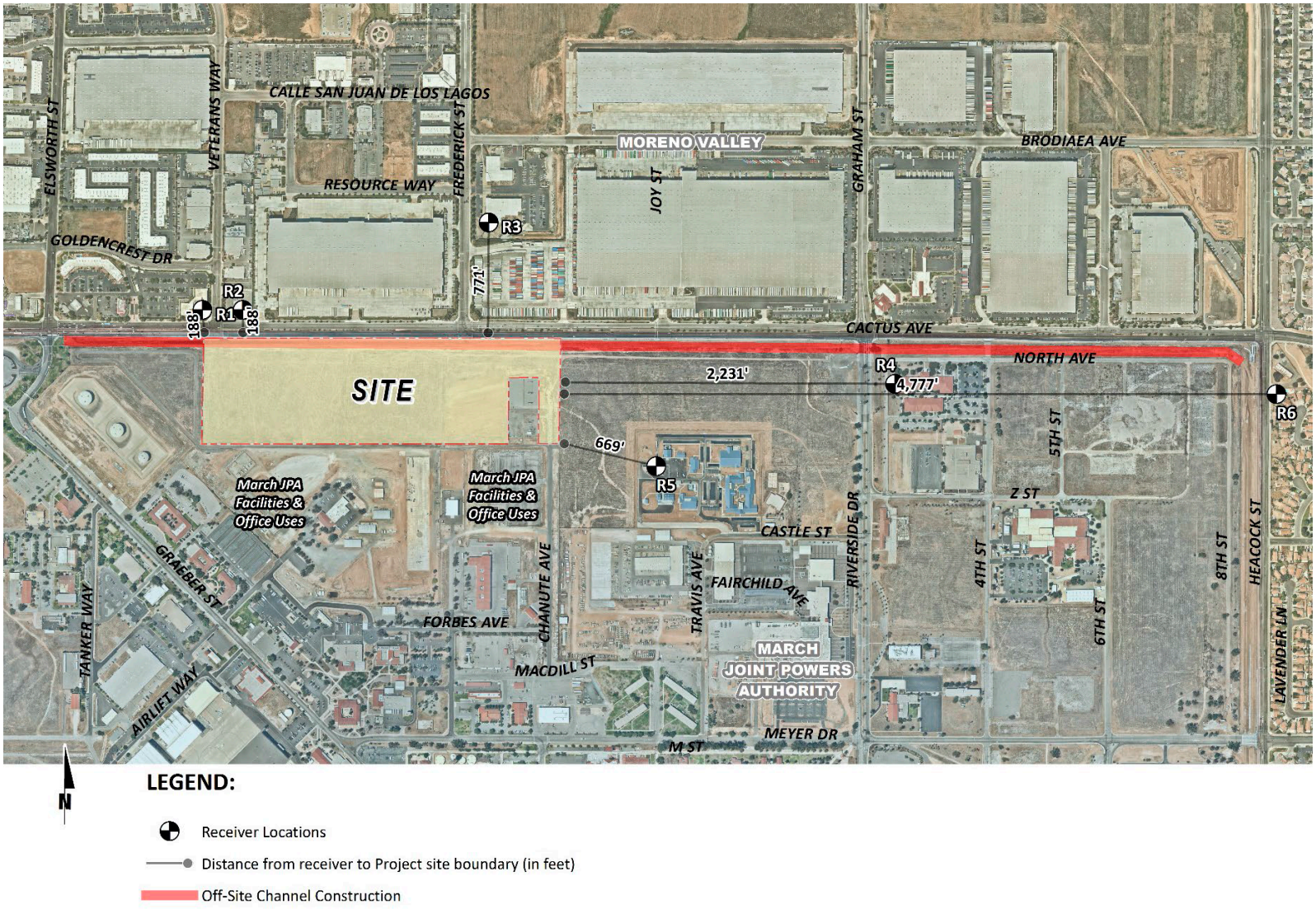
March JPA (Joint Powers Authority). 1999. *General Plan of the March Joint Powers Authority – Noise/Air Quality Element.* Accessed March 20, 2015. https://www.marchjpa.com/documents/docs_forms/general_plan_updt_011718.pdf.

Mead & Hunt. 2014. March Air Reserve Base / Inland Port Airport Land Use Compatibility Plan. http://www.rcaluc.org/Portals/0/PDFGeneral/plan/2014/17%20-%20Vol.%201%20March%20Air%20Reserve%20Base%20Final.pdf

OPR (Office of Planning and Research). 2017. State of California 2017 General Plan Guidelines. Appendix D Noise Element Guidelines. http://opr.ca.gov/docs/OPR_Appendix_D_final.pdf.

OPR. 2017. General Plan Guidelines: 2017 Update. Appendix D Noise Element Guidelines.

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SOURCE: Urban Crossroads 2018

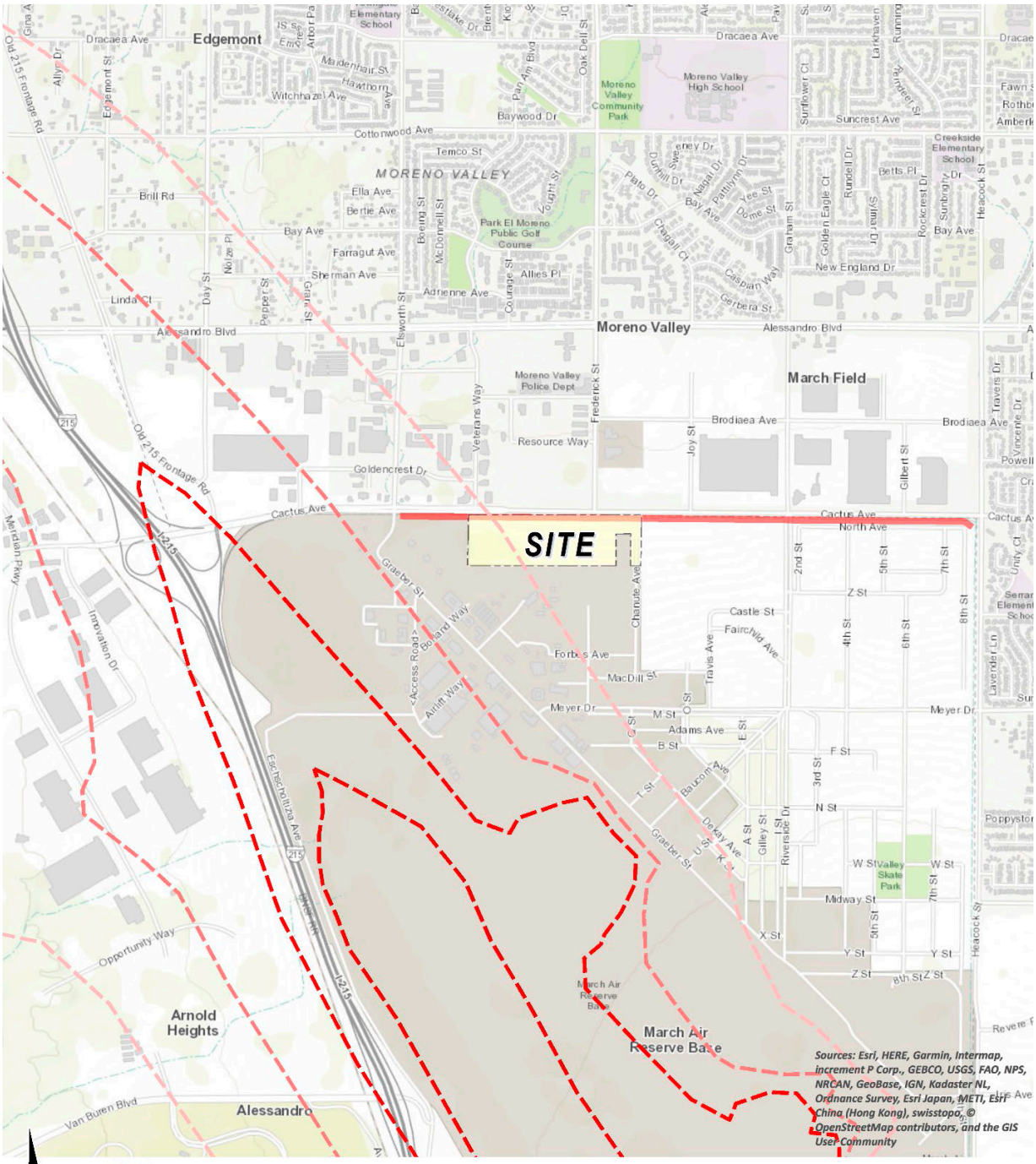
FIGURE 4.10-1

Receiver Locations

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

Unmitigated 60 dBA CNEL Noise Level Contour Boundary

Unmitigated 65 dBA CNEL Noise Level Contour Boundary

Unmitigated 70 dBA CNEL Noise Level Contour Boundary

Unmitigated 75 dBA CNEL Noise Level Contour Boundary

Source: Riverside County Airport Land Use Compatibility Plan, Chapter W7, Exhibit MA-4.

Off-Site Channel

SOURCE: Urban Crossroads 2018

FIGURE 4.10-2

March ARB IPA Future Airport Noise Contours

K4 Warehouse and Cactus Channel Improvements Project EIR

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4.11 TRANSPORTATION

This section describes the existing traffic/circulation setting of the K4 Warehouse and Cactus Channel Improvement Project (proposed Project or Project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. The traffic analysis provided in this section is based on the information provided in the Traffic Impact Analysis (TIA) report, prepared by Urban Crossroads in April 2019 (Appendix R).

This section analyzes the potential of the proposed Project to conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system; conflict with an applicable congestion management program (CMP); substantially increase hazards due to a design feature or incompatible uses; result in inadequate emergency access; and conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

As mentioned in Chapter 2, Project Description, of this EIR, the Project includes the following components:

- **General Plan Amendment**: The Project site has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger**: A parcel merger is required to merge the five separate parcels on the Project site into on 35.4-acre parcel.

4.11.1 Existing Conditions

This section provides a summary of the existing circulation network, the March JPA General Plan Circulation Network, and a review of existing peak-hour intersection operations, roadway segment operations, freeway mainline operations, and traffic signal warrant analyses.

The approximately 35.4-acre Project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west, to where Frederick Street terminates at Cactus Avenue on the east. The Project site is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California as

shown in Figure 2-1, Project Location. The Interstate 215 Freeway (I-215) is located approximately 0.8 miles east of the Project site.

Existing Circulation Network

The Project's study area includes a total of 25 existing and future intersections as shown in Figure 4.11-1, Study Area. Figure 4.11-2 and 4.11-3 identify the number of through traffic lanes for existing roadways and intersection traffic controls.

General Plan Circulation Element

The Project site is located within the March JPA (Northeast Planning Subarea), but the study area includes intersections that share borders with the neighboring jurisdictions of the County of Riverside, City of Riverside, City of Moreno Valley, and the California Department of Transportation (Caltrans).

March Joint Powers Authority (JPA)

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the March JPA General Plan Circulation Element, are described subsequently. The March JPA General Plan Circulation Element (March JPA 1999) roadway classification map and roadway cross-sections are shown on Exhibits 3-2, and 3-3 in the Traffic Impact Analysis (TIA) (Appendix R). The March JPA is currently undergoing a General Plan Update, but the work effort associated with the General Plan Update had not been completed at the time of this analysis. March JPA Resolution 16-05 amended the General Plan Transportation Element. The roadway system classifications from the March JPA General Plan Circulation Element are shown on Exhibit 3-2 of the TIA.

County of Riverside, City of Riverside, and City of Moreno Valley

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the County of Riverside General Plan Circulation Element, City of Riverside General Plan Circulation Element, and City of Moreno Valley General Plan Circulation Element are shown on Exhibits 3-4 through 3-9 in Appendix R.

Truck Routes

The March JPA designated truck route map is shown on Exhibit 3-10 in Appendix R. I-215, Alessandro Boulevard (west of I-215), Meridian Parkway, Innovation Drive, Opportunity Way, Van Buren Boulevard, Krameria Avenue, Street Y, and Cactus Avenue are identified as designated truck routes. Truck traffic westbound onto Alessandro Boulevard from Meridian Parkway and San Gorgonio Drive is limited to local deliveries.

Transit Service

The study area within the March JPA and the surrounding Cities of Riverside and Moreno Valley are currently served by the Riverside Transit Authority (RTA), a public transit agency serving various jurisdictions within Riverside County. The existing bus routes provided within the Project area by RTA are shown on Exhibit 3-11 in the TIA (Appendix R).

RTA Route 20 operates along Alessandro Boulevard to the north of the Project site, providing access to RUHS Medical Center, Kaiser Permanente Hospital, Moreno Valley College, and the Moreno Valley/March Field Metrolink Station. Route 20 operates from 4:27 a.m. to 10:11 p.m. in the eastbound direction and from 3:53 a.m. to 10:54 p.m. in the westbound direction during weekday service. The route also offers weekend/holiday service ranging from approximately 7:00 a.m. to 9:30 p.m.

RTA Route 11 operates along Cactus Avenue northeast of the Project site, and Frederick Street north of the Project site, providing access to the Moreno Valley Mall, Moreno Valley High School, two middle schools, the Riverside County Superior Court, and Kaiser Medical Offices. The clockwise loop of Route 11 operates from 5:15 a.m. to 9:42 p.m., and the counterclockwise loop operates from 5:51 a.m. to 9:30 p.m. during weekday service. The route also offers weekend/holiday service ranging from approximately 7:30 a.m. to 8:30 p.m.

Transit service is reviewed and updated by RTA periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments, which may lead to either enhanced or reduced service where appropriate.

The recently opened Moreno Valley/March Field Metrolink Station is located on Meridian Parkway, approximately 1.5 miles to the Project site. The Metrolink Perris Valley Line serves the Riverside area, providing access to the City of Perris, Riverside, Anaheim, and downtown Los Angeles. The Perris Valley Line also provides transfer service to the Riverside and Inland Empire – Orange County Metrolink Lines, and operates from 4:57 a.m. to 2:05 p.m. in the northbound direction and from 8:35 a.m. to 7:20 p.m. in the southbound direction at this station. Weekend and holiday service does not serve the Moreno Valley/March Field Station.

Bicycle and Pedestrian Facilities

Field observations conducted in May 2018 indicate nominal pedestrian and bicycle activity within the study area. Existing pedestrian facilities within the study area are shown on Exhibit 3-12 in the TIA (Appendix R). There are currently Class II bike lanes along Alessandro Boulevard northwest of the Project site; Elsworth Street between Alessandro Boulevard and Cactus Avenue; and, Cactus Avenue between Veterans Way and Heacock Street. Existing sidewalks are currently in place along both sides of Elsworth Street, Veterans Way, and Alessandro Boulevard. Cactus Avenue has existing sidewalks on the north side of the street.

Study Scenarios

The following study scenarios are included in the analysis of traffic conditions:

- **Existing Conditions**: Information for the Existing condition is disclosed to represent the baseline traffic conditions as they existed at the time the analysis was conducted in 2018.
- **Existing with Project Conditions**: This scenario analyzes existing traffic conditions with trips added due to the Project. The Existing with Project analysis is intended to identify the Project-specific traffic impacts associated solely with the development of the Project based on a comparison of the Existing with Project Conditions to Existing conditions. As such, Existing with Project Conditions were evaluated for each phase of development to determine the Project-specific traffic impacts associated with each phase.
- **Opening Year Cumulative (2023) Conditions**: The Opening Year Cumulative condition analyses identifies potential near-term cumulative circulation system deficiencies in year 2023. To account for background traffic growth, an ambient growth factor and traffic associated with other cumulative Projects were added to existing traffic volumes. With and without Project conditions were compared to isolate Project related impacts.
- **Horizon Year Traffic (2040) Conditions**: The Horizon Year (buildout year 2040) traffic volume forecasts were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. Horizon Year with Project traffic was determined by adding the Project traffic to the Horizon Year without Project forecasts from the RivTAM model.

The traffic impacts for those conditions outlined above are based on weekday AM (7:00 a.m. to 9:00 a.m.) and PM (4:00 p.m. to 6:00 p.m.) peak period traffic volumes collected in May 2018 in the study area. The weekday AM and PM peak commute hours represent the highest overall hourly volumes in the study area (during the AM and PM peak periods), while the remaining off-peak hours would have lower overall traffic volumes. All four representative agencies (March JPA, cities of Moreno Valley and Riverside, and Riverside County) require that project traffic impacts be based on traffic conditions during the weekday AM and PM peak hours.

Study Area

A traffic study scoping agreement was reviewed and approved by March JPA staff prior to the preparation of the TIA. The traffic study scoping agreement provided an outline of the Project's study area, trip generation, trip distribution, and analysis methodology. This agreement is included in Appendix 1.1 of the TIA (Appendix R).

Intersections

The 25 study area intersections, shown in Figure 4.11-1 and listed in Table 4.11-1, were selected for analysis based on consultation with March JPA and City of Moreno Valley staff. In general, the study area includes intersections where the Project is anticipated to contribute 50 or more peak-hour trips. Table 4.11-1 also indicates whether an intersection is part of the CMP, described further in Section 4.11.2, Methodology.

Table 4.11-1
Intersection Analysis Locations

ID	Intersection Location	Jurisdiction	CMP?
1	Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard	City of Riverside	No
2	Trautwein Road/Alessandro Boulevard	City of Riverside	No
3	Mission Grove Parkway/Alessandro Boulevard	City of Riverside	No
4	Barton Street/Alessandro Boulevard	City of Riverside/JPA	No
5	San Gorgonio Drive/Alessandro Boulevard	City of Riverside/JPA	No
6	Sycamore Canyon Boulevard/Alessandro Boulevard	City of Riverside/JPA	No
7	Meridian Parkway/Cactus Avenue	March JPA	No
8	Meridian Parkway/Innovation Drive	March JPA	No
9	Meridian Parkway/Opportunity Way	March JPA	No
10	Meridian Parkway/Van Buren Boulevard	March JPA/County	No
11	Innovation Drive/Cactus Avenue	March JPA	No
12	I-215 southbound ramps/Alessandro Boulevard	City of Riverside/County/Caltrans	Yes
13	I-215 southbound ramps/Cactus Avenue	March JPA/County/Caltrans	No
14	I-215 northbound ramps/Alessandro Boulevard	City of Riverside/County/Caltrans	Yes
15	Old 215 Frontage Road/Alessandro Boulevard	Cities of Riverside and MV/County	No
16	Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue	March JPA/Caltrans	No
17	Day Street/Alessandro Boulevard	City of Moreno Valley	No
18	Elsworth Street/Alessandro Boulevard	City of Moreno Valley	No
19	Elsworth Street/Cactus Avenue	March JPA/City of Moreno Valley	No
20	Veterans Way/Alessandro Boulevard	City of Moreno Valley	No
21	Veterans Way/Cactus Avenue	March JPA/City of Moreno Valley	No
22	Frederick Street/Alessandro Boulevard	City of Moreno Valley	No
23	Frederick Street/Cactus Avenue	March JPA/City of Moreno Valley	No
24	Graham Street – Riverside Drive/Cactus Avenue	March JPA/City of Moreno Valley	No
25	Heacock Street/Cactus Avenue	March JPA/City of Moreno Valley	No

Source: Appendix R.
CMP = Congestion Management Program
JPA = March Joint Powers Authority

Freeway Mainline Segments

The Project's study area freeway mainline analysis was performed under the Highway Capacity Manual (TRB 2010) methodology for the Basic Freeway Segments utilizing actual vehicle traffic

volumes, where heavy trucks were accounted for as a percentage of total traffic. Table 4.11-2 shows the study freeway mainline segments, in each direction of flow, that were analyzed.

Table 4.11-2
Freeway Mainline Segment Analysis Locations

ID	Freeway Mainline Segments
1	I-215 Freeway – southbound, north of Cactus Avenue
2	I-215 Freeway – southbound, south of Cactus Avenue
3	I-215 Freeway – northbound, north of Cactus Avenue
4	I-215 Freeway – northbound, south of Cactus Avenue

Source: Appendix R.

Freeway Merge/Diverge Ramp Junctions

The study area freeway merge/diverge ramp junction analysis was also performed under the Highway Capacity Manual (TRB 2010) methodology for the freeway merge/diverge ramp locations, and direction of flow, listed below in Table 4.11-3.

Table 4.11-3
Freeway Merge/Diverge Ramp Junction Analysis Locations

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – southbound, off-ramp at Cactus Avenue (diverge)
2	I-215 Freeway – southbound, loop off-ramp at Cactus Avenue (diverge)
3	I-215 Freeway – southbound, on-ramp at Cactus Avenue (merge)
4	I-215 Freeway – northbound, on-ramp at Cactus Avenue (merge)
5	I-215 Freeway – northbound, loop on-ramp at Cactus Avenue (merge)
6	I-215 Freeway – northbound, off-ramp at Cactus Avenue (diverge)

Source: Appendix R.

Traffic Signal Warrant Analysis

The term "signal warrants" refers to the list of established criteria in the *California Manual of Uniform Traffic Control Devices* (CA MUTCD) used by Caltrans and other public agencies to quantitatively assess the need for traffic signal installation at an unsignalized intersection. The future intersection of Meridian Parkway/Street A (under March JPA jurisdiction) has been assessed for the need for signalization.

Existing Conditions Traffic

The analysis results of Existing Conditions is presented below. Traffic operations of roadway facilities are described using the term "level of service" (LOS). Section 4.11.2 describes the analysis methodologies in detail.

Traffic Volumes

As previously mentioned, the existing intersection LOS analysis is based on the weekday AM and PM peak hour traffic volumes collected in May 2018. Consistent with standard traffic engineering practice, these traffic counts were conducted either on Tuesday, Wednesday, or Thursday due to potential fluctuations in traffic that typically occur on Mondays, Fridays, holidays, or weekends. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes. In addition, nearby schools were in session and operating on normal schedules. The traffic counts include the following vehicle classifications: passenger cars, 2-axle trucks, 3-axle trucks, and 4- or more axle trucks.

To represent the impact of large trucks, buses, and recreational vehicles on traffic flow, truck traffic has been accounted for in the analysis as a percentage of total traffic at the study area intersections. The traffic volumes utilized in the analysis of intersections, basic freeway segments, and merge/diverge ramp junctions utilize the actual vehicle traffic flow, and trucks are reflected in the analysis as a percentage of the total traffic flow, and not as passenger-car equivalents (PCE).

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown in Figure 4.11-4. Where 24-hour tube count data was not available, existing ADT volumes were based upon factored intersection peak hour counts. Existing weekday AM and weekday PM peak-hour intersection volumes (in actual vehicles) are shown in Figure 4.11-5.

Intersection Operations

Existing peak-hour traffic operations have been evaluated for the study area intersections based on the intersection analysis methodology presented in Section 4.11.2 of this chapter. The intersection operations analysis worksheets are provided in Appendix R. The intersection operations analysis results are provided in Table 4.11-4 and shown in Figure 4.11-6, Existing (2018) Summary of LOS, which indicate that the following study area intersections are currently operating at an unsatisfactory LOS (LOS E or F) during one or both peak hours:

- Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard – LOS F AM and PM peak hours
- Mission Grove Parkway/Alessandro Boulevard – LOS E AM peak hour
- Sycamore Canyon Boulevard/Alessandro Boulevard – LOS E AM peak hour
- Elsworth Street/Cactus Avenue – LOS F AM and PM peak hours

The deficiencies at Overlook Parkway/Canyon Crest Drive and Alessandro Boulevard are caused by minimum green times necessary for pedestrian crossing time. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

Table 4.11-4
Intersection Analysis for Existing (2018) Conditions

#	Intersection	Traffic Control[1]	Delay[2] (seconds)		Level of Service		Acceptable LOS	Jurisdiction
			AM	*PM*	*AM*	*PM*		
1	Overlook Parkway – Canyon Crest/Alessandro	TS	**356.3**	**81.5**	**F**	**F**	D	Riverside
2	Trautwein Road/Alessandro Boulevard	TS	36.1	25.5	D	C	D	Riverside
3	Mission Grove Parkway/Alessandro Boulevard	TS	**76.6**	22.6	**E**	C	D	Riverside
4	Barton Street/Alessandro Boulevard	TS	25.5	22.8	C	C	D	Riverside/JPA
5	San Gorgonio Drive/Alessandro Boulevard	TS	17.0	15.5	B	B	D	Riverside/JPA
6	Sycamore Canyon Boulevard/Alessandro Blvd	TS	**79.4**	47.6	**E**	D	D	Riverside/JPA
7	Meridian Parkway/Cactus Avenue	TS	45.0	36.7	D	D	D	JPA
8	Meridian Parkway/Innovation Drive	CSS	24.4	24.9	C	C	D	JPA
9	Meridian Parkway/Opportunity Way	TS	10.0	23.1	A	C	D	JPA
10	Meridian Parkway/Van Buren Boulevard	TS	44.6	41.2	D	D	D	JPA
11	Innovation Drive/Cactus Avenue	TS	18.6	18.1	B	B	D	JPA
12	I-215 southbound ramps/Alessandro Boulevard	TS	5.5	8.9	A	A	D	Caltrans/Riverside/County
13	I-215 southbound ramps/Cactus Avenue	TS	4.3	9.1	B	A	D	Caltrans/JPA/County
14	I-215 northbound ramps/Alessandro Boulevard	TS	21.1	20.4	C	C	D	Caltrans/Riverside/County
15	Old 215 Frontage Road/Alessandro Boulevard	TS	22.0	32.9	C	C	D	MV/Riverside/County
16	Old 215 Frontage – I-215 NB ramps/Cactus Ave	TS	52.4	20.2	D	C	D	Caltrans/JPA
17	Day Street/Alessandro Boulevard	TS	23.4	16.1	C	B	D	MV
18	Elsworth Street/Alessandro Boulevard	TS	20.7	25.5	C	C	D	MV
19	Elsworth Street/Cactus Avenue	TS	**189.6**	**99.1**	**F**	**F**	D	MV/JPA
20	Veterans Way/Alessandro Boulevard	TS	19.0	19.8	B	B	D	MV
21	Veterans Way/Cactus Avenue	TS	7.1	7.7	A	A	D	MV/JPA
22	Frederick Street/Alessandro Boulevard	TS	38.5	50.8	A	D	D	MV
23	Frederick Street/Cactus Avenue	TS	21.7	22.1	C	C	D	MV/JPA

Table 4.11-4
Intersection Analysis for Existing (2018) Conditions

#	Intersection	Traffic Control[1]	Delay[2] (seconds)		Level of Service		Acceptable LOS	Jurisdiction
			AM	*PM*	*AM*	*PM*		
24	Graham Street – Riverside Drive/Cactus Ave	TS	47.1	40.5	D	D	D	MV/JPA
25	Heacock Street/Cactus Avenue	TS	45.4	28.2	D	C	D	MV/JPA

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
1 CSS = cross-street stop; TS = traffic signal
2 Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

Traffic Signal Warrants

Traffic signal warrants are based on existing peak hour intersection approach volumes. Based on the warrants, the only existing unsignalized intersection in the study area, Meridian Parkway/Innovation Drive, does not currently warrant a traffic signal. The analysis worksheets are provided in Appendix R.

Off-Ramp Queuing Analysis

A queuing analysis was performed for the off-ramps at the I-215/Cactus Avenue interchange to assess vehicle queues of the off-ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections, and may potentially "spill back" onto the I-215 mainline. The queuing analysis findings are presented in Table 4.11-5. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. Analysis worksheets are provided in Appendix R.

Table 4.11-5
Existing Conditions Peak-Hour Freeway Off-Ramp Queuing

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)[1]		Satisfactory?[2]	
			AM	*PM*	*AM*	*PM*
I-215 SB ramps/Cactus Avenue	SBR	1,115	128	0	Yes	Yes
	NBR	1,850	0	0	Yes	Yes
I-215 NB ramps/Cactus Avenue	NBL	145	541[4]	45	Yes[3]	Yes
	NBT/R	1,650	294	54	Yes	Yes

Source: Appendix R.
SBL = southbound left turn lane; SBR = southbound right turn lane; NBL = northbound left turn lane; NBR = northbound right turn lane
1 Maximum queue length for the approach reported

2 Stacking Distance is satisfactory if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking, which is assumed to be provided in the transition for turn pockets, is reflected in the stacking distance shown in this table, where applicable.
3 Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 mainline.
4 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

As shown on Table 4.11-5, there are no existing queues that spill onto the I-215 mainline. While the AM peak hour queue (541 feet) at the northbound left-turn lane of the off-ramp exceeds the 145 foot storage lane, that queue combined with the queue (294 feet) of the shared through plus right-turn lane, on a single off-ramp lane, would not spillover to the I-215 mainline.

Basic Freeway Segment Analysis

Existing mainline directional volumes for the weekday AM and PM peak hours are shown in Figure 4.11-7. As provided in Table 4.11-6, the basic freeway segments analyzed were found to operate at a satisfactory LOS (LOS D or better) during the peak hours. Analysis worksheets are provided in Appendix R. However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the PM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Table 4.11-6
Existing Conditions Freeway Segment Analysis

Freeway	Direction	Mainline Segment	Lanes[2]	Volume		Truck %	Truck %	Density[3]		LOS	
				AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215	SB	north of Cactus Avenue	4	3,766	3,120	3%	3%	15.1	--[4]	B	**F**
		south of Cactus Ave	4	3,600	3,476	2%	2%	14.3	--[4]	B	**F**
	NB	north of Cactus Avenue	4	1,954	3,377	3%	3%	--[4]	--[4]	**F**	**F**
		south of Cactus Ave	4	3,446	3,606	2%	2%	--[4]	--[4]	**F**	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
1 NB = Northbound; SB = Southbound
2 Number of lanes are in the specified direction and are based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 Observations made in field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated based on the HCM freeway merge/diverge analysis methodology presented in Section 4.11.2 of this chapter. As shown in

Table 4.11-7, the freeway ramps currently operate at LOS D or better. Existing freeway ramp junction operations analysis worksheets are provided in Appendix R. However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Table 4.11-7
Existing Conditions Freeway Ramp Junction Merge/Diverge Analysis

Freeway	Direction	Ramp or Segment	Lanes on Freeway[2]	AM Peak Hour		PM Peak Hour	
				Density[3]	*LOS*	*Density*[3]	*LOS*
I-215	SB	off-ramp at Alessandro Boulevard	4	15.4	B	--[4]	**F**
		off-ramp at Cactus Avenue	4	16.1	C	--[4]	**F**
		on-ramp at Cactus Avenue	3	21.0	C	--[4]	**F**
	NB	on-ramp at Alessandro Boulevard	3	--[4]	**F**	--[4]	**F**
		loop on-ramp at Cactus Ave – downstream	3	--[4]	**F**	--[4]	**F**
		loop on-ramp at Cactus Ave – upstream	3	--[4]	**F**	--[4]	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
1 NB = Northbound; SB = Southbound
2 The number of lanes on the freeway prior to the merge with on-ramp is used in the analysis. Number of lanes are in the specified direction and are based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 Observations made in field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

4.11.2 Methodology

This section summarizes the methodologies used to perform the traffic analyses. The methodologies described are consistent with March JPA traffic study guidelines. Study locations and study scenarios are discussed in Section 4.11.1, Existing Conditions.

Level of Service

Traffic operations of roadway facilities are described using LOS. LOS is a qualitative description of traffic flow based on several factors, including speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

Intersection Analysis

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The March JPA, City of Riverside, City of Moreno Valley, and County of Riverside require signalized and unsignalized intersection operations analysis to be based on the methodology described in the Highway Capacity Manual (HCM).

Signalized Intersections

Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections, LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as provided in Table 4.11-8.

Study area intersections, including freeway ramps, located within the March JPA, City of Riverside, City of Moreno Valley and Caltrans jurisdiction have been analyzed using the software package Synchro (Version 10). Synchro is a traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Common practice for LOS analysis is to use a peak 15-minute rate of flow. Therefore, the peak-hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Signal timing for the freeway arterial-to-ramp intersections was obtained from Caltrans District 8.

Table 4.11-8
Signalized Intersection LOS Thresholds

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F

Source: HCM 2010.
V/C = volume to capacity ratio

Unsignalized Intersections

The LOS rating is based on the weighted average control delay expressed in seconds per vehicle, as shown in Table 4.11-9. At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

Table 4.11-9
Unsignalized Intersection Level of Service Thresholds

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service
Little or no delay	0 to 10.00	A
Short traffic delay	10.01 to 15.00	B
Average traffic delay	15.01 to 25.00	C
Long traffic delay	25.01 to 35.00	D
Very long traffic delay	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded	> 50.00	F

Source: HCM 2010.

Freeway Off-Ramp Queuing Analysis

Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the study area off-ramps to determine potential queuing impacts at the freeway ramp intersections. Specifically, the queuing analysis is used to identify any potential queuing and spill-back onto the I-215 mainline from the off-ramps.

Traffic Signal Warrant Analysis

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This traffic analysis uses the signal warrant criteria presented in the latest edition of the *California Manual on Uniform Traffic Control Devices* (CA MUTCD) for all unsignalized study area intersections. Existing and future unsignalized intersections that provide access to the Project were assessed for the potential need for new traffic signals based on ADT volumes and the Caltrans planning level ADT-based signal warrant analysis worksheets.

Note that a signal warrant defines only one condition (traffic volumes) of several conditions under which the installation of a traffic signal might be warranted. Meeting this threshold does not require that a traffic control signal be installed at a particular location, but, rather, that other traffic factors and conditions be

evaluated to determine whether the signal is truly justified. Signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above satisfactory LOS, or vice-versa, operate below satisfactory LOS and not meet a signal warrant.

Freeway Mainline Segment Analysis

The specific freeway mainline segments that were analyzed were discussed with the March JPA traffic consultant during the TIA scoping process and is consistent with previous traffic studies in prepared for the March JPA. Freeway analysis locations were included in the approved scoping document dated June 6, 2018. Consistent with recent March JPA guidance, and because impacts to freeway segments dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry is not required.

The freeway segments were evaluated based on peak-hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using HCS7 software. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 4.11-10 provides a summary of the freeway segment LOS descriptions for each density range.

Table 4.11-10
Description of Freeway Mainline Level of Service

Level of Service	Description	Density Range (pc/mi/ln)
A	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0–11.0
B	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1–18.0
C	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1–26.0
D	Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1–35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1–45.0
F	Breakdown in vehicle flow.	>45.0

Source: HCM, 2010.
pc/mi/ln = passenger cars per mile per lane.

The number of lanes for the baseline conditions was obtained from field observations conducted in May 2018. These existing freeway geometrics were used for all analysis scenarios.

I-215 mainline volume data was obtained from the Caltrans Performance Measurement System (PeMS) website for the I-215 segments. The data is from May 2018. In addition, truck traffic, represented as a percentage of total traffic, has been used in an effort to not overstate traffic volumes and peak-hour deficiencies. As such, actual vehicles (as opposed to PCE volumes) have been used for the purposes of the freeway segment analysis.

Freeway Merge/Diverge Ramp Junction Analysis

The freeway system in the study area was broken into segments defined by freeway-to-arterial interchange locations, resulting in three existing on- and off-ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis was performed at all ramp locations with respect to the nearest on- or off-ramp at each interchange to be consistent with Caltrans guidance and comments received on similar Projects in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS7 software. The measures of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on- and off-ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 4.11-11 provides a summary of the merge/diverge area LOS descriptions for each density range used.

Table 4.11-11
Description of Freeway Merge/Diverge Level of Service

Level of Service	Density Range (pc/mi/ln)
A	≤10.0
B	10.0 – 20.0
C	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

Source: HCM, 2010.
pc/mi/ln = passenger cars per mile per lane.

Project Fair Share Calculation Methodology

In cases where this traffic analysis identifies that the proposed Project would contribute additional traffic volumes to cumulative traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies were identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to total future (Horizon Year) traffic:

Project Fair Share % = Project Traffic/2040 Total Traffic

4.11.3 Relevant Plans, Policies, and Ordinances

The following section describes regulations, plans, policies, and ordinances relevant to the study area. These include policies or regulations regarding minimum LOS standards. State, regional, and local regulations are described. There are no traffic-specific federal regulations applicable to the Project. A summary of minimum LOS standards as applicable to the Project is provided in Section 4.11.4, Thresholds of Significance.

State

Senate Bill 743

On September 27, 2013, Governor Brown signed SB 743, which became effective on January 1, 2014. The purpose of SB 743 is to streamline the review under the California Environmental Quality Act (CEQA) process for several categories of development projects including the development of infill projects in transit priority areas and to balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions. SB 743 adds Chapter 2.7: Modernization of Transportation Analysis for Transit Oriented Infill Projects to the CEQA Statute (Section 21099). Section 21099(d)(1) provides that aesthetic and parking impacts of a residential, mixed-use residential, or employment center project on an infill site within a transit priority area shall not be considered significant impacts on the environment. In addition, SB 743 mandates that alternative metric(s) for determining impacts relative to transportation shall be developed to replace the use of LOS in CEQA documents.

Currently, environmental review of transportation impacts focuses on the delay that vehicles experience at intersections and on roadway segments, which is often measured using LOS. Mitigation for impacts on vehicular delay often involves increasing capacity such as widening a roadway or the size of an intersection, which in turns encourages more vehicular travel and greater pollutant emissions. Additionally, improvements to increase vehicular capacity can often discourage alternative forms of transportation such as biking and walking. SB743 directs the office of Planning and Research (OPR) to develop an alternative metric(s) for analyzing transportation impacts in CEQA document. The alternative shall promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of multimodal transportation system, and providing clean, efficient access to destinations. Under SB 743, it is anticipated that the focus of transportation analysis will shift from vehicle delay to vehicle miles traveled (VMT) within transit priority areas (i.e., areas well served by transit).

Pursuant to SB743, OPR released the draft revised CEQA Guidelines in November 2017, recommending the use of vehicles miles traveled (VMT) for analyzing transportation impacts. Additionally, OPR released Updates to Technical Advisory on Evaluating Transportation Impacts

in CEQA, to provide guidance on VMT analysis. In this Technical Advisory, OPR provides its recommendations to assist lead agencies in screening out projects from VMT analysis and selecting a significance threshold that may be appropriate for their particular projects. While OPR's Technical Advisory is not binding on public agencies, CEQA allows lead agencies to "consider thresholds of significance... recommended by other public agencies, provided the decision to adopt those thresholds is supported by substantial evidence." (CEQA Guidelines, § 15064.7, subd. (c).)

In December 2018 CEQA Guidelines were updated to add new section 15064.3 "Determining the Significance of Transportation Impacts" that describes specific considerations for evaluating a project's transportation impacts using the VMT methodology. This new methodology is required to be used for projects beginning on July 1, 2020. This new CEQA Guideline section applies prospectively, meaning that projects such as the proposed Project are not currently required to incorporate VMT as the primary transportation impact metric.

Sustainable Communities Strategies: Senate Bill 375

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, Senate Bill (SB) 375, Chapter 728, Statutes of 2008) supports the state's climate action goals to reduce greenhouse gas emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Under the Sustainable Communities Act, the California Air Resources Board (ARB) sets regional targets for greenhouse gas emissions reductions from passenger vehicle use. In 2010, ARB established these targets for 2020 and 2035 for each region covered by one of the state's metropolitan planning organizations (MPO). ARB will periodically review and update the targets, as needed.

Each of California's MPOs must prepare a sustainable communities strategy (SCS) as an integral part of its regional transportation plan (RTP). The SCS contains land use, housing, and transportation strategies that, if implemented, would allow the region to meet its greenhouse gas emission reduction targets. Once adopted by the MPO, the RTP/SCS guides the transportation policies and investments for the region. ARB must review the adopted SCS to confirm and accept the MPO's determination that the SCS, if implemented, would meet the regional greenhouse gas targets. If the combination of measures in the SCS would not meet the regional targets, the MPO must prepare a separate alternative planning strategy (APS) to meet the targets. The APS is not a part of the RTP.

The Sustainable Communities Act also establishes incentives to encourage local governments and developers to implement the SCS or the APS. Developers can get relief from certain environmental review requirements under the California Environmental Quality Act (CEQA) if their new residential and mixed-use Projects are consistent with a region's SCS (or APS) that meets the targets (see Cal. Public Resources Code Sections 21155, 21155.1, 21155.2, 21159.28.).

Caltrans

Based on guidance from Caltrans, the LOS for operating state highway facilities is based on Measures of Effectiveness (MOE) identified in the HCM (Caltrans 2002). Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on state highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing state highway facility is operating at less than this target LOS, the existing MOE should be maintained. In general, the region-wide goal for a satisfactory LOS on all freeways, roadways segments, and intersections is D. For undeveloped or not densely developed locations, the goal may be to achieve LOS C. For the purposes of this study the LOS standard of D is used. The Caltrans facilities studied provide access to well developed or quickly developing areas and therefore it was found that a standard of D is more appropriate. Per Caltrans guidance, at locations that are already operating at deficient LOS (E or F) an impact occurs if 50 or more peak-hour trips are added (Caltrans 2002).

Regional

Southern California Association of Governments (SCAG)

The Southern California Association of Governments (SCAG) develops the Regional Transportation Plan (RTP), which presents the transportation vision for Los Angeles, Orange, San Bernardino, Imperial, Riverside, and Ventura Counties. SB 375 was enacted to reduce greenhouse gas emissions from automobiles and light trucks through integrated transportation, land use, housing and environmental planning. Under the law, SCAG is tasked with developing a Sustainable Communities Strategy (SCS), an element of the Regional Transportation Plan (RTP) that provides a plan for meeting emissions reduction targets set forth by the California Air Resources Board.

The 2016 RTP/SCS identifies priorities for transportation planning within the Southern California region, sets goals and policies, and identifies performance measures for transportation improvements to ensure that future Projects are consistent with other planning goals for the area (SCAG 2016). The RTIP, also prepared by SCAG based on the RTP, lists all of the regional funded/programmed improvements within the next 7 years. To qualify for CEQA streamlining benefits under SB 375, a Project must be consistent with the RTP/SCS.

County of Riverside Congestion Management Program

The passage of Proposition 111 in June 1990 established a process for each metropolitan county in California that has an urbanized area with a population over 50,000 (which would include the County of Riverside) to prepare a CMP. Additionally, the passage of Proposition 111 provided additional transportation funding through a $0.09 per gallon increase in the state gas tax. The Riverside County Transportation Commission (RCTC) was designated as the CMA in 1990, and therefore, prepares the CMP updates.

Although implementation of the CMP was made voluntary by the passage of AB 2419, the CMP requirement has been retained in all five urbanized counties within the SCAG region. In addition to their value as a transportation management tool, CMPs have been retained in these counties because of the federal Congestion Management System requirement that applies to all large, urban areas that are not in attainment of federal air quality standards. These counties recognize that the CMP provides a mechanism through which locally implemented programs can fulfill most aspects of a regional requirement that would otherwise have to be addressed by the regional agency (for the County of Riverside, SCAG).

The most recent CMP that was prepared by the RCTC was developed in consultation with the county and cities in Riverside County and is an effort to more directly align land use, transportation, and air quality management efforts and to promote reasonable growth management programs that effectively use statewide transportation funds while ensuring that new development pays its fair share of needed transportation improvements (RCTC 2011).

Per the CMP-adopted LOS standard of E, when a CMP facility falls to LOS F, a deficiency plan is required. Preparation of a deficiency plan would be the responsibility of the local agency where the deficiency is located. Other agencies identified as contributors to the deficiency would also be required to coordinate with the development of the plan. The plan must contain mitigation measures, including transportation demand management strategies and transit alternatives, and a schedule of mitigating the deficiency. To ensure that the Congestion Management System is appropriately monitored to reduce the occurrence of CMP deficiencies, it is the responsibility of local agencies, when reviewing and approving development proposals, to consider the traffic impacts on the Congestion Management System.

Transportation Uniform Mitigation Fee (TUMF)

The Western Riverside Council of Governments (WRCOG) is responsible for establishing and updating the Transportation Uniform Mitigation Fee (TUMF) program. TUMF is a multijurisdictional impact fee program that funds transportation improvements on a regional and sub-regional basis associated with new growth. All new development in each of the participating jurisdictions is subject to TUMF, based on the proposed intensity and type of development. TUMF fees are submitted by the applicant and are passed on to WRCOG as the ultimate program administrator. TUMF funds are distributed on a formula basis to the regional, local, and transit components of the program. March JPA participates in the TUMF program.

TUMF identifies a network of backbone and local roadways that are needed to accommodate growth through 2035. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service critical to mobility in the region. TUMF fees and other applicable fair

share contributions are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the Projected vehicle trip increases.

The TUMF program is based upon a regional Nexus Study completed in early 2003 and updated in 2009 to address major changes in right of way acquisition and improvement cost factors. An update to the WRCOG TUMF Nexus Study is anticipated in early 2017.

Local

March JPA

Based on the March JPA Traffic Impact Study Preparation Guide (March JPA 2011), all intersections and roadway segments within the March JPA Planning Area shall operate at LOS D or better with limiting circumstances of LOS E to occur. LOS E may also be allowed to the extent that would support transit-oriented development (TOD) and walkable communities. A lower LOS in TOD environments encourages people to shift from dependency on single occupancy vehicles to use of public transit and other modes of transportation. This is acceptable in TOD environments because alternative modes of transportation are readily accessible and are more convenient than in non-TOD land use environments. LOS E is also acceptable during peak hours at interchange ramp intersections where ramp metering occurs. The Project is not proposed to be a TOD and neither the Alessandro Boulevard nor Cactus Avenue on-ramps are currently metered; as such, the minimum LOS used for the purposes of this analysis is LOS D.

General Plan

The Transportation Element of the March JPA General Plan includes goals and policies related to transportation. The following goals and polices are from the March JPA General Plan that apply to the Project.

Policy 2.1: March JPA shall balance the need for free traffic flow with economic realities and environmental and aesthetic consideration, such that transportation facilities are capable of normal patterns and volume, with tolerance of peak and high level usage with minimal disruption, delays or impacts.

Policy 2.6: FAA standards, military AICUZ, and appropriate Comprehensive Land Use Plan for March Airfield shall be upheld and supported to encourage and realize a safe environment in and around the aviation field.

Policy 2.7: On-street parking shall be de-emphasized throughout the planning area to permit maximum capacity of roadways to be actuated by vehicular and bicycle transportation modes.

Policy 3.5: Driveway entrances onto surrounding arterial highways, major and minor arterials streets should be redistricted when practical, and through traffic on interior streets should be minimized.

Policy 4.3: Arterial roads should carry both local and through traffic and be planned and improved to maintain a Level of Service "D" or better with limiting circumstances of Level of Service "E" to occur.

Policy 4.4: Through traffic planning, measures should be implemented to alleviate direct impacts to adjoining jurisdictions which decrease roadway function Level of Service below the jurisdiction's adopted accepted Level of Service, as appropriate.

Policy 4.5: Require the dedication and improvement of arterial roadways prior to the issuance of certificates of occupancy.

Goal 6: Establish vehicular access control policies in order to maintain and insure the effectiveness and capacity of arterial roadways.

Policy 6.1: To the extent possible, access shall be provided on local or collector streets where the frontage is available on both local and arterials streets.

Policy 6.2: Access to an arterial road shall be limited to one point for every 300 feet of frontage or one point for parcels with less than 300 feet of frontage.

Policy 6.4: For corner lots, whenever possible, vehicular access points on arterial roadways shall be located a minimum of 300 feet from the centerline of the intersection.

Policy 8.8: Require the installation of bus improvements such as bus turnouts, bus stops, and terminals as part of the conditions of development for employment centers and land uses that attract large numbers of persons, where appropriate.

Goal 9: Develop measures which will reduce the number of vehicle miles traveled during peak travel periods.

Goal 10: Regulate the travel of trucks on March JPA Planning Area streets.

Policy 10.1: Establish a truck route system which designates truck commercial vehicle routes and provides adequately sized and designated roadways to meet the needs of trucks and commercial vehicles. This will eliminate truck and commercial vehicle traffic through inappropriate areas of the March JPA Planning Area.

Goal 12: Plan for and seek to establish an area-wide system of bicycling trails, with linkages within the planning area and with adjacent jurisdictions, and in compliance with sub-regional plans.

Policy 12.5: Provide adequate right-of-way and improvements for bike lanes in accordance with the Transportation Plan.

Policy 12.7: Require sidewalks on both sides of the all streets. The March JPA encourages alternate designs including parkways and meandering and enhanced paving.

Goal 15: In accordance with state and federal law, promote and provide mobility for the disabled.

Policy 15.1: Require that all development comply with the requirements of the state and federal law for the disabled. Requirements may include ramps at street corners, access to public buildings, traffic signal timing and the like.

City of Riverside

The City of Riverside General Plan states the City will strive to maintain LOS D or better on arterial streets wherever possible (City of Riverside 2007). At some key locations, such as City arterial roadways, which are used as freeway bypass by regional through traffic and at heavily traveled freeway intersections, LOS E may be acceptable as determined on a case-by-case basis. These situations may include roadways where capacity expansion is not feasible or would not mitigate the congestion. Locations that may warrant the LOS E standard include portions of Arlington Avenue/Alessandro Boulevard, Van Buren Boulevard throughout the City, portions of La Sierra Avenue, and selected freeway interchanges. However, the General Plan does not specify which portions of these roadways segments are acceptable to operate at LOS E. A higher standard, such as LOS C or better, may be adopted for Local and Collector streets in residential areas. The City recognizes that along key freeway feeder segments during peak commute hours, LOS F may be expected due to regional travel patterns.

For the purposes of this study, LOS D was used as the standard as it is consistent with the policies and practices in other cities and the March JPA and it is the highest standard applicable to non-residential areas.

General Plan

The Circulation Element of the City of Riverside General Plan includes goals and policies that apply to the Project related to transportation (City of Riverside 2007).

Policy CCM-2.3: Maintain LOS D or better on Arterial Streets wherever possible. At key locations, such as City Arterials that are used by regional freeway bypass traffic and at heavily traveled freeway interchanges, allow LOS E at peak hours as the acceptable standard on a case-by-case basis.

Policy CCM-2.7: Limit driveway and local street access on Arterial Streets to maintain a desired quality of traffic flow. Wherever possible, consolidate driveways and implement access controls during redevelopment of adjacent parcels. Policy CCM-5.7 Work with Riverside County and as a member of the March Joint Powers Authority to ensure adequate circulation within the JPA jurisdictional area and around Riverside National Cemetery.

City of Moreno Valley

The City of Moreno Valley General Plan states that LOS C should be maintained wherever possible and LOS D in the vicinity of State Route 60 and high employment centers. Figure 9-2 of the General Plan indicates which standard should be used for each roadway (City of Moreno Valley 2006). All of the study intersections located in the City of Moreno Valley are on roadways with a LOS standard of D. Therefore, for the purposes of this study LOS D is the standard used of intersections in the City of Moreno Valley.

General Plan

The Circulation Element of the City of Moreno Valley General Plan includes goals objectives, and policies related to transportation and traffic that apply to the Project related to transportation and traffic.

Policy 5.1.1: Plan access and circulation of each development Project to accommodate vehicles (including emergency vehicles and trash trucks), pedestrians, and bicycles.

Policy 5.1.3: Require adequate off-street parking for all developments.

Policy 5.1.4: Driveway placement shall be designed for safety and to enhance circulation wherever possible.

Policy 5.1.6: Design new developments to provide opportunity for access and circulation to future adjacent developments.

Objective 5.3: Maintain Level of Service (LOS) "C" on roadway links, wherever possible, and LOS "D" in the vicinity of SR 60 and high employment centers. Figure 9-2 depicts the LOS standards that are applicable to all segments of the General Plan Circulation Element Map.

Policy 5.3.5: Ensure that new development pays a fair share of costs to provide local and regional transportation improvements and to mitigate cumulative traffic impacts. For this purpose, require new developments to participate in Transportation Uniform Mitigation Fee Program (TUMF), the Development Impact Fee Program (DIF) and any other applicable transportation fee programs and benefit assessment districts.

Policy 5.5.8: Whenever possible, require private and public land developments to provide on-site and off-site improvements necessary to mitigate any development-generated circulation impacts. A review of each proposed land development Project shall be undertaken to identify Project impacts to the circulation system. The City may require developers to provide traffic impact studies prepared by qualified professionals to identify the impacts of a development.

Policy 5.11.2: Driveways shall be designed to avoid conflicts with pedestrian and bicycle travel.

County of Riverside

The Circulation Element of the County of Riverside General Plan includes policies related to traffic that require County facilities to maintain LOS C, except in certain Area Plans and Community Development Areas where LOS D is the standard that should be maintained. Intersections in the study area that fall under County of Riverside jurisdiction are within the Community Development Areas of Mead Valley and Lake Mathews/Woodcrest. These Community Development Areas are required to maintain the LOS standard of D (County of Riverside 2016). As such, LOS D is used as the standard for intersections located under the jurisdiction of the County.

Policy C 2.1: The following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County with respect to transportation impacts on roadways designated in the Riverside County Circulation Plan (Figure C-1) which are currently County maintained, or are intended to be accepted into the County maintained roadway system:

LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non- Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.

LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans. LOS E may be allowed by the Board of Supervisors within designated areas where transit oriented development and walkable communities are proposed.

Notwithstanding the forgoing minimum LOS targets, the Board of Supervisors may, on occasion by virtue of their discretionary powers, approve a Project that fails to meet these LOS targets in order to balance congestion management considerations in relation to benefits, environmental impacts and costs, provided an Environmental Impact Report, or equivalent, has been completed to fully evaluate the impacts of such approval. Any such approval must incorporate all feasible mitigation measures, make specific findings to support the decision, and adopt a statement of overriding considerations. (AI 3)

Policy C 2.2: Require that new development prepare a traffic impact analysis as warranted by the Riverside County Traffic Impact Analysis Preparation Guidelines or as approved by the Director of Transportation. Apply level of service targets to new development per the Riverside County Traffic Impact Analysis Preparation Guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development. (AI 3)

Policy C 2.3: Traffic studies prepared for development entitlements (tracts, public use permits, conditional use permits, etc.) shall identify Project related traffic impacts and determine the significance of such impacts in compliance with CEQA and the Riverside County Congestion Management Program Requirements. (AI 3)

Policy C 2.4: The direct Project related traffic impacts of new development proposals shall be mitigated via conditions of approval requiring the construction of any improvements identified as necessary to meet level of service targets.

Policy C 2.5: The cumulative and indirect traffic impacts of development may be mitigated through the payment of various impact mitigation fees such as County Development Impact Fees, Road and Bridge Benefit District Fees, and Transportation Uniform Mitigation Fees to the extent that these programs provide funding for the improvement of facilities impacted by development.

Policy C 3.4: Allow roundabouts or other innovative design solutions such as triple left turn lanes, continuous flow intersections, or other capacity improvements, when a thorough traffic impact assessment has been conducted demonstrating that such an intersection design alternative would manage traffic flow, and improve safety, if it is physically and economically feasible.

Policy C 3.6: Require private developers to be primarily responsible for the improvement of streets and highways that serve as access to developing commercial, industrial, and residential areas. These may include road construction or widening, installation of turning lanes and traffic signals, and the improvement of any drainage facility or other auxiliary facility necessary for the safe and efficient movement of traffic or the protection of road facilities.

Policy C 3.8: Restrict heavy duty truck through-traffic in residential and community center areas and plan land uses so that trucks do not need to traverse these areas.

Policy C 3.10: Require private and public land developments to provide all on-site auxiliary facility improvements necessary to mitigate any development-generated circulation impacts. A review of each proposed land development Project shall be undertaken to identify Project impacts to the circulation system and its auxiliary facilities. The Transportation Department may require developers and/or subdividers to provide traffic impact studies prepared by qualified professionals to identify the impacts of a development.

Policy C 7.1: Work with incorporated cities to mitigate the cumulative impacts of incorporated and unincorporated development on the transportation system. (AI 2, 49, 50, 53)

Policy C 7.8: Collaborate with all incorporated cities and all adjacent counties to implement and integrate right-of-way requirements and improvement standards for General Plan roads that cross jurisdictional boundaries. Detailed procedures have been developed and include the following:

c. Transition areas at meeting points of roadways designed to differing city and Riverside County standards or differing functional classifications should be individually designed to facilitate satisfactory operational and safety performance. Further, Riverside County should update the road standards to reflect the intent of this policy and standards agreed upon by the County of Riverside and other local agencies. (AI 4, 50)

4.11.4 Thresholds of Significance

The significance criteria used to evaluate the Project impacts to traffic and circulation are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to traffic and circulation would occur if the Project would:

- **TRAF-1**: Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.
- **TRAF-2**: Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- **TRAF-3**: Substantially increase hazards due to a geometric design feature (e.g., sharp curves, or dangerous intersections) or incompatible uses (e.g., farm equipment).
- **TRAF-4**: Result in inadequate emergency access.

LOS is used as the measure of effectiveness for the performance of the circulation system by the agencies with jurisdiction over the Project study area. (See Section 4.11.2 for a detailed description of LOS.) However, the standard varies for each agency. Table 4.11-12 shows the applicable standards for LOS based on the type or location of the intersection or roadway facility. Where more than one agency has jurisdiction over an intersection the higher standard is used.

Table 4.11-12
LOS Significance Criteria by Jurisdiction[1]

Type of Roadway	Non-CMP Intersection	CMP Intersection	Applies to Project?[2]	Standard Used for Analysis
Caltrans				
All Facilities	D	E	Yes	D
March JPA				
Non-TOD Developments	D	E	Yes	D
TOD Developments	E	E	No	n/a
Ramp Metered Interchanges	E	E	No	n/a
City of Riverside				
Arterials	D	E	Yes	D
Freeway Bypass Roadways	E	E	Yes[3]	D
Key Freeway Feeder Segments	F	E	No	n/a
Local and Collector Roads in Residential Areas	C	E	No	n/a
City of Moreno Valley				
Roadways Adjacent to Freeways or Employment Generating Land Uses[4]	D	E	Yes	D
All other roadways	C	E	No	n/a
County of Riverside				
Outside of Area Plans or Non-Community Development Areas[5]	C	E	No	n/a
Within Area Plans or Community Development Areas[6]	D	E	Yes	D
Transit Oriented Development[7]	D	E	No	n/a

Source: Dudek 2018

CMP = Congestion Management Program; TOD = transit-oriented development

1 Intersections already operating at unsatisfactory LOS are considered to be significantly impacted if Project traffic comprises 2% or more of the total peak-hour traffic.

2 States whether there are any intersections or roadways in the Project study area that meet the definition of the land use or context to which the LOS standard applies.

3 While some of the arterials listed as freeway bypass roads include roadways in the study area, the more stringent standard of LOS D is used due to lack of specificity of exact locations that may use LOS E and for consistency with other agency policies in the study area.

4 Figure 9-2 of the City of Moreno General Plan shows which standard applies to which roadway. All of the study area intersections are located on roadways with a LOS standard of D.

5 Specifically, LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non-Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.

6 LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western 9 Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.

7 Requires approval of County Board of Supervisors

Direct Project Impacts

Direct impacts are those impacts for which the addition of Project-only trips result in an identifiable degradation in LOS to unsatisfactory LOS from the existing conditions, thereby triggering the need for specific Project-related improvements.

March JPA

To determine whether the addition of Project traffic at a study intersection would result in a direct Project-specific traffic impact, the Existing without Project Conditions is compared to Existing with Project Conditions. If the comparison reveals that one of the two following conditions are met, then a direct Project impact occurs per the March JPA Traffic Impact Preparation Guide (March JPA 2011):

- Impact is significant if the pre-Project condition is at or better than LOS D (or acceptable LOS) and the Project-generated traffic causes deterioration below acceptable levels (to LOS E or F), a deficiency is deemed to occur. OR;
- If the pre-Project condition is already below LOS D (or acceptable LOS), the impact is significant if the Project contributes more than 2% of the total traffic.

City of Riverside

For the study area intersections that lie within the City of Riverside, to determine whether the addition of Project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct Project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., unsatisfactory LOS), and Project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D or increases to the peak hour delay as defined by Table 4.11-13, a deficiency is deemed to occur.

Table 4.11-13
City of Riverside – Thresholds of Significance

Pre-Project LOS	Project-Related Delay Increase	Mitigation Measure
A/B	10.0 Seconds or More	Achieve pre-Project delay or better
C	8.0 Seconds or More	Achieve pre-Project delay or better
D	5.0 Seconds or More	Achieve pre-Project delay or better
E	2.0 Seconds or More	Achieve pre-Project delay or better
F	1.0 Second or More	Achieve pre-Project delay or better

Source: Appendix R.

City of Moreno Valley

The minimum LOS for the City of Moreno Valley is LOS D for intersections that are adjacent to freeway on/off ramps, and/or adjacent to employment generating land uses. LOS C is applicable to all other intersections. Boundary intersections are assumed to be LOS D.

For the study area intersections that lie within the City of Moreno Valley, March JPA or County of Riverside thresholds of significance apply as the City of Moreno Valley does not have its own threshold criteria.

County of Riverside

For the study area intersections that lie within the County of Riverside, to determine whether the addition of Project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct Project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and Project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

Caltrans Facilities

To determine if the addition of Project traffic to the State Highway System freeway segments under Caltrans jurisdiction would result in a deficiency, both of the following must be found:

- The traffic study finds that the LOS of a segment would degrade from D or better to E or F; and
- The traffic study finds that the Project would exacerbate an already deficient condition by contributing 50 or more peak-hour trips. A segment that is operating at or near capacity is deemed to be deficient.

Cumulative Project Impacts

Cumulatively considerable impact indicates that the incremental effects of an individual Project are significant when viewed in connection with the effects of past Projects, the effects of other current Projects, and the effects of probable future Projects. Cumulative traffic impacts are created by a combination of the proposed Project together with other future developments which contribute to the overall traffic impacts. Because the impacts are cumulative, additional improvements to maintain satisfactory LOS operations would be required with or without the Project. A Project's contribution to a significant and cumulatively considerable impact can be reduced to less than

significant if the Project contributes its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact.

4.11.5 Impacts Analysis

Threshold TRAF-1. Would the Project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

The study area within the March JPA and the surrounding Cities of Riverside and Moreno Valley are currently served by the Riverside Transit Authority (RTA), a public transit agency serving various jurisdictions within Riverside County. As discussed in 4.11.1, Existing Conditions, RTA Route 20 could potentially serve the Project, as it currently operates along Alessandro Boulevard to the north of the Project site. RTA Route 11 could serve the Project, as it currently operates along Cactus Avenue northeast of the Project site and Frederick Street north of the Project site. Transit service is reviewed and updated by RTA periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments, which may lead to either enhanced or reduced service where appropriate. The recently opened Moreno Valley/March Field Metrolink Station is located on Meridian Parkway, approximately 1.5 miles to the Project site.

Field observations conducted in May 2018 indicate nominal pedestrian and bicycle activity within the study area. Existing pedestrian facilities within the study area are shown on Exhibit 3-12 in the TIA (Appendix R). There are currently Class II bike lanes along Alessandro Boulevard northwest of the Project site, Elsworth Street, and Cactus Avenue between Veterans Way and Heacock Street. Existing sidewalks are currently in place along Elsworth Street, Veterans Way, Alessandro Boulevard, and Cactus Avenue on the north side of the street.

The Project would not include any off-site improvements that would extend into adjacent roadways or otherwise impede public transit, bicycle, or pedestrian facilities. The Project would not include any improvements that would extend into Cactus Avenue and interfere with the construction of pedestrian or bicycle facilities in the future. Additionally, primarily based on the Project area's urbanized nature, no existing recreational trails serve the immediate Project area. Therefore, there are **no impacts** to alternative transportation facilities, and no mitigation measures are required.

Threshold TRAF-2. Would the Project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

In December 2018 CEQA Guidelines were updated to include a threshold for evaluating traffic impacts using the VMT methodology. This new methodology is required to be used statewide

beginning on July 1, 2020. As such, and because March JPA as the lead agency has not yet adopted VMT thresholds, the analysis for this Project utilizes the LOS methodology.

RTP/SCS Consistency Analysis

The Southern California Association of Governments (SCAG) Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) establishes regional policies and goals for transportation to improve mobility, promote sustainability, facilitate economic development, and preserve the quality of life for residents in the region (SCAG 2016). SCAG reviews environmental documents for regionally significant Projects for their consistency with the adopted RTP/SCS. Lead agencies have the sole discretion in determining a Project's consistency with the RTP/SCS. Based on the analysis shown in Table 4.11-14, the Project is consistent with the RPT/SCS and there is **no impact**.

Table 4.11-14
RTP/SCS Consistency Analysis

No	Goal	Consistency
G-1	Align the plan investments and policies with improving regional economic development and competitiveness.	Consistent: The Project would provide employment and economic stimulation.
G-2	Maximize mobility and accessibility for all people and goods in the region.	Consistent: The Project includes roadway improvements that take into consideration all modes of transportation. New roadways and improved existing roadways will provide improved mobility and accessibility to regional destinations.
G-3	Ensure travel safety and reliability for all people and goods in the region.	Consistent: The Project's transportation facilities are planned with state-of-the-practice standards and considers safety of all new facilities. The March JPA coordinates with transit providers with regard to safety and reliability, but does not have direct authority over transit facilities.
G-4	Preserve and ensure a sustainable regional transportation system.	Consistent: The March JPA coordinates with regional transit providers, other jurisdictions and Caltrans to provide sustainable options for transportation.
G-5	Maximize the productivity of our transportation system.	Not applicable: Transportation Systems Management and Intelligent Transportation Systems are implemented by SCAG and Transportation Demand Management is implemented within the March JPA on a Project level basis if or when appropriate.
G-6	Protect the environment and health of our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).	Consistent: The Project includes improvements to the circulation system for bicyclists and pedestrians that will help improve mobility options for active modes of travel.
G-7	Actively encourage and create incentives for energy efficiency, where possible.	Consistent: In addition to state and federal incentives, the Project EIR includes MM-AQ-4, which includes energy saving strategies. (See Section 4.2, Air Quality, for more detail.)

Table 4.11-14
RTP/SCS Consistency Analysis

No	Goal	Consistency
G-8	Encourage land use and growth patterns that facilitate transit and active transportation.	Consistent: The Project will locate employment near residential areas and includes a mix of uses thereby providing opportunities for employees to reside close to work. The Project includes street designs that call for bicycle and pedestrian facilities encouraging people to use these forms of transportation from nearby residences.
G-9	Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.	Not applicable: The regional transportation system is managed by regional agencies and Caltrans. However, the March JPA coordinates with these agencies on safety and security where applicable.

Source: Dudek 2018.

Project Traffic

In considering whether the proposed Project would conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, it is necessary to analyze the Project's potential impacts relative to the significance criteria used by the March JPA and the cities or agencies that have jurisdiction over each of the study intersections, as discussed in Section 4.11.4. Where necessary, mitigation measures were introduced to reduce and/or avoid potentially significant traffic impacts. Mitigation measures are provided in Section 4.11.6 of this EIR.

Trip Generation

Trip generation represents the amount of traffic which is both attracted to and produced by a development. The Institute of Traffic Engineers (ITE) *Trip Generation, 10th Edition* (2017) publication provides the industry standards for trip generation rates. Based on the proposed land use, it was determined that use of the ITE High-Cube Fulfillment Center Warehouse (ITE Land Use Code 155) trip rates would be the appropriate trip generation rates to use. The following is the description of a high-cube fulfillment center warehouse from ITE's *Trip Generation*:

> A typical high-cube warehouse (HCW) has a high level of on-site automation and logistics management. The automation and logistics enable highly-efficient processing of goods through the HCW. High-cube fulfillment center warehouses include warehouses characterized by a significant storage function and direct distribution of ecommerce product to end users. These facilities typically handle smaller packages and quantities than other types of HCWs and often contain multiple mezzanine levels...

The 2017 ITE Trip Generation Manual trip generation rates for high-cube fulfillment center use (ITE land use code 155) are based on limited data (i.e., one to two surveyed sites) and the ITE Trip

Generation Manual recommends the use of local data sources where available. As such, Project trip generation has been calculated based on the trip-generation statistics published in the TUMF High-Cube Warehouse Trip Generation Study which was commissioned by Western Riverside Council of Governments (WRCOG) in support of the Transportation Uniform Mitigation Fee (TUMF) update WRCOG TUMF High-Cube Warehouse Trip Generation Study (Appendix R).

To accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation. The trip generation summary illustrating daily and peak-hour trip generation estimates for the proposed Project are shown in Table 4.11-15. As indicated in the table, the proposed Project would generate approximately 5,873 vehicle trips per day (5,356 passenger-cars and 517 trucks), with 425 AM peak hour trips (412 passenger-cars and 13 trucks), and 983 PM peak hour trips (965 passenger-cars and 18 trucks). As shown in Table 4.11-15, using the ITE land use code 155 generates far more trips than using the WRCOG rates. The WRCOG data is far more accurate for estimating the number of trips that the proposed Project will generate. The proposed Project's impacts were conservatively analyzed using the ITE land use code 155 which vastly overstates the proposed Project's contribution to traffic, as well as impacts from traffic such as air quality, noise, greenhouse gas, and health risks.

Table 4.11-15
Project Trip Generation

Land Use	Quantity (TSF)[1]	Type of Vehicle[2]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
High-Cube Warehouse/ Distribution Center	718.000	passenger-cars	317	95	412	270	695	965	5,356
		trucks	10	3	13	5	13	18	517
Fulfillment Center Total Net Trips (WRCOG Rates)[3]			67	20	87	33	85	118	1,530
Total Trips			**327**	**98**	**425**	**275**	**708**	**983**	**5,873**
Variance (WRCOG Rates – TIA)			-260	-78	-338	-242	-623	-865	-4,343

Source: Appendix R.
1 TSF = thousand square feet
2 Total truck percentage source from ITE Trip Generation Manual
3 Trips based on WRCOG TUMF High Cube Warehouse Trip Generation Study

The potential for non-truck Project trips to be reduced by the use of public transit, walking, or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are conservative in that these alternative travel modes would reduce Project traffic volumes.

Trip Distribution

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern of passenger cars is heavily influenced by the

geographical location of the Project site, the location of surrounding land uses, and the proximity to the regional freeway system. The trip distribution pattern for truck traffic is influenced by land use as well as by the local truck routes approved by the March JPA, City of Riverside, City of Moreno Valley, and Caltrans. Exhibit 4-1 of Appendix R shows the trip distribution patterns for passenger cars, and Exhibit 4-2 of Appendix R illustrates the truck trip distribution patterns.

Trip Assignment

The assignment of traffic from the Project area to the adjoining roadway system is based on the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the proposed Project. Based on the identified traffic generation and trip distribution patterns, ADT and peak-hour intersection turning movement volumes of the proposed Project are shown in Figure 4.11-8, Project Only Average Daily Traffic (ADT), and 4.11-9, Project Only Traffic Volumes.

Existing with Project Traffic Conditions

This section discusses the traffic analysis for Existing with Project Conditions and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

Roadway Improvements

The lane configurations and traffic controls assumed to be in place for Existing with Project Conditions are consistent with those shown in Figures 4.11-2 and 4.11-3, respectively, with the exception of Project driveways and those facilities assumed to be constructed by the Project to provide site access (e.g., intersection and roadway improvements at the Project's frontage and driveways).

Traffic Volumes

To derive traffic volumes for the Existing with Project scenario, Project traffic is added to the existing traffic volumes. Figures 4.11-10 and 4.11-11 show the resulting ADT and peak-hour volumes, respectively.

Intersection Operations

Peak-hour traffic operations were evaluated for the study area intersections based on the analysis methodologies presented in Section 4.11.2. The intersection analysis results are summarized in Table 4.11-16 and Figure 4.11-12, E+P Summary of LOS, which indicates that same following four study area intersections that currently operate with unsatisfactory LOS in the existing condition are forecast to continue to operate with unsatisfactory LOS in the Existing plus Project condition:

1. Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard – LOS F AM and PM peak hours
3. Mission Grove Parkway/Alessandro Boulevard – LOS E AM peak hour
6. Sycamore Canyon Boulevard/Alessandro Boulevard – LOS F AM and PM peak hours
19. Elsworth Street/Cactus Avenue – LOS F AM and PM peak hours

The proposed Project is anticipated to result in significant impacts at the following intersections, as the Project would meet the significance criteria for its respective jurisdiction(s):

1. Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard: Addition of 1.0 second or more of delay at LOS F (City of Riverside) in both peak hours.
19. Elsworth Street/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic at LOS E-F (March JPA) in both peak hours.

At the Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard intersection, the roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. The LOS deficiency at this intersection is caused by the minimum green times necessary for pedestrian crossing time. As a result, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. Potential physical improvements such as grade-separated pedestrian crossings would not be financially feasible based on the pedestrian and bicycle activity at this location. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at this intersection (also validated by peak hour count data). As such, the impact is considered **significant and unavoidable**.

Mitigation measure **MM-TRAF-1** shall be incorporated at Elsworth Street/Cactus Avenue to reduce the peak-hour delay and improve LOS to D or better in the Existing with Project condition. Section 4.12.6 describes the mitigation measure in detail. With the implementation of mitigation measure **MM-TRAF-1**, the impact to traffic conditions at Elsworth Street/Cactus Avenue under the Existing with Project condition would be **less than significant.**

Table 4.11-16
Existing with Project Intersection Analysis

#	Intersection	Traffic Control[2]	Existing (2018)				Existing with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[1] (secs)		LOS		Delay[1] (secs)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
1	Overlook-Canyon Crest/Alessandro Bl	TS	356.3	81.5	F	F	393.3	86.3	F	F	D	Riverside	≥1 sec @ LOS F	Yes
2	Trautwein Road/Alessandro Blvd	TS	36.1	25.5	D	C	36.2	25.5	D	C	D	Riverside	--3	No
3	Mission Grove Pkwy/Alessandro Blvd	TS	76.6	22.6	E	C	77.1	23.7	E	C	D	Riverside	≥2.0 sec	No
4	Barton Street/Alessandro Blvd	TS	25.5	22.8	C	C	25.8	23.2	C	C	D	Riverside/JPA	--3	No
5	San Gorgonio Drive/Alessandro Blvd	TS	17.0	15.5	B	B	17.1	15.5	B	B	D	Riverside/JPA	--3	No
6	Sycamore Canyon Blvd/Alessandro Bl	TS	79.4	47.6	E	D	81.1	48.3	F	D	D	Riverside/JPA	≥2 sec @ LOS E	No
7	Meridian Parkway/Cactus Avenue	TS	45.0	36.7	D	D	45.3	42.1	D	D	D	JPA	--3	No
8	Meridian Parkway/ Innovation Drive	CSS	24.4	24.9	C	C	25.1	26.2	D	D	D	JPA	--3	No
9	Meridian Parkway/ Opportunity Way	TS	10.0	23.1	A	C	10.0	23.4	B	C	D	JPA	--3	No
10	Meridian Parkway/Van Buren Boulevard	TS	44.6	41.2	D	D	45.2	41.5	D	D	D	JPA	--3	No

Table 4.11-16
Existing with Project Intersection Analysis

#	Intersection	Traffic Control[2]	Existing (2018)				Existing with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[1] (secs)		LOS		Delay[1] (secs)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
11	Innovation Drive/Cactus Avenue	TS	18.6	18.1	B	B	18.7	18.3	B	B	D	JPA	--3	No
12	I-215 SB Ramps/ Alessandro Boulevard	TS	5.5	8.9	A	A	5.5	8.9	A	A	D	Caltrans/ Riverside/ County	--3	No
13	I-215 SB Ramps/Cactus Avenue	TS	4.3	9.1	B	A	4.5	12.6	A	B	D	Caltrans/JPA/ County	--3	No
14	I-215 NB Ramps/ Alessandro Boulevard	TS	21.1	20.4	C	C	21.3	20.6	C	C	D	Caltrans/ Riverside/County	--3	No
15	Old 215 Frontage Rd/ Alessandro Blvd	TS	22.0	32.9	C	C	24.2	32.9	C	C	D	MV/Riverside/ County	--3	No
16	Old 215 - I-215 NB ramps/Cactus Ave	TS	52.4	20.2	D	C	53.4	31.3	D	C	D	Caltrans/JPA	--3	No
17	Day Street/Alessandro Boulevard	TS	23.4	16.1	C	B	23.7	16.5	C	B	D	MV	--3	No
18	Elsworth Street/Alessandro Boulevard	TS	20.7	25.5	C	C	20.7	25.7	C	C	D	MV	--3	No
19	Elsworth Street/Cactus Avenue	TS	189.6	99.1	F	F	212.3	160.3	F	F	D	MV/JPA	≥2% of total traffic	Yes
20	Veterans Way/Alessandro Boulevard	TS	19.0	19.8	B	B	19.0	19.9	B	B	D	MV	--3	No

Table 4.11-16
Existing with Project Intersection Analysis

#	Intersection	Traffic Control[2]	Existing (2018)				Existing with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[1] (secs)		*LOS*		*Delay[1] (secs)*		*LOS*					
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*				
21	Veterans Way/Cactus Avenue	TS	7.1	7.7	A	A	13.9	18.6	B	B	D	MV/JPA	--3	No
22	Frederick Street/Alessandro Boulevard	TS	38.5	50.8	A	D	38.8	51.3	D	D	D	MV	--3	No
23	Frederick Street/Cactus Avenue	TS	21.7	22.1	C	C	22.1	48.2	C	D	D	MV/JPA	--3	No
24	Graham St – Riverside Dr/ Cactus Ave	TS	47.1	40.5	D	D	52.7	51.7	D	D	D	MV/JPA	--3	No
25	Heacock Street/Cactus Avenue	TS	45.4	28.2	D	C	53.9	32.2	D	C	D	MV/JPA	--3	No

Source: Appendix R.

Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS). **Bold and highlighted** = significant impact.

1 Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = cross-street stop; TS = traffic signal

3 Intersection forecast to continue to operate with satisfactory LOS (LOS D or better) with addition of Project traffic.

Traffic Signal Warrants Analysis

Traffic signal warrants are prepared for the only existing unsignalized intersection in the study area, Meridian Parkway/Innovation Drive. Based on the warrant analysis, Meridian Parkway/Innovation Drive would not warrant a traffic signal in the Existing with Project condition. The analysis worksheets are provided in Appendix R.

Freeway Analysis

Off-Ramp Queuing

A queuing analysis was performed for the off-ramps at the I-215/Cactus Avenue interchanges to assess vehicle queues that may potentially result in deficient peak-hour operations at the ramp-to-arterial intersections and potentially cause spill-back onto the I-215 mainline. Worksheets for Existing with Project Conditions off-ramp queuing analysis are provided in Appendix R. Queuing analysis findings are shown in Table 4.11-17 for Existing with Project Conditions.

Table 4.11-17
Existing with Project Peak-Hour Freeway Off-Ramp Queuing

Intersection	Movement	Available Stacking Distance (Feet)	Existing				Existing with Project			
			95th Percentile Queue (Feet)[3]		*Satisfactory?*[1]		*95th Percentile Queue (Feet)*[3]		*Satisfactory?*[1]	
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215 SB ramps/ Cactus Avenue	SBR	1,115	128	0	Yes	Yes	128	0	Yes	Yes
	NBR	1,850	0	0	Yes	Yes	14	23	Yes	Yes
I-215 NB ramps/ Cactus Avenue	NBL	145	541[2]	45	Yes[4]	Yes	550	45	Yes[4]	Yes
	NBT/R	1,650	294	54	Yes	Yes	300	54	Yes	Yes

Source: Appendix R.
SBL = southbound left turn lane; SBR = southbound right turn lane; NBL = northbound left turn lane; NBR = northbound right turn lane; T = through-lane

1 Stacking Distance is satisfactory if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
2 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
3 Maximum queue length for the approach reported.
4 Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through-lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 mainline.

As shown on Table 4.11-17, there are no queues forecast in the Existing with Project condition that would spill onto the I-215 mainline. While the AM peak hour queue (550 feet) at the northbound left-turn lane of the northbound off-ramp exceeds the 145 foot storage lane, that queue combined with the queue (300 feet) of the shared through plus right-turn lane, on a single off-ramp lane of 1,650 feet, would not spillover to the I-215 mainline.

Freeway Segment

A freeway mainline segment analysis was conducted for the Existing with Project condition per the HCM methodology. Freeway mainline directional volumes for the Existing plus Project weekday AM and PM peak hours are shown in Figure 4.11-13. Analysis worksheets are provided in Appendix R. As shown in Table 4.11-18, the study area freeway mainline segments are forecast to continue to operate with satisfactory LOS during the peak hours in Existing with Project condition. However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F, and because the Project would add more than 50 peak hour trips to those segments that are anticipated to continue to operate at unacceptable LOS, the Project would have a potentially significant impact.

Table 4.11-18
Existing with Project Freeway Segment Analysis

Freeway	Direction	Mainline Segment	Lanes[2]	Existing				Existing with Project			
				Density[3]		*LOS*		*Density*[3]		*LOS*	
				AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215	SB	north of Cactus Avenue	4	15.1	--[4]	B	**F**	15.3	--[4]	B	**F**
		south of Cactus Avenue	4	14.3	--[4]	B	**F**	14.3	--[4]	B	**F**
	NB	north of Cactus Avenue	4	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**
		south of Cactus Avenue	4	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
1 NB = Northbound; SB = Southbound
2 Density is measured by passenger cars per mile per lane (pc/mi/ln).
3 Number of lanes are in the specified direction and is based on existing conditions.
4 Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

Freeway Merge/Diverge Analysis

Ramp merge and diverge operations were also evaluated for Existing with Project conditions per HCM methodology. Analysis worksheets are provided in Appendix R. As shown in Table 4.11-19, the freeway ramp merge and diverge areas are anticipated to continue to operate at LOS D or better with the addition of Project traffic in the Existing with Project condition. However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant

traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F, and because the Project would add more than 50 peak hour trips to those segments that are anticipated to continue to operate at unacceptable LOS, the Project would have a potentially significant impact.

Table 4.11-19
Existing with Project Freeway Ramp Junction Merge/Diverge Analysis

Freeway	Direction	Ramp or Segment	Lanes on Fwy[2]	Existing				Existing with Project			
				AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
				Density[3]	*LOS*	*Density*[3]	*LOS*	*Density*[3]	*LOS*	*Density*[3]	*LOS*
I-215	SB	off-ramp at Cactus Ave	4	15.4	B	--[4]	**F**	15.7	B	--[4]	**F**
		loop off-ramp at Cactus	4	16.1	C	--[4]	**F**	16.5	C	--[4]	**F**
		on-ramp at Cactus Ave	3	21.0	C	--[4]	**F**	21.2	C	--[4]	**F**
	NB	on-ramp at Cactus Ave	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**
		loop on-ramp at Cactus	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**
		off-ramp at Cactus Ave	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS)
1 NB = Northbound; SB = Southbound
2 Number of lanes are in the specified direction and is based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

Freeway Analysis Impacts

As described above, there are no identified significant Project impacts to the study area off-ramp queues at I-215/Cactus Avenue with implementation of the proposed Project. Therefore, there **is no impact.**

However, due to observed queuing from downstream bottlenecks, there are identified significant Project impacts to the study area I-215 mainline segments and I-215 merge/diverge areas with implementation of the proposed Project. At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development Projects in the JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program

identifies this interchange, inclusive of on/off-ramps as a transportation mitigation Project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. As such, no improvements have been recommended, and the impact to these freeway facilities is **significant and unavoidable**.

Opening Year Cumulative with Project Conditions

The Opening Year Cumulative condition analyses identifies potential near-term cumulative circulation system deficiencies in year 2023, without and with the proposed Project. To account for background traffic growth, an ambient growth factor and traffic associated with other cumulative Projects were added to existing traffic volumes. Without and with Project conditions were compared to isolate potential Project impacts to the study area intersection operations, freeway mainline operations, and traffic signal warrant analyses.

Roadway Improvements

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative Conditions are consistent with existing lane configurations and traffic controls, with the exception of Project driveways and those facilities assumed to be constructed by the Project to provide site access (e.g., intersection and roadway improvements along the Project's frontage). These Project-specific improvements are only included in the with-Project conditions.

Additionally, driveways and those facilities assumed to be constructed by cumulative development Projects to provide site access are also assumed to be in place for the Opening Year Cumulative condition (e.g., intersection and roadway improvements along the cumulative developments' frontages and driveways). The future proposed Plateau development would also use the extension of Cactus Avenue, west of Meridian Parkway. Other connections assumed include the extension of San Gorgonio Avenue to the south of Alessandro Boulevard, and the extension of Cactus Avenue to the west of Meridian Parkway.

Traffic Volumes

Opening year traffic forecasts are calculated based upon 5 years of background (ambient) growth at 2% per year to account for regional traffic growth between 2018 (existing conditions) and 2023 (opening year). The total ambient growth is 10.41% for 2020 traffic conditions (compounded growth of 2.0% per year over 5 years). This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development Projects. A cumulative Project list was developed for the purposes of this analysis through consultation with planning and engineering staffs from the Cities of Riverside and Moreno Valley, and the County to include related cumulative Projects in their respective jurisdictions.

Exhibit 4-5 in Appendix R shows a comprehensive cumulative development location map. A summary of cumulative development Projects and their proposed land uses are shown in Table 4-3 of the TIA (Appendix R). All cumulative Projects were considered and reviewed to determine which Projects would likely contribute measurable traffic (i.e., 50 or more peak-hour trips) to study area intersections. The determination was made based on anticipated trip generation and potential travel patterns. The traffic generated by individual cumulative Projects has been manually added to the study area network to generate Opening Year Cumulative (2023) forecasts for those cumulative Projects that were anticipated to contribute measurable traffic to a study area intersection. Opening Year Cumulative without Project development ADT and peak-hour intersection turning movement volumes are shown on Figures 4.11-14 and 4.11-15. Opening Year Cumulative with Project daily and peak hour traffic volumes are shown in Figures 4.11-17 and 4.11-18, respectively.

Intersection Operations

An intersection LOS analysis was conducted for the study intersections to evaluate their operations under Opening Year Cumulative conditions. The analysis worksheets are included in Appendix R. As shown in Table 4.11-20 and Figure 4.11-16, most of the study area intersections are anticipated to operate with satisfactory LOS in the Opening Year Cumulative (without Project) condition, with the exception of the following intersections:

1. Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard – LOS F AM and PM peak hours
3. Mission Grove Parkway/Alessandro Boulevard – LOS F AM peak hour
6. Sycamore Canyon Boulevard/Alessandro Boulevard – LOS F AM and PM peak hours
7. Meridian Parkway/Cactus Avenue – LOS E AM peak hour
10. Meridian Parkway/Van Buren Boulevard – LOS F AM and PM peak hours
11. Innovation Drive/Cactus Avenue – LOS F PM peak hour
16. Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue – LOS F AM peak hour
19. Elsworth Street/Cactus Avenue – LOS F AM and PM peak hours
25. Heacock Street/Cactus Avenue – LOS F AM peak hour; LOS E PM peak hour

For the Opening Year plus Project, as shown in Table 4.11-20 and Figure 4.11-19, the proposed Project is anticipated to result in significant impacts at the following intersections, as the Project would meet the significance criteria for its respective jurisdiction(s):

1. Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard: Addition of 1.0 second or more of delay at LOS F (City of Riverside) in PM peak hour.
6. Sycamore Canyon Boulevard/Alessandro Boulevard: Addition of 1.0 second or more of delay at LOS F (City of Riverside) in both peak hours.
16. Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue: Addition of 2% or more of total peak hour traffic at LOS E-F (March JPA); and, addition of 50 or more peak hour trips to LOS E-F (Caltrans) in both peak hours.
19. Elsworth Street/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic at LOS E-F (March JPA) in both peak hours.
25. Heacock Street/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic (March JPA) in both peak hours.

At the Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard and Sycamore Canyon Boulevard/Alessandro Boulevard intersections, the roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. The LOS deficiency at these intersections is caused by the minimum green times necessary for pedestrian crossing time. As a result, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. Potential physical improvements such as grade-separated pedestrian crossings would not be financially feasible based on the pedestrian and bicycle activity at this location. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data). As such, the impact to the Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard and Sycamore Canyon Boulevard & Alessandro Boulevard intersections is considered **significant and unavoidable**.

The incorporation of mitigation measures **MM-TRAF-2**, **MM-TRAF-3**, and **MM-TRAF-4** to Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue, Elsworth Street/Cactus Avenue, and Heacock Street/Cactus Avenue, respectively, would reduce off-site impacts associated with the development of the proposed Project and improve to less than significant levels for Opening Year Cumulative with Project condition.

The proposed Project would impact several roadways outside of the jurisdiction of the lead agency. The proposed Project would be required to pay its fair share toward the costs of specific

improvements under mitigation measure **MM-TRAF-18** to the County of Riverside and the Cities of Riverside and Moreno Valley. However, it cannot be guaranteed that these fees would be applied to the specific improvements summarized herein. Currently, since at least some of these improvements are not scheduled in their respective City's Capital Improvement Program (CIP), Development Impact Fee (DIF), or similar program, there are no established programs to accept the fees contributed by the applicant and bundle them with fees from other cumulative Projects that also contribute to traffic impacts at those roadway facilities. In addition, because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvement will be constructed. Therefore, the proposed Project's contribution to cumulative impacts is **cumulative considerable** as well as **significant and unavoidable**.

Traffic Signal Warrants Analysis

Traffic signal warrants were prepared for the only unsignalized intersection in the study area, Meridian Parkway/Innovation Drive. Based on the warrant analysis, Meridian Parkway/Innovation Drive would not warrant a traffic signal in the Opening Year Cumulative with Project condition. The analysis worksheets are provided in Appendix R.

Freeway Analysis

Off-Ramp Queuing

A queuing analysis was performed for the off-ramps at the I-215/Cactus Avenue interchange to assess vehicle queues that may potentially result in deficient peak-hour operations at the ramp intersections, and cause spill-back onto the I-215 mainline. Analysis worksheets are provided in Appendix R.

Table 4.11-20
Opening Year Cumulative with Project Intersection LOS

#	Intersection	Traffic Control[1]	2023 without Project				2023 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		LOS		Delay[2] (secs.)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
1	Overlook-Canyon Crest/ Alessandro Bl	TS	**464.3**	**113.1**	**F**	**F**	**464.4**	**117.9**	**F**	**F**	D	Riverside	≥1 sec at LOS F	**Yes**
2	Trautwein Road/ Alessandro Blvd	TS	49.0	32.5	D	C	49.1	32.5	D	C	D	Riverside	--[3]	No
3	Mission Grove Pkwy/ Alessandro Blvd	TS	97.5	31.4	F	C	97.9	33.2	F	C	D	Riverside	--[3]	No
4	Barton Street/ Alessandro Blvd	TS	42.1	32.4	D	C	42.8	34.1	D	C	D	Riverside/JPA	--[3]	No
5	San Gorgonio Drive/ Alessandro Blvd	TS	28.5	29.5	C	C	29.1	31.1	C	C	D	Riverside/JPA	--[3]	No
6	Sycamore Canyon Blvd/ Alessandro Blvd	TS	**98.9**	**80.7**	**F**	**F**	**103.4**	**84.5**	**F**	**F**	D	Riverside/JPA	≥1 sec at LOS F	**Yes**
7	Meridian Parkway/ Cactus Avenue	TS	62.1	44.8	E	D	166.7	268.6	F	F	D	JPA	--[3]	No
8	Meridian Parkway/ Innovation Drive	CSS	17.0	29.4	C	D	17.3	31.2	C	D	D	JPA	--[3]	No
9	Meridian Parkway/ Opportunity Way	TS	11.3	40.9	B	D	20.8	49.2	C	D	D	JPA	--[3]	No
10	Meridian Parkway/ Van Buren Boulevard	TS	151.6	150.0	F	F	161.5	150.6	F	F	D	JPA	--[3]	No

Table 4.11-20
Opening Year Cumulative with Project Intersection LOS

#	Intersection	Traffic Control[1]	2023 without Project				2023 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		*LOS*		*Delay[2] (secs.)*		*LOS*					
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*				
11	Innovation Drive/ Cactus Avenue	TS	41.8	122.9	D	F	45.4	148.5	D	F	D	JPA	--[3]	No
12	I-215 SB ramps/ Alessandro Boulevard	TS	7.8	12.3	A	B	7.8	12.4	A	B	D	Caltrans/ Riverside/ County	--[3]	No
13	I-215 SB ramps/ Cactus Avenue	TS	5.3	29.4	A	C	5.5	46.9	A	D	D	Caltrans/JPA/ County	--[3]	No
14	I-215 NB ramps/ Alessandro Boulevard	TS	50.7	24.4	D	C	54.7	25.0	D	C	D	Caltrans/ Riverside/ County	--[3]	No
15	Old 215 Frontage Rd/ Alessandro Blvd	TS	31.2	50.4	C	D	34.2	52.4	C	D	D	MV/Riverside/ County	--[3]	No
16	Old 215 - I-215 NB ramps/ Cactus Ave	TS	**189.0**	43.2	**F**	D	**191.8**	**74.9**	**F**	**E**	D	Caltrans/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**
17	Day Street/ Alessandro Boulevard	TS	39.1	17.9	D	B	40.2	18.6	D	B	D	MV	--[3]	No
18	Elsworth Street/ Alessandro Boulevard	TS	28.9	43.0	C	D	29.1	44.6	C	D	D	MV	--[3]	No
19	Elsworth Street/ Cactus Avenue	TS	**305.5**	**204.9**	**F**	**F**	**328.3**	**265.3**	**F**	**F**	D	MV/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**

Table 4.11-20
Opening Year Cumulative with Project Intersection LOS

#	Intersection	Traffic Control[1]	2023 without Project				2023 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		*LOS*		*Delay[2] (secs.)*		*LOS*					
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*				
20	Veterans Way/ Alessandro Boulevard	TS	22.4	23.5	C	C	23.2	23.8	C	C	D	MV	--[3]	No
21	Veterans Way/ Cactus Avenue	TS	8.4	7.6	A	A	17.3	23.5	B	C	D	MV/JPA	--[3]	No
22	Frederick Street/ Alessandro Boulevard	TS	24.2	40.3	C	D	26.3	47.6	C	D	D	MV	--[3]	No
23	Frederick Street/ Cactus Avenue	TS	31.0	25.0	C	C	37.4	53.2	D	D	D	MV/JPA	--[3]	No
24	Graham St – Riverside Dr/ Cactus Ave	TS	30.8	24.4	C	C	32.7	29.0	C	C	D	MV/JPA	--[3]	No
25	Heacock Street/ Cactus Avenue	TS	**104.1**	**63.8**	**F**	**E**	**117.2**	**64.7**	**F**	**E**	D	MV/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**

Source: Appendix R.

Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS). **Bold and highlighted** = significant impact.

1 CSS = cross-street stop; TS = traffic signal

2 Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 Intersection forecast to continue to operate with satisfactory LOS (LOS D or better) with addition of Project traffic.

Table 4.11-21
Opening Year Cumulative with Project Peak Hour Freeway Off-Ramp Queuing

Intersection	Movement	Available Stacking Distance (Feet)	2023 without Project				2023 with Project			
			95th Percentile Queue (Feet)[3]		*Satisfactory?*[1]		*95th Percentile Queue (Feet)*[3]		*Satisfactory?*[1]	
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215 SB Ramps/ Cactus Avenue	SBR	1,115	147[2]	0	Yes	Yes	146[2]	0	Yes	Yes
	NBR	1,850	48	80[2]	Yes	Yes	157	369[2]	Yes	Yes
I-215 NB Ramps/ Cactus Avenue	NBL	145	892[2]	111	Yes[4]	Yes	892[2]	111	Yes[4]	Yes
	NBT/R	1,650	367[2]	60	Yes	Yes	367	60	Yes	Yes

Source: Appendix R.
SBL = southbound left turn lane; SBR = southbound right turn lane; NBL = northbound left turn lane; NBR = northbound right turn lane; T = through-lane

1 Stacking distance is satisfactory if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

2 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.

3 Maximum queue length for the approach reported.

4 Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 mainline.

As shown on Table 4.11-21, there are no queues forecast in the Opening Year Cumulative with Project condition that would spill onto the I-215 mainline. While the AM peak hour queue (892 feet) at the northbound left-turn lane of the northbound off-ramp exceeds the 145 foot storage lane, that queue combined with the queue (367 feet) of the shared through plus right-turn lane, on a single off-ramp lane of 1,650 feet, would not spillover to the I-215 mainline.

Freeway Segments

Opening Year Cumulative mainline directional volumes for the weekday AM and PM peak hours, without and with, the proposed Project are shown in Figures 4.11-20 and 4.11-21, respectively. As shown in Table 4.11-22, the study area freeway segments are forecast to continue to operate with satisfactory LOS during both peak hours, without and with, the proposed Project. Analysis worksheets are provided in Appendix R. However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Table 4.11-22
Opening Year Cumulative Conditions Freeway Segment Analysis

Freeway	Direction	Mainline Segment	Lanes[2]	2023 without Project				2023 with Project			
				Density[3]		*LOS*		*Density*[3]		*LOS*	
				AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215	SB	north of Cactus Avenue	4	18.5	--[4]	C	**F**	18.9	--[4]	C	**F**
		south of Cactus Avenue	4	17.6	--[4]	B	**F**	17.7	--[4]	B	**F**
	NB	north of Cactus Avenue	4	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**
		south of Cactus Avenue	4	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**

Source: Appendix R.
1 NB = Northbound; SB = Southbound
2 Number of lanes are in the specified direction and is based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

Freeway Merge/Diverge

Ramp merge and diverge operations were evaluated for the Opening Year Cumulative, without and with, Project conditions and the results of this analysis are shown in Table 4.11-23.

Table 4.11-23
Opening Year Cumulative Conditions Freeway Ramp Junction Merge/Diverge Analysis

Freeway	Direction	Ramp or Segment	Lanes on Freeway[2]	2023 without Project				2023 with Project			
				AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
				Density[3]	*LOS*	*Density*[3]	*LOS*	*Density*[3]	*LOS*	*Density*[3]	*LOS*
I-215	SB	off-ramp at Cactus Ave	4	19.1	C	--[5]	**F**	19.4	C	--[5]	**F**
		loop off-ramp at Cactus	4	19.4	C	--[5]	**F**	20.4	C	--[5]	**F**
		on-ramp at Cactus Ave	3	26.6	C	--[5]	**F**	26.7	C	--[5]	**F**
	NB	on-ramp at Cactus Ave	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**

Table 4.11-23
Opening Year Cumulative Conditions Freeway Ramp Junction Merge/Diverge Analysis

Freeway	Direction	Ramp or Segment	Lanes on Freeway[2]	2023 without Project				2023 with Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[3]	LOS	Density[3]	LOS	Density[3]	LOS	Density[3]	LOS
		loop on-ramp at Cactus	3	--[5]	F	--[5]	F	--[5]	F	--[5]	F
		off-ramp at Cactus Ave	3	--[4]	F	--[5]	F	--[4]	F	--[5]	F

Source: Appendix R.
1 NB = Northbound; SB = Southbound
2 Number of lanes are in the specified direction and is based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 HCS7 does not report density for freeway facilities operating at LOS F.
5 Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

As shown in Table 4.11-23, most of the study area freeway ramp merge/diverge ramp junctions are forecast to operate with satisfactory LOS (LOS D or better), with exception of the I-215 northbound off-ramp (diverge) at Cactus Avenue, which is forecast to operate at LOS F in the AM peak hour in both, without and with, Project conditions. While the addition of Project traffic is not anticipated to result in an LOS letter grade change to this deficient ramp diverge junction, it would contribute to its deficiency. In addition, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Freeway Analysis Impacts

As described above, there are no identified significant Project impacts to the study area off-ramp queues at I-215/Cactus Avenue, and the I-215 mainline segments with implementation of the proposed Project. Therefore, there **is no impact.**

However, the ramp (diverge) junction at the northbound I-215 off-ramp at Cactus Avenue is forecast to continue to operate with unsatisfactory LOS under Opening Year Cumulative with Project conditions. The Cactus Avenue overcrossing is the subject of a Project Study Report (PSR) prepared by the City of Moreno Valley in conjunction with Caltrans. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation Project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along I-215. At this time, Caltrans has no fee programs or other improvement programs

in place to address the deficiencies caused by development Projects in the March JPA (or other neighboring jurisdictions) on State Highway System (SHS) roadway segments. As such, no improvements have been recommended, and the impact to the ramp (diverge) junction at the northbound I-215 off-ramp at Cactus Avenue is **significant and unavoidable**.

Furthermore, due to observed queuing from downstream bottlenecks, there are identified significant Project impacts to the study area I-215 mainline segments and other I-215 merge/diverge areas with implementation of the proposed Project. At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development Projects in the JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation Project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. Additionally, the March JPA cannot guarantee the timing or implementation of such improvements as the facilities are under the jurisdiction of Caltrans. As such, no improvements have been recommended, and the impact to these freeway facilities is **significant and unavoidable** and **cumulatively considerable**.

Horizon Year with Project Traffic Conditions

This section discusses the methods used to develop the Horizon Year, without and with Project, traffic conditions and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

Roadway Improvements

The study area lane configurations and traffic controls assumed to be in place for the Horizon Year conditions are consistent with existing conditions, with the exception of Project driveways and other intersection and roadway improvements along the Project's frontage and driveways. Additionally, driveways and those facilities assumed to be constructed by cumulative development Projects to provide site access are also assumed to be in place for the Horizon Year conditions (e.g., intersection and roadway improvements along the cumulative development's frontage and driveways). Other connections assumed include the extension of San Gorgonio Avenue to the south of Alessandro Boulevard; and, the extension of Cactus Avenue to the west of Meridian Parkway.

Traffic Volumes

The Horizon Year (2040) without Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. Figures 4.11-22 and 4.11-23 show the ADT and intersection volumes, respectively for Horizon Year traffic conditions without the Project. The Horizon Year with Project traffic forecasts were determined by adding the Project traffic to the Horizon Year without Project

traffic forecasts from the RivTAM model. Figures 4.11-25 and 4.11-26 show the ADT and intersection volumes, respectively, for Horizon Year Conditions with the Project.

Intersection Operations

An intersection LOS analysis was conducted for the study intersections to evaluate their operations under Horizon Year without Project Conditions. The analysis worksheets are included in Appendix R. As shown in Table 4.11-24 and Figure 4.11-24, the following study area intersections are anticipated to operate with unsatisfactory LOS:

1. Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard – LOS F AM and PM peak hours
3. Mission Grove Parkway/Alessandro Boulevard – LOS F AM peak hour; LOS E PM peak hour
6. Sycamore Canyon Boulevard/Alessandro Boulevard – LOS F AM and PM peak hours
7. Meridian Parkway/Cactus Avenue – LOS F AM peak hour; LOS E PM peak hour
10. Meridian Parkway/Van Buren Boulevard – LOS F AM and PM peak hours
11. Innovation Drive/Cactus Avenue – LOS E AM peak hour; LOS F PM peak hour
13. I-215 southbound ramps/Cactus Avenue – LOS F PM peak hour only
14. I-215 northbound ramps/Alessandro Boulevard – LOS E AM and PM peak hours
15. Old 215 Frontage Road/Alessandro Boulevard – LOS F AM peak hour only
16. Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue – LOS F AM and PM peak hours
17. Day Street/Alessandro Boulevard – LOS E PM peak hour only
18. Elsworth Street/Alessandro Boulevard – LOS F PM peak hour only
19. Elsworth Street/Cactus Avenue – LOS F AM and PM peak hours
22. Frederick Street/Alessandro Boulevard – LOS F AM and PM peak hours
24. Graham Street – Riverside Drive/Cactus Avenue – LOS F AM and PM peak hours
25. Heacock Street/Cactus Avenue – LOS F AM peak hour; LOS E PM peak hour

For the Horizon Year plus Project condition, as shown in Table 4.11-24 and Figure 4.11-27, the Project is anticipated to result in significant impacts at the following intersections, as the Project would meet the significance criteria for its respective jurisdiction(s):

1. Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard: Addition of 1.0 second or more of delay at LOS F (City of Riverside) in both peak hours.

6. Sycamore Canyon Boulevard/Alessandro Boulevard: Addition of 1.0 second or more of delay at LOS F in both peak hours (City of Riverside) in both peak hours.

13. I-215 southbound ramps/Cactus Avenue: Addition of 2% or more of total peak hour traffic at LOS E-F (March JPA); and, addition of 50 or more peak hour trips to LOS E-F (County and Caltrans) in PM peak hour.

14. I-215 northbound ramps/Alessandro Boulevard: Addition of 2.0 seconds or more of delay at LOS E (City of Riverside); and, addition of 50 or more peak hour trips to LOS E-F (County and Caltrans) in PM peak hour.

15. Old 215 Frontage Road/Alessandro Boulevard: Addition of 1.0 seconds or more of delay at LOS F (City of Riverside); and, addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley and County) in PM peak hour.

16. Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue: Addition of 2% or more of total peak hour traffic at LOS E-F (March JPA); and, addition of 50 or more peak hour trips to LOS E-F (Caltrans) in both peak hours.

17. Day Street/Alessandro Boulevard: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley) in PM peak hour.

18. Elsworth Street/Alessandro Boulevard: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley) in PM peak hour.

19. Elsworth Street/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic at LOS E-F (March JPA) in both peak hours.

22. Frederick Street/Alessandro Boulevard: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley) in both peak hours.

24. Graham Street/Riverside Drive/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic at LOS E-F (March JPA) in both peak hours.

25. Heacock Street/Cactus Avenue: Addition of 50 or more peak hour trips to LOS E-F (City of Moreno Valley); and, addition of 2% or more to the total peak hour traffic at LOS E-F (March JPA) in both peak hours.

At the Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard intersection, the roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. The LOS deficiency at this intersection is caused by the minimum green times necessary for pedestrian crossing time. As a result, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. Potential physical improvements such as grade-separated pedestrian crossings would not be financially feasible based

on the pedestrian and bicycle activity at this location. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at this intersection (also validated by peak hour count data). As such, the impact is considered **significant and unavoidable**. As such, the impact to the Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard intersection is considered **significant and unavoidable**.

The incorporation of mitigation measures **MM-TRAF-5** through **MM-TRAF-15** would reduce off-site impacts associated with the development of the proposed Project to less than significant levels for Horizon Year with Project conditions. Table 4.11-24 shows the resulting LOS and delay with and without these mitigations. The intersection operations analysis worksheets are provided in Appendix R.

However, since some of the mitigation measures required are either the responsibility and jurisdiction of another public agency, and not the lead agency, or have been deemed infeasible by the lead agency, impacts associated with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, as well as impacts related to an applicable congestion management program, would be considered **significant and unavoidable** following the incorporation of mitigation measures identified herein. Additionally, the Project's contribution to these impacts is **cumulative considerable.**

Traffic Signal Warrants Analysis

Traffic signal warrants were prepared for the only unsignalized intersection in the study area, Meridian Parkway/Innovation Drive. Based on the warrant analysis, Meridian Parkway/Innovation Drive would not warrant a traffic signal in the Horizon Year, without and with, Project conditions. The analysis worksheets are provided in Appendix R.

Table 4.11-24
Horizon Year with Project Intersection LOS

#	Intersection	Traffic Control[1]	2040 without Project				2040 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		LOS		Delay[2] (secs.)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
1	Overlook-Canyon Crest/ Alessandro Bl	TS	**530.8**	**156.9**	**F**	**F**	**548.1**	**162.6**	**F**	**F**	D	Riverside	≥1 sec at LOS F	**Yes**
2	Trautwein Road/ Alessandro Blvd	TS	53.9	34.0	D	C	54.3	34.3	D	C	D	Riverside	--[3]	No
3	Mission Grove Pkwy/ Alessandro Blvd	TS	139.6	58.2	F	E	139.8	58.9	F	E	D	Riverside	--[3]	No
4	Barton Street/ Alessandro Blvd	TS	49.0	45.4	D	D	52.7	49.5	D	D	D	Riverside/ JPA	--[3]	No
5	San Gorgonio Drive/ Alessandro Blvd	TS	38.3	51.6	D	D	39.0	54.8	D	D	D	Riverside/ JPA	--[3]	No
6	Sycamore Canyon Blvd/ Alessandro Bl	TS	116.1	103.4	F	F	**118.0**	**104.8**	**F**	**F**	D	Riverside/ JPA	≥1 sec at LOS F	**Yes**
7	Meridian Parkway/ Cactus Avenue	TS	88.8	63.2	F	E	89.8	67.2	F	E	D	JPA	--[3]	No
8	Meridian Parkway/ Innovation Drive	CSS	19.1	33.9	C	D	20.0	34.2	C	D	D	JPA	--[3]	No
9	Meridian Parkway/ Opportunity Way	TS	12.1	46.2	B	D	12.2	51.3	B	D	D	JPA	--[3]	No
10	Meridian Parkway/ Van Buren Boulevard	TS	190.7	196.5	F	F	193.2	197.2	F	F	D	JPA	--[3]	No
11	Innovation Drive/ Cactus Avenue	TS	73.7	161.2	E	F	74.2	163.7	E	F	D	JPA	--[3]	No

Table 4.11-24
Horizon Year with Project Intersection LOS

#	Intersection	Traffic Control[1]	2040 without Project				2040 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		LOS		Delay[2] (secs.)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
12	I-215 SB ramps/ Alessandro Boulevard	TS	11.6	19.5	B	B	11.8	20.0	B	C	D	Caltrans/ Riverside/ County	--[3]	No
13	I-215 SB ramps/ Cactus Avenue	TS	6.9	85.6	A	F	7.2	**103.8**	A	**F**	D	Caltrans/ JPA/ County	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**
14	I-215 NB ramps/ Alessandro Boulevard	TS	67.1	56.9	E	E	**67.9**	**59.4**	**E**	**E**	D	Caltrans/ Riverside/ County	≥50 trips at LOS E/F; ≥2 sec at LOS E	**Yes**
15	Old 215 Frontage Rd/ Alessandro Blvd	TS	83.8	51.7	F	D	**96.4**	52.3	**F**	D	D	MV/ Riverside/ County	≥50 trips at LOS E/F; ≥1 sec at LOS F	**Yes**
16	Old 215 - I-215 NB ramps/ Cactus Ave	TS	872.4	339.0	F	F	**876.9**	**366.7**	**F**	**F**	D	Caltrans/ JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**
17	Day Street/ Alessandro Boulevard	TS	30.8	77.4	C	E	31.5	**78.5**	C	**E**	D	MV	≥50 trips at LOS E/F	**Yes**
18	Elsworth Street/ Alessandro Boulevard	TS	45.8	95.2	D	F	46.4	**97.5**	D	**F**	D	MV	≥50 trips at LOS E/F	**Yes**
19	Elsworth Street/ Cactus Avenue	TS	374.8	270.5	F	F	**396.7**	**324.6**	**F**	**F**	D	MV/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**

Table 4.11-24
Horizon Year with Project Intersection LOS

#	Intersection	Traffic Control[1]	2040 without Project				2040 with Project				Acceptable LOS	Jurisdiction	Significance Threshold	Significant Impact?
			Delay[2] (secs.)		LOS		Delay[2] (secs.)		LOS					
			AM	PM	AM	PM	AM	PM	AM	PM				
20	Veterans Way/ Alessandro Boulevard	TS	32.9	40.0	C	D	33.1	40.7	C	D	D	MV	--[3]	No
21	Veterans Way/ Cactus Avenue	TS	9.0	27.7	A	C	18.4	30.8	B	C	D	MV/JPA	--[3]	No
22	Frederick Street/ Alessandro Boulevard	TS	112.8	193.7	F	F	**114.6**	**195.3**	**F**	**F**	D	MV	≥50 trips at LOS E/F	**Yes**
23	Frederick Street/ Cactus Avenue	TS	33.9	28.5	C	C	36.7	54.2	D	D	D	MV/JPA	--[3]	No
24	Graham St – Riverside Dr/ Cactus Ave	TS	139.7	111.9	F	F	**149.8**	**133.3**	**F**	**F**	D	MV/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**
25	Heacock Street/ Cactus Avenue	TS	162.5	74.3	F	E	**178.4**	**87.6**	**F**	**F**	D	MV/JPA	≥50 trips at LOS E/F; ≥2% of total traffic	**Yes**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS). **Bold and highlighted** = significant impact.
1 CSS = cross-street stop; TS = traffic signal
2 Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.
3 Intersection forecast to continue to operate with satisfactory LOS (LOS D or better) with addition of Project traffic.

Freeway Analysis

Off-Ramp Queuing

A queuing analysis was performed for the off-ramps from I-215/Cactus Avenue interchange to assess vehicle queues that may potentially result in deficient peak-hour operations at intersections and cause spill-back onto the I-215 mainline. Analysis worksheets are provided in Appendix R. The analysis findings are shown in Table 4.11-25 for Horizon Year without and with Project Conditions.

Table 4.11-25
Horizon Year Traffic Conditions Peak-Hour Freeway Off-Ramp Queuing

Intersection	Movement	Available Stacking Distance (Feet)	2020 Without Project				2020 With Project			
			95th Percentile Queue (Feet)[3]		*Satisfactory?*[1]		*95th Percentile Queue (Feet)*[3]		*Satisfactory?*[1]	
			AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215 SB ramps/ Cactus Avenue	SBR	1,115	167	14	Yes	Yes	167	20	Yes	Yes
	NBR	1,850	148[2]	216[2]	Yes	Yes	339[2]	312[2]	Yes	Yes
I-215 NB ramps/ Cactus Avenue	NBL	145	952[2]	245	Yes[4]	Yes[4]	952[2]	245[2]	Yes[4]	Yes[4]
	NBT/R	1,650	663[2]	222	Yes	Yes	663[2]	224	Yes	Yes

Source: Appendix R.
SBL = southbound left turn lane; SBR = southbound right turn lane; NBL = northbound left turn lane; NBR = northbound right turn lane; T = through-lane

1 Stacking distance is satisfactory if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
2 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after two cycles.
3 Maximum queue length for the approach reported.
4 Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 mainline.

As shown in Table 4.11-25, there are no queues forecast in the Horizon Year with Project condition that would spill onto the I-215 mainline. While the AM peak hour queue (952 feet) at the northbound left-turn lane of the northbound off-ramp exceeds the 145 foot storage lane, that queue combined with the queue (663 feet) of the shared through plus right-turn lane, on a single off-ramp lane of 1,650 feet, would not spillover to the I-215 mainline.

Freeway Segments

The Project Study Report/Project Development Support in Riverside County on I-215 and State Route 60 between Nuevo Road and I-215/State Route 60 Junction and Box Springs Road and Day Street (Caltrans 2008), also known as the I-215 North Project, includes construction of a high-occupancy-vehicle (HOV) (i.e., carpool) lane in each direction of I-215 between Nuevo Road and Box Springs Road within the existing median. According to the RCTC and Caltrans websites, the

I-215 North Project is a long-term project, as priority has been given to the southern and central projects along the I-215 corridor.

Caltrans typically assumes a reduction of 14% to the freeway mainline through volumes in this region to account for vehicles using the HOV lanes. The reduction to the I-215 mainline volumes has been applied to account for the proposed HOV lanes. The analysis has been performed assuming the same number of mixed-flow lanes and on and off-ramp configurations as existing baseline conditions at the I-215 and Alessandro Boulevard interchange.

Horizon Year traffic conditions mainline directional volumes for the weekday AM and PM peak hours without and with the Project are shown in Figures 4.11-28 and 4.11-29, respectively. Table 4.11-26 presents the results for the freeway segment analysis, and includes LOS for without and with Project conditions, and without and with the I-215 North Project. Analysis worksheets are provided in Appendix R.

Table 4.11-26
Horizon Year Traffic Conditions Freeway Segment Analysis

Freeway	Direction	Mainline Segment	With/Without Improvement	Lanes[2]	2040 Without Project				2040 With Project			
					Density[3]		*LOS*		*Density*[3]		*LOS*	
					AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215	SB	north of Cactus Ave	Without	4	22.3	--[5]	C	**F**	22.7	--[5]	C	**F**
			With	4	18.9	--[5]	C	**F**	18.3	--[5]	C	**F**
		south of Cactus Ave	Without	4	21.2	--[5]	C	**F**	21.5	--[5]	C	**F**
			With	4	18.0	--[5]	B	**F**	18.3	--[5]	C	F
	NB	north of Cactus Ave	Without	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
			With	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
		south of Cactus Ave	Without	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
			With	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
1 NB = Northbound; SB = Southbound
2 Number of lanes are in the specified direction and is based on existing conditions.
3 Density is measured by passenger cars per mile per lane (pc/mi/ln).
4 HCS7 does not report density for freeway facilities operating at LOS F.
5 Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

As shown in Table 4.11-26, the following freeway segments analyzed for this study are anticipated to operate at an unsatisfactory LOS (LOS E or worse) during the peak hours without the Project:

- I-215 northbound, north of Cactus Avenue – LOS F PM peak hour only
- I-215 northbound, south of Cactus Avenue – LOS F AM peak hour; LOS E PM peak hour

With the addition of Project traffic, the two segments noted above would continue to operate with unsatisfactory LOS, with the addition of the segment of I-215 southbound, south of Cactus Avenue, which is forecast to operate at an unsatisfactory LOS (LOS E PM peak hour) from LOS D (without the Project).

With the improvements from the I-215 North Project in place, most of the freeway segments that were forecast to operate with unsatisfactory LOS would operate with satisfactory LOS, with the exception of I-215 northbound, south of Cactus Avenue, which is forecast to continue to operate with unsatisfactory LOS (LOS E AM peak hour). It should be noted, however, that the LOS would improve from LOS F to LOS E.

However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Freeway Merge/Diverge

Ramp merge and diverge operations were evaluated for Horizon Year traffic conditions, without and with, the proposed Project and the results of this analysis are presented in Table 4.11-27.

Table 4.11-27
Horizon Year Traffic Conditions Freeway Ramp Junction Merge/Diverge Analysis

Freeway	Direction	Ramp or Segment	With/ Without Improvement	Lanes[2]	2040 Without Project				2040 With Project			
					Density[3]		*LOS*		*Density*[3]		*LOS*	
					AM	*PM*	*AM*	*PM*	*AM*	*PM*	*AM*	*PM*
I-215	SB	off-ramp at Cactus	Without	4	22.7	--[5]	C	**F**	23.0	--[5]	C	**F**
			With	4	19.4	--[5]	C	**F**	19.7	--[5]	C	**F**
		loop off-ramp at Cactus	Without	4	24.1	--[5]	D	**F**	24.5	--[5]	D	**F**
			With	4	20.5	--[5]	C	**F**	20.9	--[5]	C	**F**
		on-ramp at Cactus	Without	3	32.8	--[4]	D	**F**	32.9	--[5]	D	**F**
			With	3	27.3	--[5]	C	**F**	27.5	--[5]	C	**F**
	NB	on-ramp at Cactus	Without	3	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
			With	3	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
		loop on-ramp at Cactus	Without	3	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**
			With	3	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
		off-ramp at Cactus	Without	3	--[4]	--[4]	**F**	**F**	--[4]	--[4]	**F**	**F**
			With	3	--[5]	--[5]	**F**	**F**	--[4]	--[5]	**F**	**F**

Source: Appendix R.
Bold = LOS does not meet the applicable jurisdictional requirements (i.e., unsatisfactory LOS).
[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.
[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).
[4] HCS7 does not report density for freeway facilities operating at LOS F.
[5] Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

As shown in Table 4.11-27, the following study area freeway ramp merge and diverge areas are anticipated to operate with unsatisfactory LOS (LOS E or F) during one or more peak hours without the Project:

- I-215 southbound, loop off-ramp at Cactus Avenue – LOS E PM peak hour
- I-215 southbound, on-ramp at Cactus Avenue – LOS F PM peak hour
- I-215 northbound, on-ramp at Cactus Avenue –LOS E PM peak hour
- I-215 northbound, loop on-ramp at Cactus Avenue – LOS F AM and PM peak hours
- I-215 northbound, off-ramp at Cactus Avenue – LOS F AM and PM peak hours

As shown in Table 4.11-27, with the addition of Project traffic, those merge/diverge areas listed above would continue to operate with unsatisfactory LOS, and there would be no additional freeway merge/diverge ramp junctions forecast to operate with unsatisfactory LOS. Analysis worksheets are provided in Appendix R.

With improvements implemented from the I-215 North Project, discussed above, two of the five ramp junctions listed above would operate with satisfactory LOS (LOS D or better). However, the following ramp junctions are anticipated to continue to operate at an unsatisfactory LOS:

- I-215 southbound, on-ramp at Cactus Avenue – LOS F PM peak hour
- I-215 northbound, loop on-ramp at Cactus Avenue – LOS F PM peak hour only
- I-215 northbound, off-ramp at Cactus Avenue – LOS F AM and PM peak hours

However, observations made in the field indicated that the I-215 southbound mainline experiences significant traffic congestion in the AM peak hour, and the I-215 northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. The queuing analysis is utilized to identify any potential queueing and "spill back" onto the freeway mainline from the off-ramps. Caltrans Guidelines do not provide a significance criteria for off-ramp queues. Where applicable, the freeway mainline is assumed to operate at LOS F.

Freeway Analysis Impacts

The Project is anticipated to have a **cumulatively considerable** impact to the identified freeway mainline segments and merge/diverge ramp junctions. No mitigation measures have been identified as no other improvements beyond those planned by the I-215 North Project have been evaluated. Neither Caltrans

nor the state have adopted a fee program that can ensure that locally contributed impact fees will be tied to improvements to freeway mainlines, and only Caltrans has the jurisdiction over mainline improvements. Because Caltrans has exclusive control over state highway improvements, ensuring that fair share contributions to mainline improvements are actually part of a program tied to implementation is within the jurisdiction of Caltrans and beyond the control of the March JPA (refer to **MM-TRAF-18**). As such, the impacts are considered **significant and unavoidable**.

Construction Traffic

Traffic operations during the proposed construction phase of the Project may potentially result in short-term traffic deficiencies related to construction employees, export of materials, and import of construction materials, etc. It is anticipated that the following construction-related activities would generate traffic and may potentially result in temporary construction-related traffic deficiencies:

- Construction employee commutes;
- Import of construction materials and soils; and
- Transport and use of heavy construction equipment.

Additionally, the Project would include improvements to the Cactus Avenue Drainage Channel that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project's frontage, and further to the east ending at the Heacock Channel. The current drainage ditch is planned to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District and the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan.

To minimize the impact of construction activities, the applicant would be required to develop and implement a March JPA-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses. With the incorporation of **MM-TRAF-19**, short term construction impacts would be **less than significant**.

Threshold TRAF-3. Would the Project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The March JPA designated truck route map is shown on Exhibit 3-10 in the TIA (Appendix R). I-215, Alessandro Boulevard (west of I-215), Meridian Parkway, Innovation Drive, Van Buren Boulevard, and Cactus Avenue are identified as designated truck routes. As shown on Exhibit 4-2 in Appendix R, 100% of outbound truck trips are estimated to utilize Cactus Avenue, with 90% of trips distributed to the west towards I-215 and 10% of trips distributed to the east. Cactus Avenue and I-215 are designated truck routes, and these roadways have been identified by March JPA as being designed to adequately support tractor trailer traffic. As the majority of truck traffic will be distributed along these roadways, the introduction of Project-related truck trips would not be considered an incompatible use.

All roadway improvements required as a result of the Project, whether located on or off site, would be designed and constructed in accordance with all applicable local, state, and federal roadway standards and practices. The Project driveways at Veteran's Way/Driveway 1/Cactus Avenue (#21) and Frederick Street/Driveway 2/Cactus Avenue (#23) will be improved and designed per local standards to accommodate Project traffic. Implementation of these improvements would be overseen by the lead agency and their qualified traffic engineers and are detailed in **MM-TRAF-16** and **MM-TRAF-17**.

This approach would ensure compliance with any and all applicable roadway design requirements. As such, no hazardous design features would be part of the Project's roadway improvements. Therefore, impacts associated with hazardous design features or incompatible uses in conjunction with the implementation of MM-TRAF-16 and MM-TRAF-17 would be **less than significant**.

Threshold TRAF-4. Would the Project result in inadequate emergency access?

All areas of the Project site would be accessible to emergency responders during both Project construction and operation. Local access to the proposed Project would be provided via existing roadways, including Cactus Avenue and Alessandro Boulevard.

A total of two driveways off Cactus Avenue would be provided, each of which would be designed and constructed according to March JPA standards. Similarly, the internal drive aisles, and loading and parking areas would be designed to comply with March JPA width, clearance, and turning radius requirements.

In addition, due to the typical wide turning radius of large trucks, a truck turning template was overlaid on the site plan at Veteran's Way (Driveway 1) and Frederick's Street (Driveway 2) on Cactus Avenue, which are anticipated to be utilized by heavy trucks, in order to determine

appropriate curb radii and to verify that trucks would have sufficient space to execute turning maneuvers. For the purposes of this evaluation, the WB-67 class truck template was used. WB-67 class trucks are approximately 73.5 feet in length.

Exhibit 1-5 in the TIA (Appendix R) illustrates the proposed truck access for the site and circulation for each of the applicable Project driveways and turning movements. The recommended curb radii of 40 feet for both driveways are anticipated to accommodate the ingress and egress of trucks. Therefore, impacts associated with hazardous design features or emergency access would be **less than significant**.

4.11.6 Mitigation Measures

Measures to Reduce Operational-Related Impacts

The recommended on-site and site-adjacent roadway measures for the Project are provided below. These mitigation measures would be imposed as conditions of approval as part of the Project approval. Construction of on-site and site-adjacent improvements shall occur in conjunction with adjacent Project development activity, or as needed for Project access purposes. The mitigation measures are organized by the scenario in which the impact occurs: Existing, Cumulative or Horizon Year.

Existing Conditions

MM-TRAF-1 Elsworth Street/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall contribute its fair-share towards the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches; and, restriping of the northbound shared left-though-right turn lane and southbound shared left-through lane. The signal modification shall include traffic signal synchronization improvements along Cactus Avenue

Opening Year Cumulative Conditions

MM-TRAF-2 Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Modify the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue
- Add a second northbound left turn lane
- Add a third westbound through lane
- Add a westbound right turn lane

MM-TRAF-3 Elsworth Street/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Modify the traffic signal to implement protected left turn phasing on the northbound and southbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue

MM-TRAF-4 Heacock Street/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Add a third eastbound through lane
- Add a third westbound through lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

Horizon Year Traffic Conditions

MM-TRAF-5 Sycamore Canyon Boulevard/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall contribute its fair share towards the installation of a second northbound left turn lane; and, the modification of the traffic signal to implement protected left turn phasing on the southbound, eastbound, and westbound approaches.

MM-TRAF-6 I-215 southbound ramps/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Add a third eastbound through lane
- Add a second westbound left turn lane
- Add a third westbound through lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

MM-TRAF-7 I-215 northbound ramps/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the installation of a second northbound left turn lane.

MM-TRAF-8 Old 215 Frontage Road/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Add a third eastbound through lane
- Add a third westbound through lane

MM-TRAF-9 Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share toward the following improvements:

- Modify the traffic signal to implement protected left turn phasing on the southbound approaches; and, include traffic signal synchronization improvements along Cactus Avenue
- Add a second northbound through lane
- Add two southbound right turn lanes
- Add a second eastbound left turn lane
- Add a third eastbound through lane
- Add an eastbound right turn lane
- Add a fourth westbound through lane

MM-TRAF-10 Day Street/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the following improvements:

- Add a third westbound through lane

MM-TRAF-11 Elsworth Street/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a second northbound left turn lane.

MM-TRAF-12 Elsworth Street/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share toward the following improvements:

- Add a second northbound left turn lane
- Add a fourth eastbound through lane
- Add a fourth westbound through lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

MM-TRAF-13 Frederick Street/Alessandro Boulevard: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a third eastbound through lane.

MM-TRAF-14 Graham Street/Riverside Drive/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share towards the addition of a second eastbound left turn lane.

MM-TRAF-15 Heacock Street/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall pay its fair share toward the following improvements:

- Add a third eastbound through lane
- Add a third westbound through lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

On-Site Access and Driveways

MM-TRAF-16 Veteran's Way/Driveway 1/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall construct the following improvements:

- Construct northbound approach with left turn lane, and shared through-right lane
- Re-stripe southbound left-right turn lane to a through lane
- Add westbound left turn lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

MM-TRAF-17 Frederick Street/Driveway 2/Cactus Avenue: Prior to issuance of first certificate of occupancy, the Project shall construct the following improvements:

- Construct northbound approach with left turn lane, through lane, and right turn lane
- Re-stripe southbound right turn lane to a through-right lane
- Add westbound left turn lane
- Modify traffic signal to include traffic signal synchronization improvements along Cactus Avenue

MM-TRAF-18 WRCOG TUMF Contribution: Prior to the issuance of building permits, the Project applicant shall participate in the WRCOG TUMF fee programs by paying the requisite fees at the time of building permit. Improvements may be eligible for a fee credit or reimbursement through the program where appropriate. Table 4.11-28 provides share calculations in the event a particular facility is not included in a pre-existing fee program.

Measures to Reduce Construction-Related Impacts

MM-TRAF-19 Construction Traffic Management Plan: Prior to the issuance of building permits, the Project applicant would be required to develop and implement a March JPA-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

Table 4.11-28
Summary of Improvements and Cost by Analysis Scenario

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside	- None					0.65%	
				- Restripe the SB shared left-through lane as a 3rd left turn lane and the SB right turn lane as a shared through-right turn lane.	- Same	No	$43,733		$286
				- Modify the TS to implement protected left turn phasing on the NB and SB approaches	- Same	No	$131,198		$857
						Total	**$174,931**		**$1,143**
6	Sycamore Canyon Bl. & Alessandro Bl.	County, Riverside	- None	- None	- 2nd NB left turn lane	No	$87,465	1.11%	$970
					- Modify the TS to implement overlap phasing on the SB, EB, and WB right turn lane	No	$131,198		$1,455
						Total	**$218,663**		**$2,425**
13	I-215 SB Ramps & Cactus Av.	March JPA, Riverside County, Caltrans	- None	- None	- 3rd EB through lane	Yes (TUMF)	NA[9]	5.35%	$0
					- 2nd WB left turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 3rd WB through lane	Yes (TUMF)	NA[9]		$0
						Total	**$0**		**$0**

Table 4.11-28
Summary of Improvements and Cost by Analysis Scenario

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
14	I-215 NB Ramps & Alessandro Bl.	March JPA, Riverside County, Caltrans	- None	- None	- 2nd NB left turn lane	No	$87,465	1.71%	$1,493
						Total	**$87,465**		**$1,493**
15	Old 215 Frontage Rd. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd EB through lane	Yes (TUMF)	NA[9]	1.80%	$0
					- 3rd WB through lane	Yes (TUMF)	NA[9]		
						Total	**$0**		**$0**
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	March JPA, Riverside County, Caltrans	- None	- 2nd NB left turn lane	- Same	Yes (TUMF)[12]	NA[9]	5.42%	$0
				- 3rd WB through lane	- Same	Yes (TUMF)	NA[9]		$0
				- WB right turn lane	- Same	Yes (TUMF)[12]	NA[9]		$0
					- 2nd NB through lane	Yes (TUMF)[12]	NA[9]		$0
					- 1st and 2nd SB right turn lanes	Yes (TUMF)[12]	NA[9]		$0
					- 2nd EB left turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 3rd EB through lane	Yes (TUMF)[12]	NA[9]		$0
					- EB right turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 4th WB through lane	Yes (TUMF)[12]	NA[9]		$0
					- WB right turn lane	Yes (TUMF)[12]	NA[9]		$0

Table 4.11-28
Summary of Improvements and Cost by Analysis Scenario

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
					- Modify the TS to implement overlap phasing on the SB right turn lane	Yes (TUMF)[12]	NA[9]		$0
						Total	**$0**		**$0**
17	Day St. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd WB through lane	Yes (TUMF)	NA	1.93%	$0
						Total	**$0**		**$0**
18	Elsworth St. & Alessandro Bl.	Moreno Valley	- None	- None	- 2nd NB left turn lane	No	$87,465	2.05%	$1,789
						Total	**$87,465**		**$1,789**
19	Elsworth St. & Cactus Av.	March JPA, Moreno Valley	- Modify the TS to implement protected left turn phasing on the NB and SB approaches	- Same	- Same	No	$131,198	6.99%	$9,168
					- 2nd NB left turn lane	No	$87,465		$6,112
					- 4th WB through lane	No	$314,874		$22,002
					- 4th EB through lane	No	$314,874		$22,002
						Total	**$848,411**		**$59,283**
21	Veterans Wy. & Cactus Av.	March JPA, Moreno Valley	- NB left turn lane[6]	- Same	- Same	No	$87,465	100.00%	$87,465
			- NB shared through-right turn lane[6]	- Same	- Same	No	$314,874		$314,874
			- WB left turn lane[6]	- Same	- Same	No	$87,465		$87,465

Table 4.11-28
Summary of Improvements and Cost by Analysis Scenario

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
			- Restripe the SB shared left-right turn lane as a through lane[6]	- Same	- Same	No	$43,733		$43,733
						Total	**$533,537**		**$533,537**
22	Frederick St. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd EB through lane	Yes (TUMF)	$0	3.57%	$0
						Total	**$0**		**$0**
23	Frederick St. & Cactus Av.	March JPA, Moreno Valley	- NB left turn lane[6]	- Same	- Same	No	$87,465	100.00%	$87,465
			- NB through lane[6]	- Same	- Same	No	$314,874		$314,874
			- NB right turn lane[6]	- Same	- Same	No	$87,465		$87,465
			- WB left turn lane[6]	- Same	- Same	No	$87,465		$87,465
			- Restripe the SB right turn lane as a shared through-right turn lane[6]	- Same	- Same	No	$43,733		$43,733
						Total	**$621,002**		**$621,002**

Table 4.11-28
Summary of Improvements and Cost by Analysis Scenario

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
24	Graham St./Riverside Dr. & Cactus Av.	March JPA, Moreno Valley	- None	- None	- 2nd EB left turn lane	No	$87,465	5.02%	$4,391
						Total	**$87,465**		**$4,391**
25	Heacock St. & Cactus Av.	March JPA, Moreno Valley	- None	- 3rd EB through lane	- Same	Yes (TUMF)	$0	4.19%	$0
				- 3rd WB through lane	- Same	No	$314,874		$13,208
						Total	**$314,874**		**$13,208**
						Total Project Fair Share Contribution to the March JPA (non-TUMF)[7]	*$1,648,716*		*$1,021,105*
						Total Project Fair Share Contribution to the City of Riverside[8]	*$240,530*		*$1,870*
						Total Project Fair Share Contribution to the County of Riverside[9]	*$153,064*		*$1,697*
						Total Project Fair Share Contribution to the City of Moreno Valley[10]	*$844,039*		*$212,105*
						Total Project Fair Share Contribution to Caltrans[11]	*$87,465*		*$1,493*
						Total	**$2,973,813**		**$1,238,270**

Source: Appendix R.

1 Improvements included in TUMF fee program. Although identified as a TUMF facility, the improvement is not currently identified on the Northwest Zone 5-Year Transportation Improvement Program Amendment (adopted January 6, 2014).

2 Costs have been estimated using the data provided in Appendix G of the CMP (2003 Update) for preliminary construction costs.

3 Appendix G costs escalated by a factor of 1.484 except Traffic Signals. This is consistent with the methodology used by other near-by agencies.

4 Program improvements constructed by Project may be eligible for fee credit, at discretion of the March JPA. See Table 1-5 for Fair Share Calculations.

5 Rough order of magnitude cost estimate.

6 Improvements are Project design features as they are either site adjacent roadway improvements or needed for site access.

7 Total Project fair share contribution consists of the improvements which are not already included in the County TUMF for those intersections wholly or partially within the March JPA.

8 Total Project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Riverside.

9 Total Project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the County of Riverside.

10 Total Project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Moreno Valley.

11 Total Project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

12 The TUMF nexus study identifies I-215/Cactus overcrossing ($22,280,000). Although the individual improvements are not specifically identified in the nexus study, they are likely to be part of the overall interchange improvements.

4.11.7 Level of Significance after Mitigation

On-Site, Site-Adjacent, and Off-Site Circulation (Thresholds TRAF-1 and TRAF-2)

With **MM-TRAF-1**, the Project shall modify the traffic signal at the intersection of Veteran's Way/Driveway 1/Cactus Avenue, reducing Project impacts to **less than significant.**

With **MM-TRAF-2**, the Project shall modify the traffic signal at the intersection of Frederick Street/Driveway 2/Cactus Avenue, reducing Project impacts to **less than significant**.

With **MM-TRAF-3**, the Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the south leg of the Overlook Parkway/Canyon Crest/Alessandro Boulevard, increasing intersection operations to LOS D and reducing Project impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-4**, the Project shall pay its fair share towards the modification of the traffic signal at the intersection of Elsworth Street/Cactus Avenue, increasing intersection operations to LOS C and reducing the Project impacts to **less than significant**.

With **MM-TRAF-5**, the Project shall pay its fair share towards the restriping of lanes and the modification of the traffic signal at the intersection of Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-6**, the Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the southbound approach at the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of City and County of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-7**, the intersection of Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards the traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the

improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-8**, the intersection of Heacock Street/Cactus Avenue is anticipated to operate at LOS D during with fair share contributions to lane additions, thus reducing the Project's contribution to cumulative impact to **less than significant**.

With **MM-TRAF-9**, the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-10**, the intersection of I-215 southbound ramps/Cactus Avenue is anticipated to operate at LOS A during the AM peak hour and at LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-11**, the intersection of I-215 northbound ramps/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-12**, the intersection of Old 215 Frontage Road/Alessandro Boulevard is anticipated to operate at LOS C with fair share contributions towards lane modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of Moreno Valley and the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-13**, the intersection of Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-14**, the intersection of Elsworth Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-15**, the intersection of Elsworth Street/Cactus Avenue is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impacts to **less than significant**.

With **MM-TRAF-16**, the intersection of Frederick Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered **significant and unavoidable**.

With **MM-TRAF-17**, the intersection of Graham Street/Riverside Drive/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impacts to **less than significant**.

With **MM-TRAF-18**, the intersection of Heacock Street/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impacts to **less than significant**.

Despite the incorporation of **MM-TRAF-19,** since some of the required improvements identified herein are within the jurisdiction of another public agency and not the lead agency, impacts associated with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, as well as impacts related to an applicable congestion management program, would be considered **significant and unavoidable** following the incorporation of mitigation measures. (See intersection mitigations immediately above for intersections that are outside of the jurisdiction of the March JPA.)

Construction Traffic (Thresholds TRAF-1 and TRAF-2)

With the incorporation of **MM-TRAF-19**, short-term construction impacts associated with the delivery and removal of heavy equipment would be **less than significant**.

Hazardous Design Features and Incompatible Uses (Threshold TRAF-4)

No mitigation measures associated with hazardous design features and incompatible uses are required. Impacts would be **less than significant**.

Emergency Access (Threshold TRAF-5)

No mitigation measures associated with air traffic patterns are required. Impacts would be **less than significant**.

Public Transit and Alternative Transpiration Facilities (Threshold TRAF-6)

No mitigation measures associated with Public Transit and Alternative Transpiration Facilities are required. Impacts would be **less than significant**.

4.11.8 References

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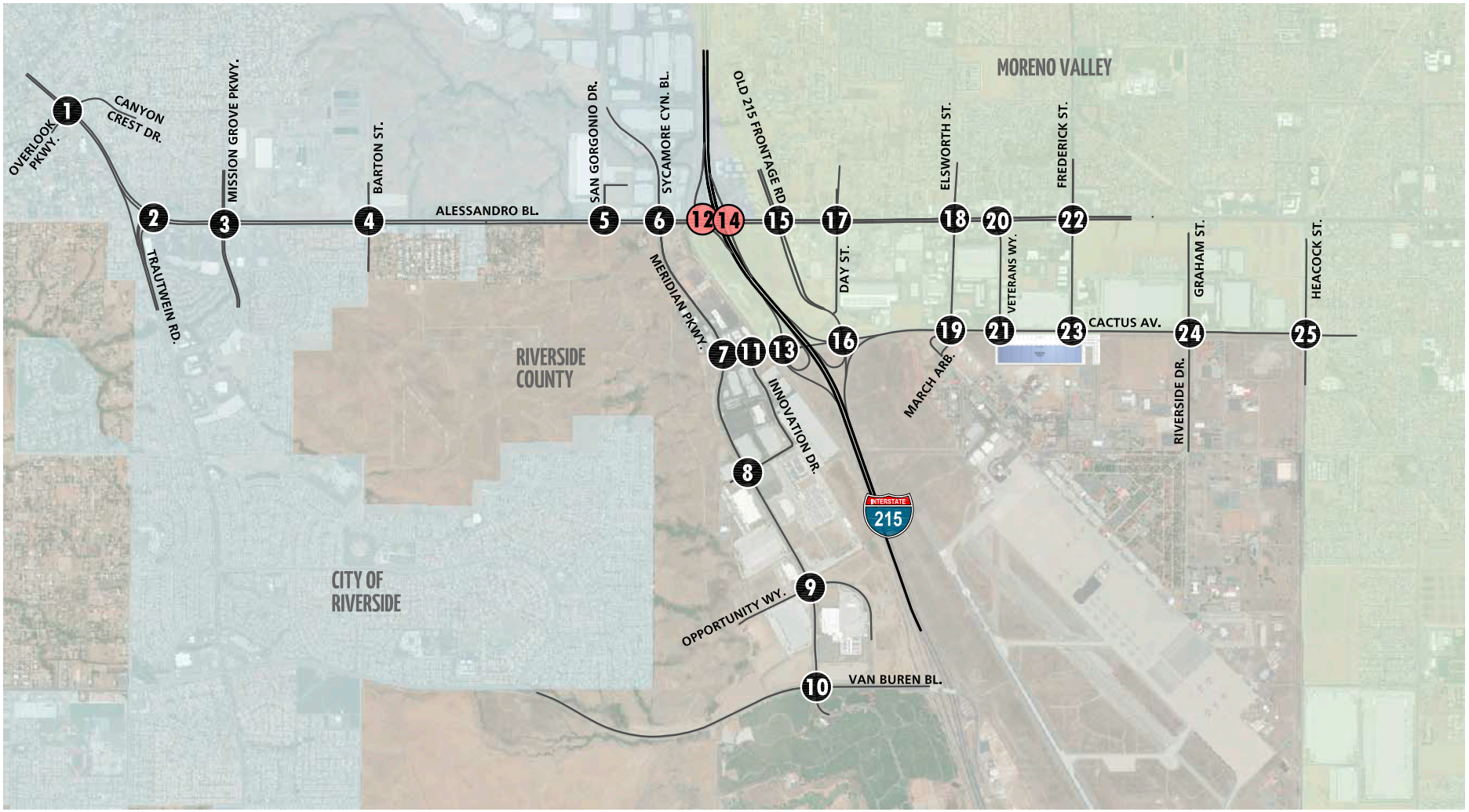
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LEGEND:

0 ▪ EXISTING INTERSECTION ANALYSIS LOCATION

0 ▪ CMP INTERSECTION

N

SOURCE: Urban Crossroads 2018

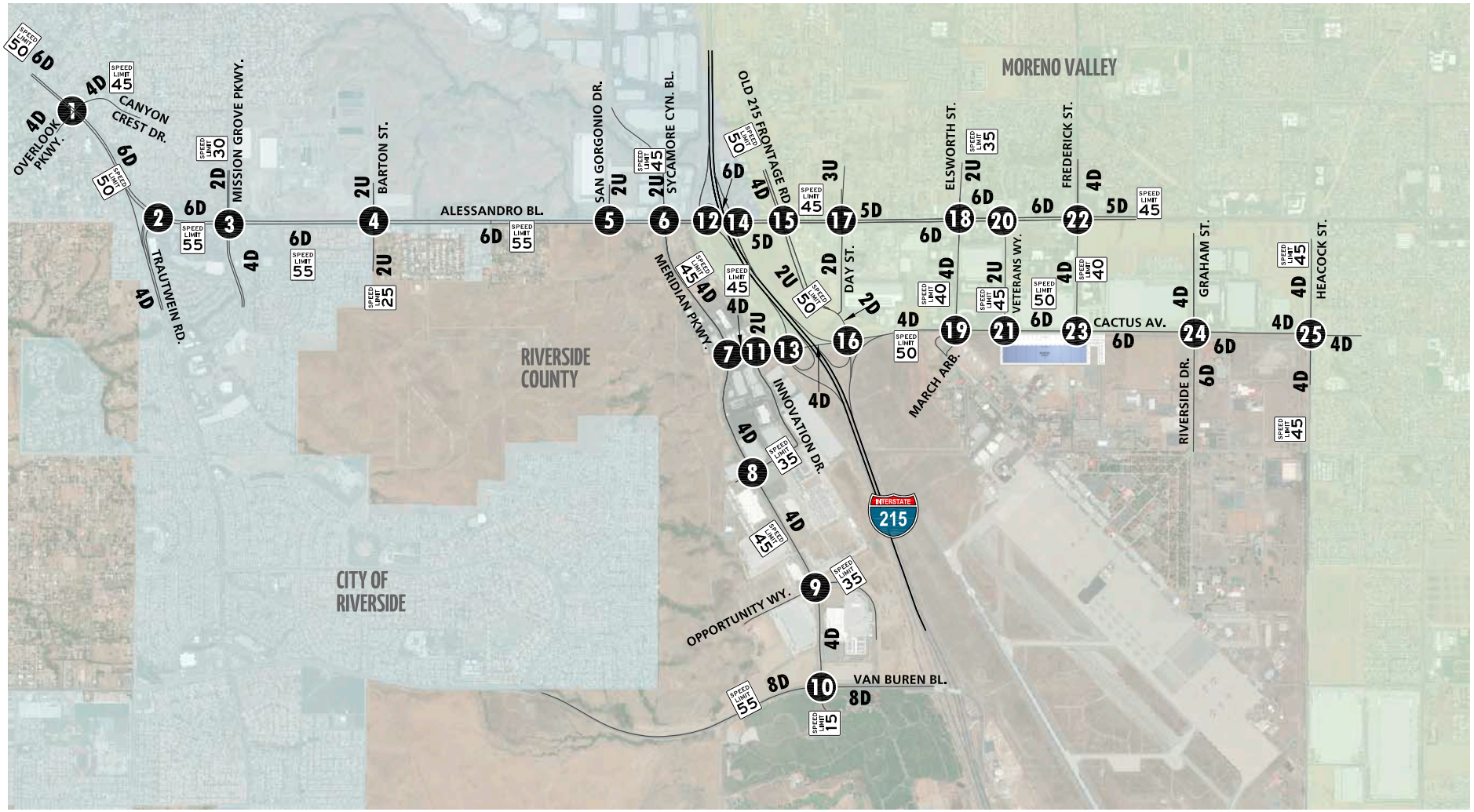
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FIGURE 4.11-1

Study Area

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

N

SOURCE: Urban Crossroads 2018

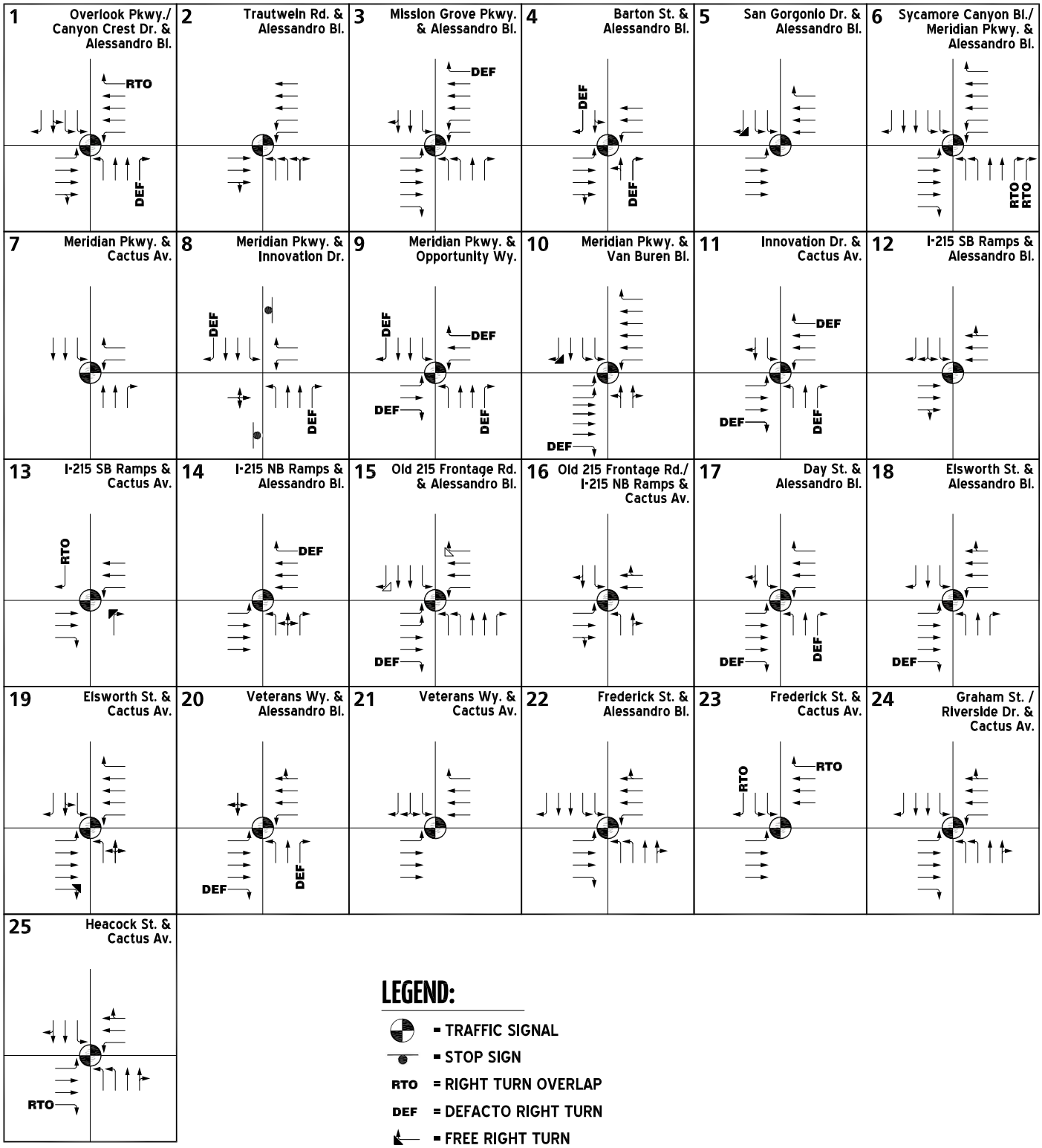
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FIGURE 4.11-2

Existing Number of Through Lanes and Intersection Controls

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

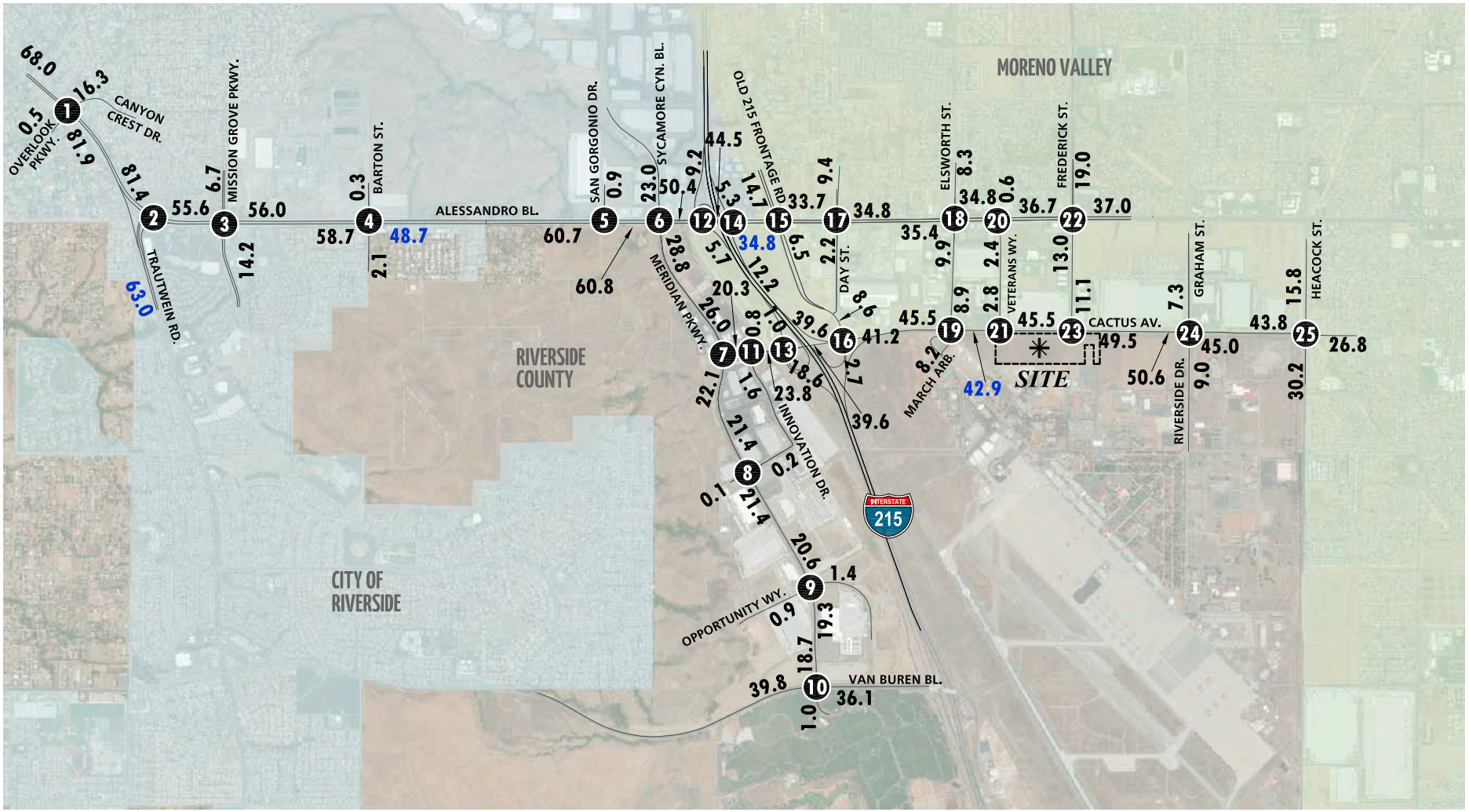
FIGURE 4.11-3

Existing Number of Through Lanes and Intersection Controls

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

10.0 = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)

N

SOURCE: Urban Crossroads 2018

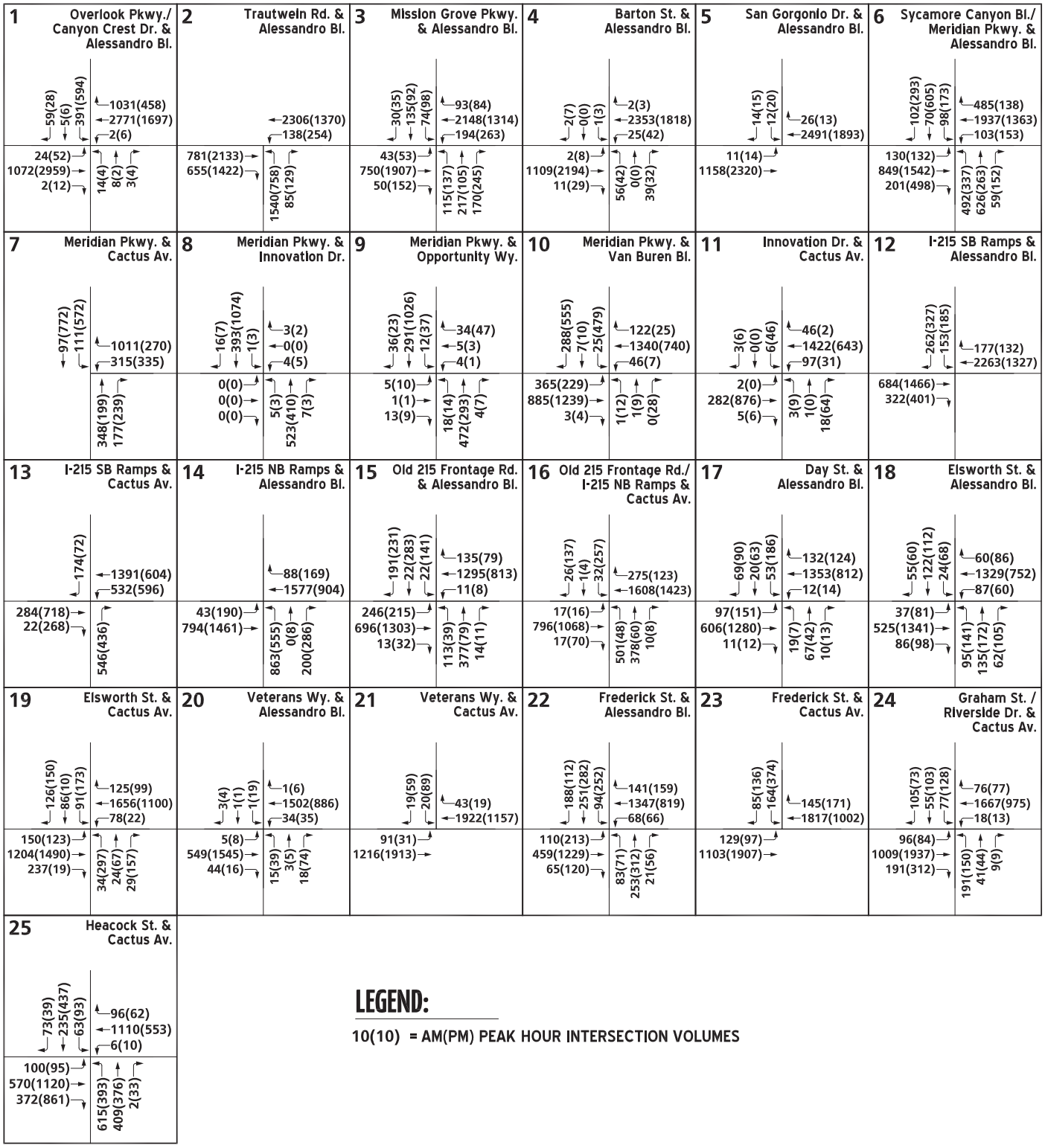
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FIGURE 4.11-4

Existing (2018) Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

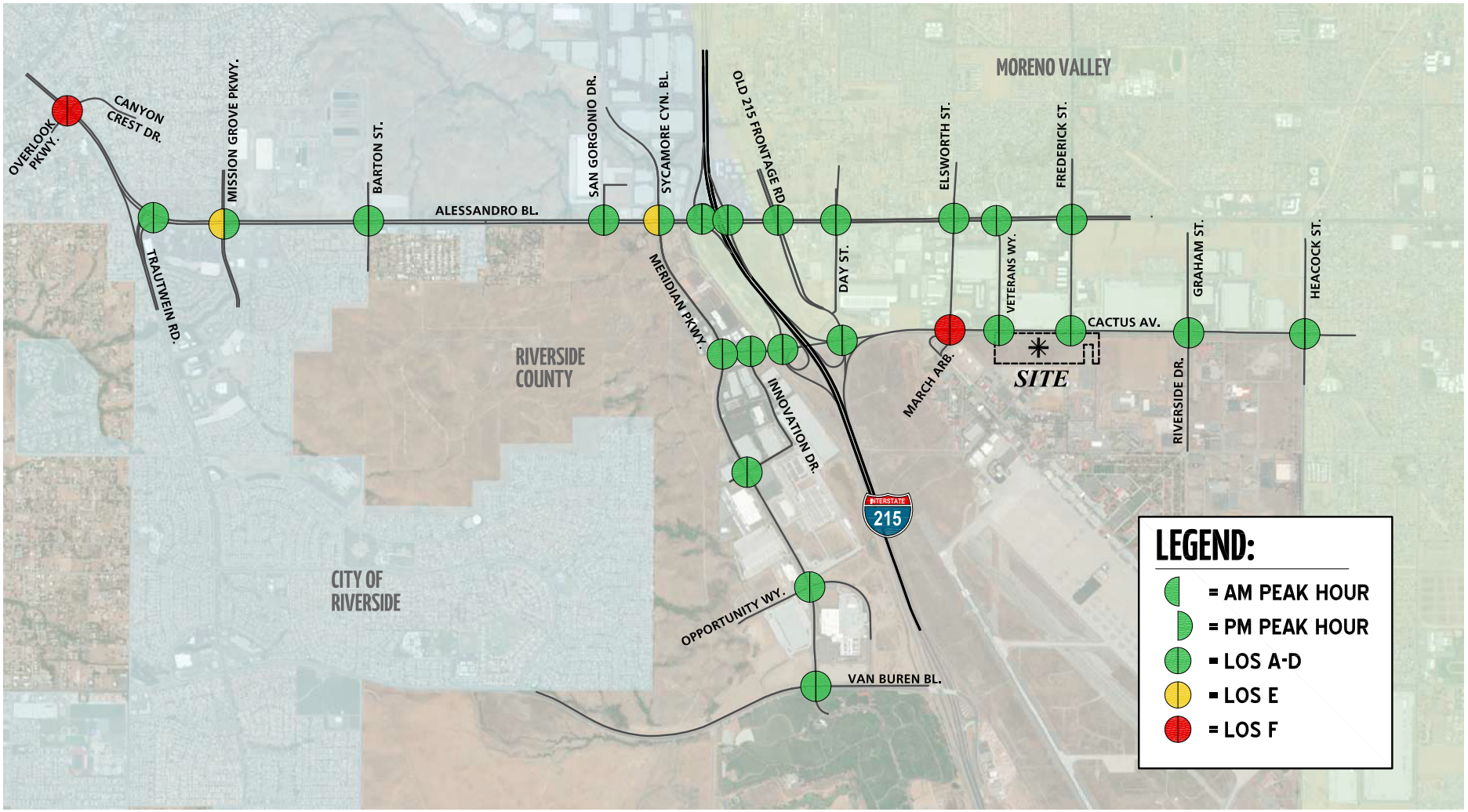
FIGURE 4.11-5

Existing (2018) Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

DUDEK

FIGURE 4.11-6

Existing (2018) Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

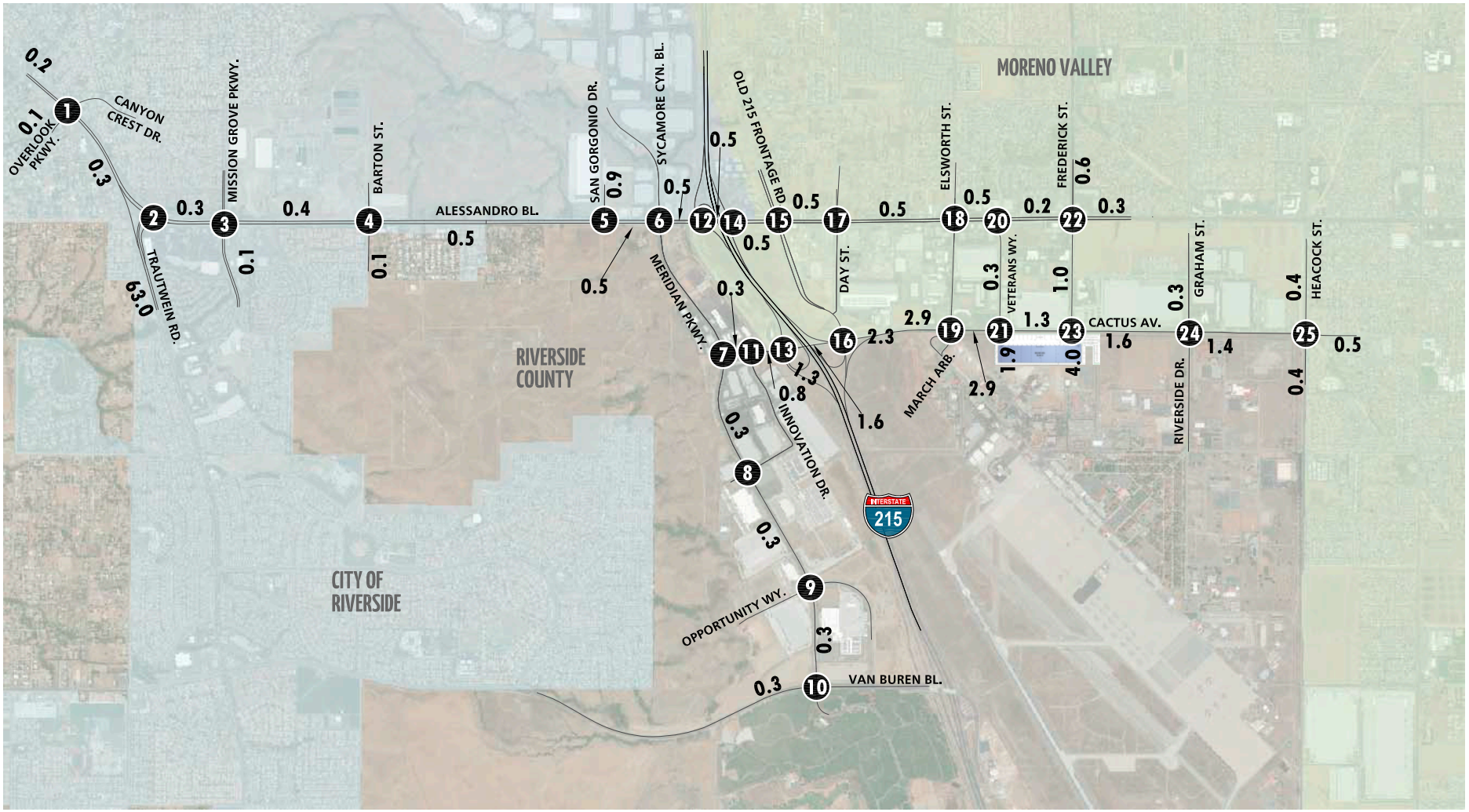
FIGURE 4.11-7

Existing (2018) Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

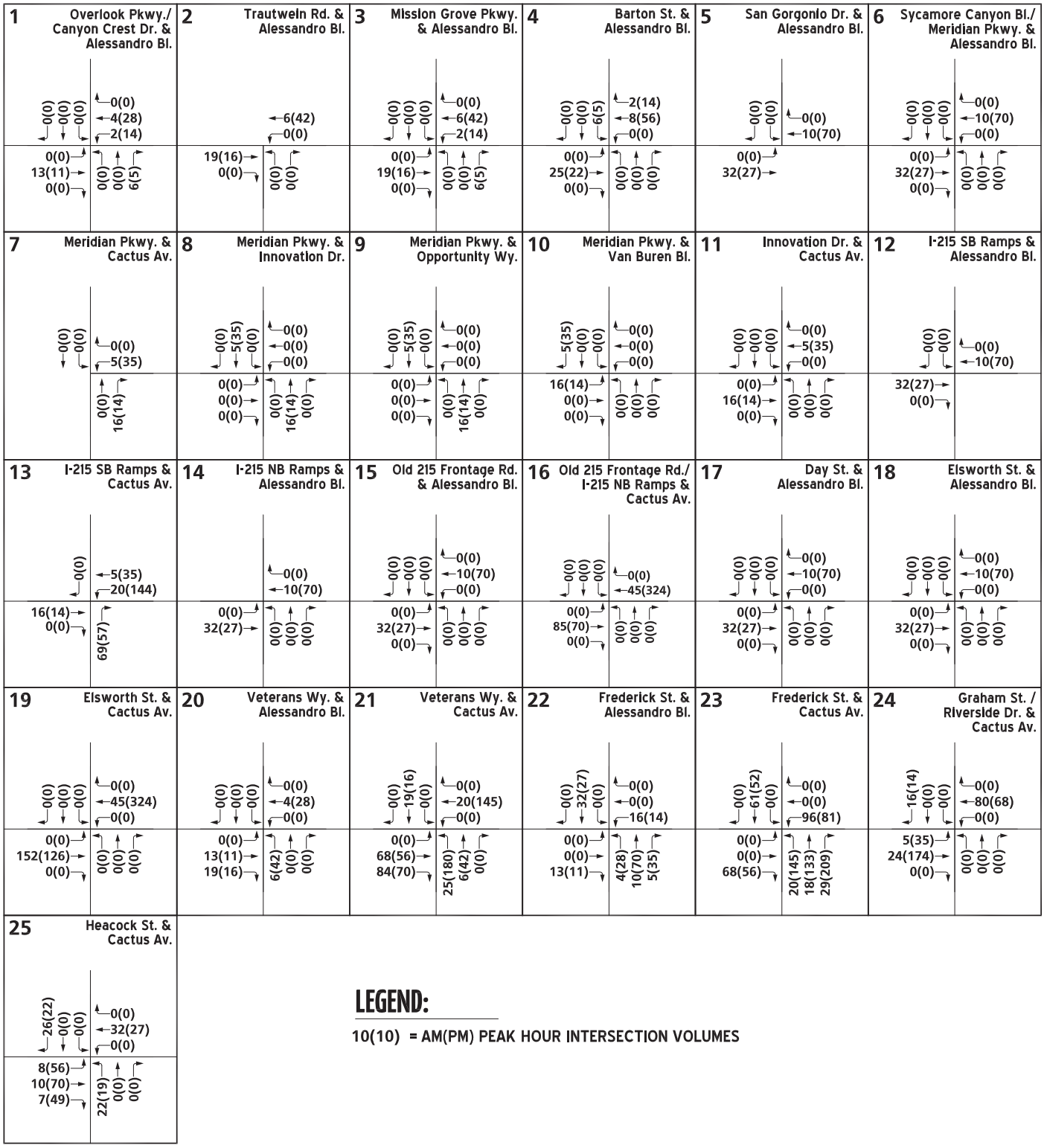
DUDEK

FIGURE 4.11-8

Project Only Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

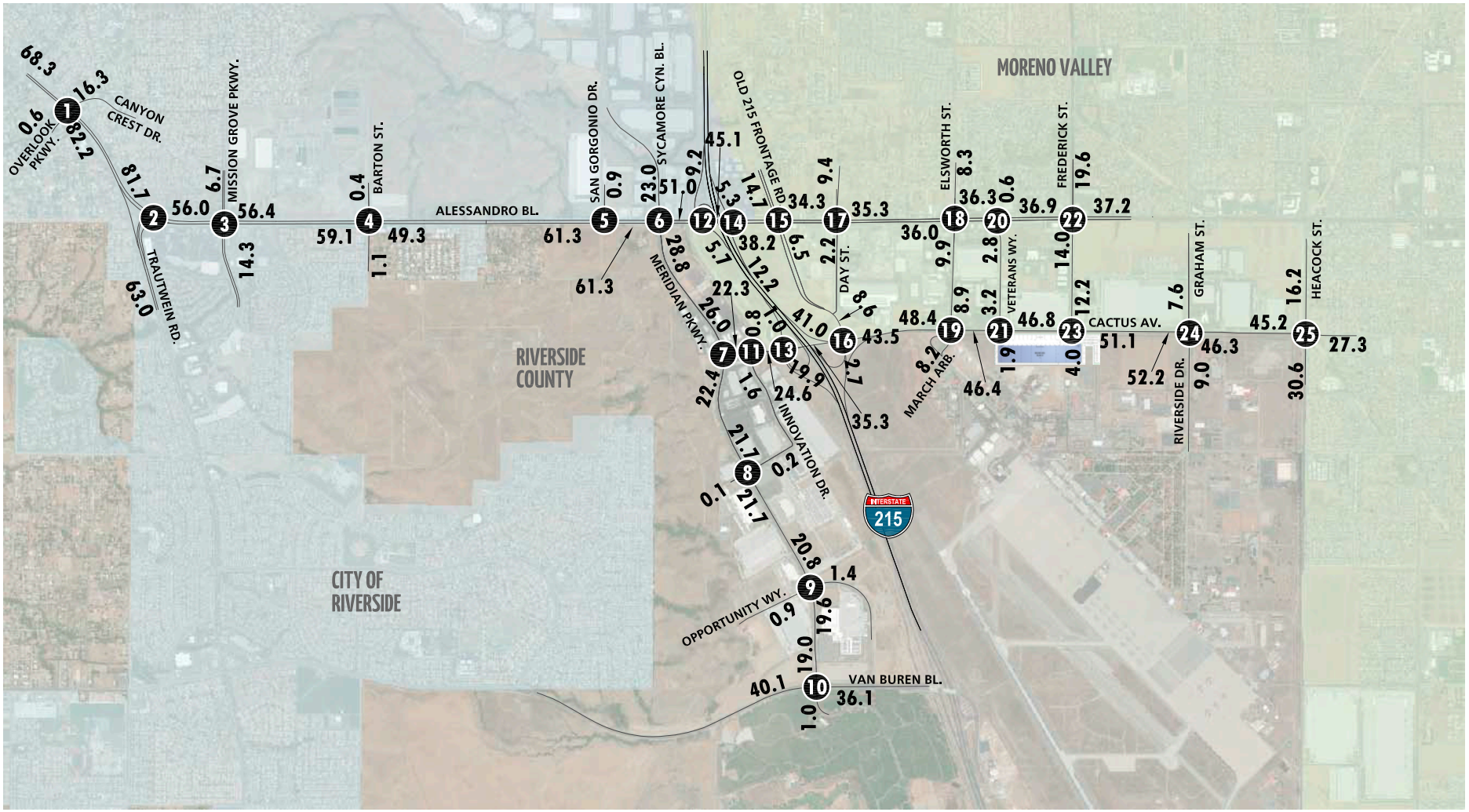
FIGURE 4.11-9

Project Only Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

10.0 ▪ VEHICLES PER DAY (1000'S)

N

SOURCE: Urban Crossroads 2018

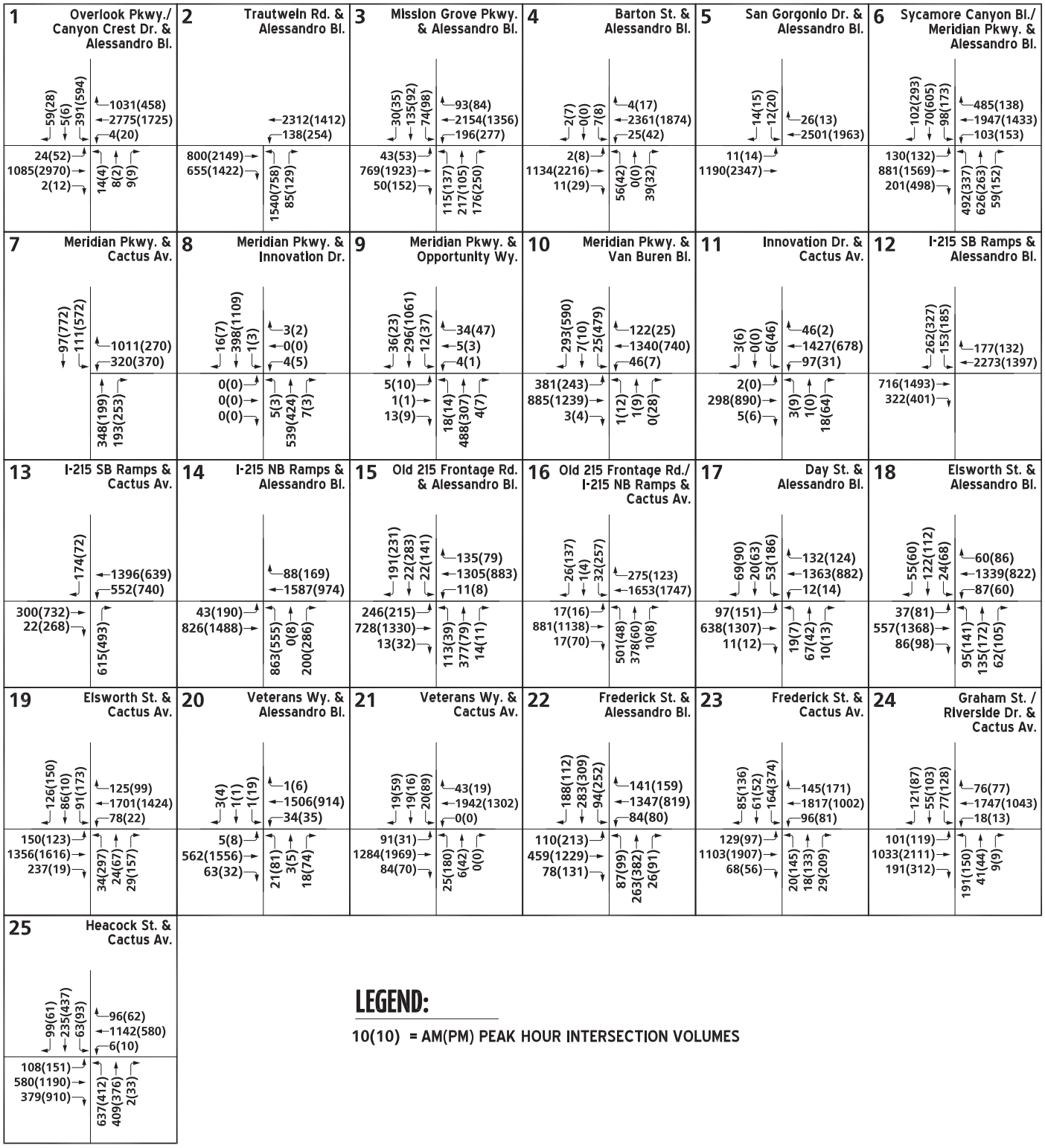
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FIGURE 4.11-10

E+P Average Daily Traffiic

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

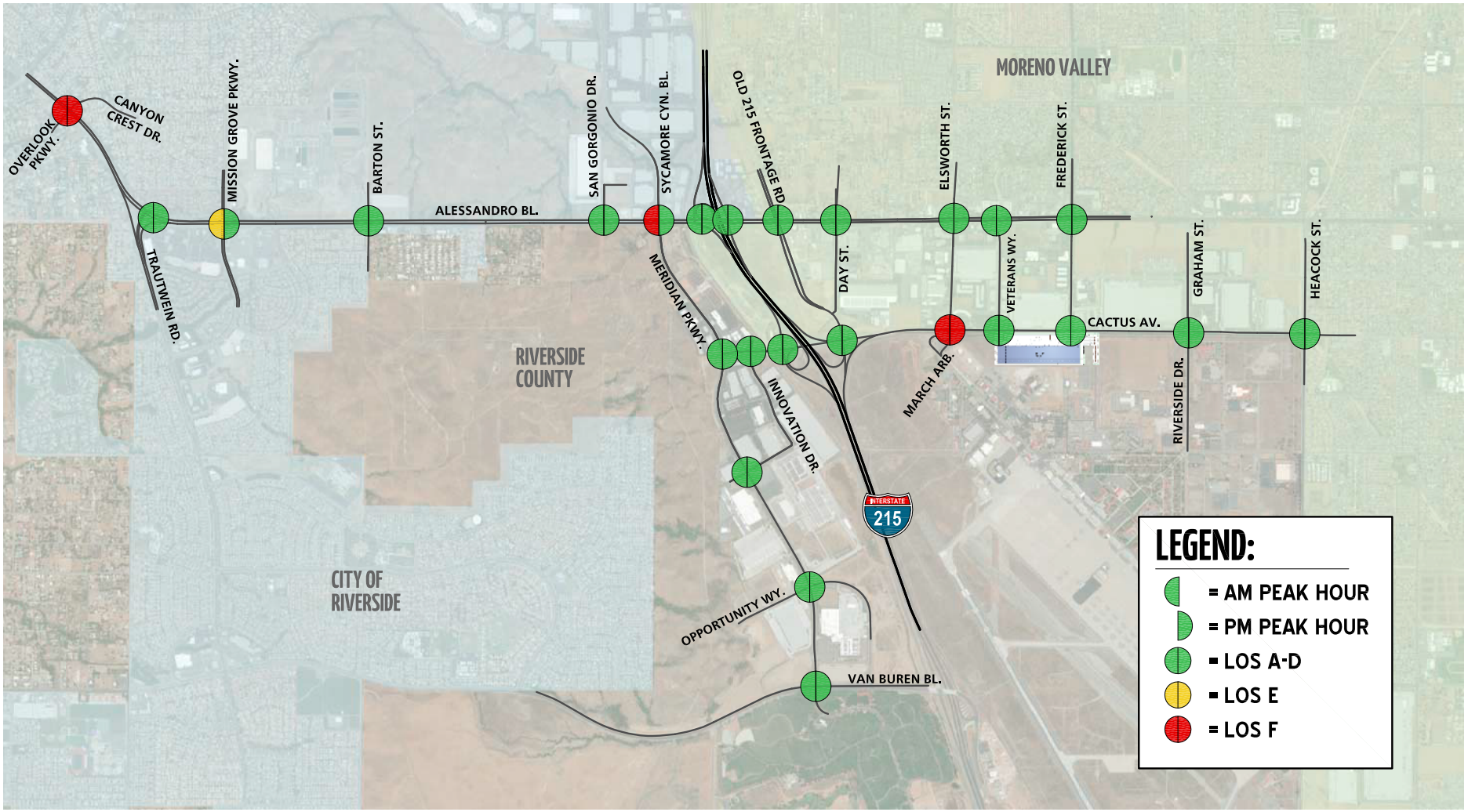
FIGURE 4.11-11

E+P Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

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FIGURE 4.11-12

E+P Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

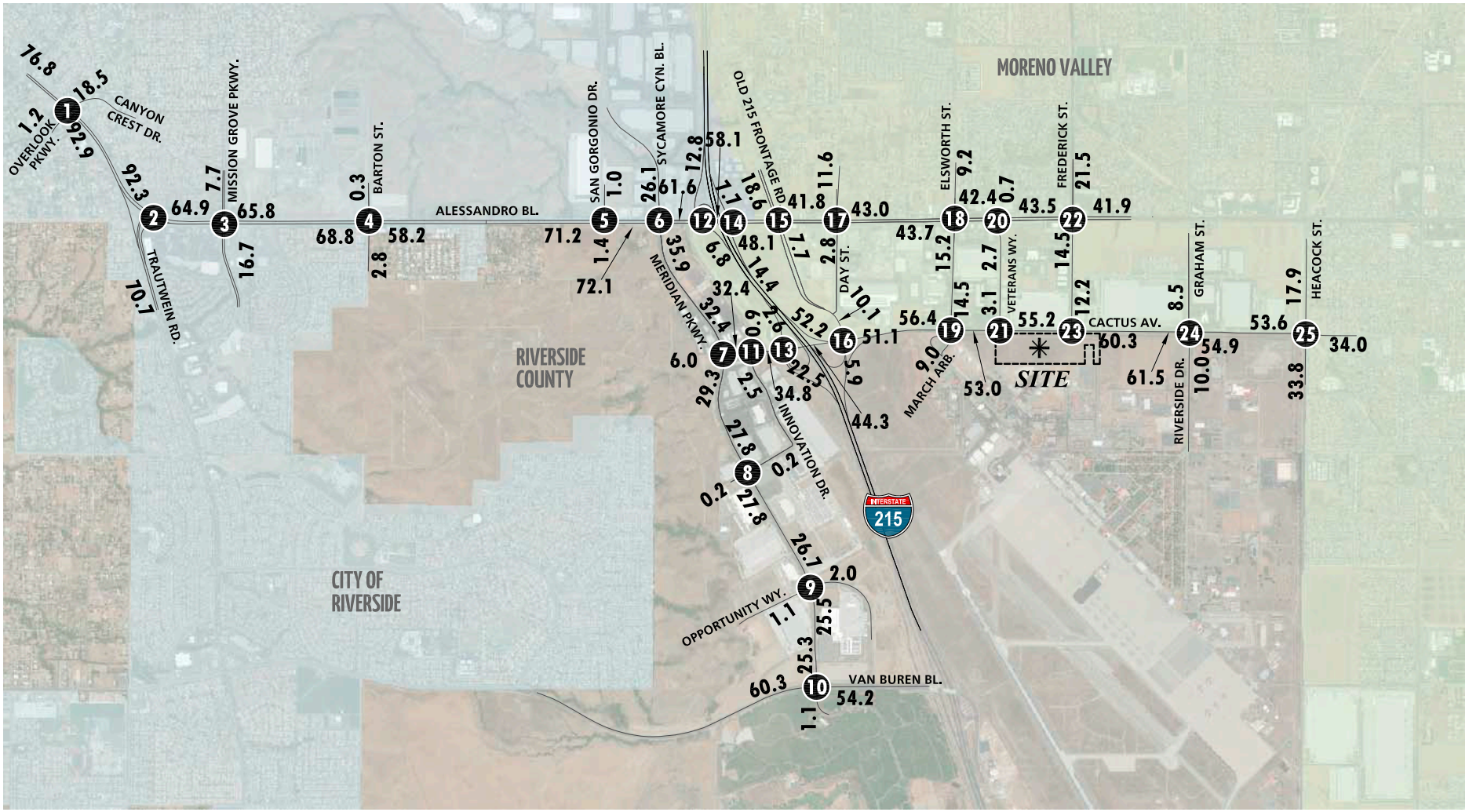
FIGURE 4.11-13

E+P Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

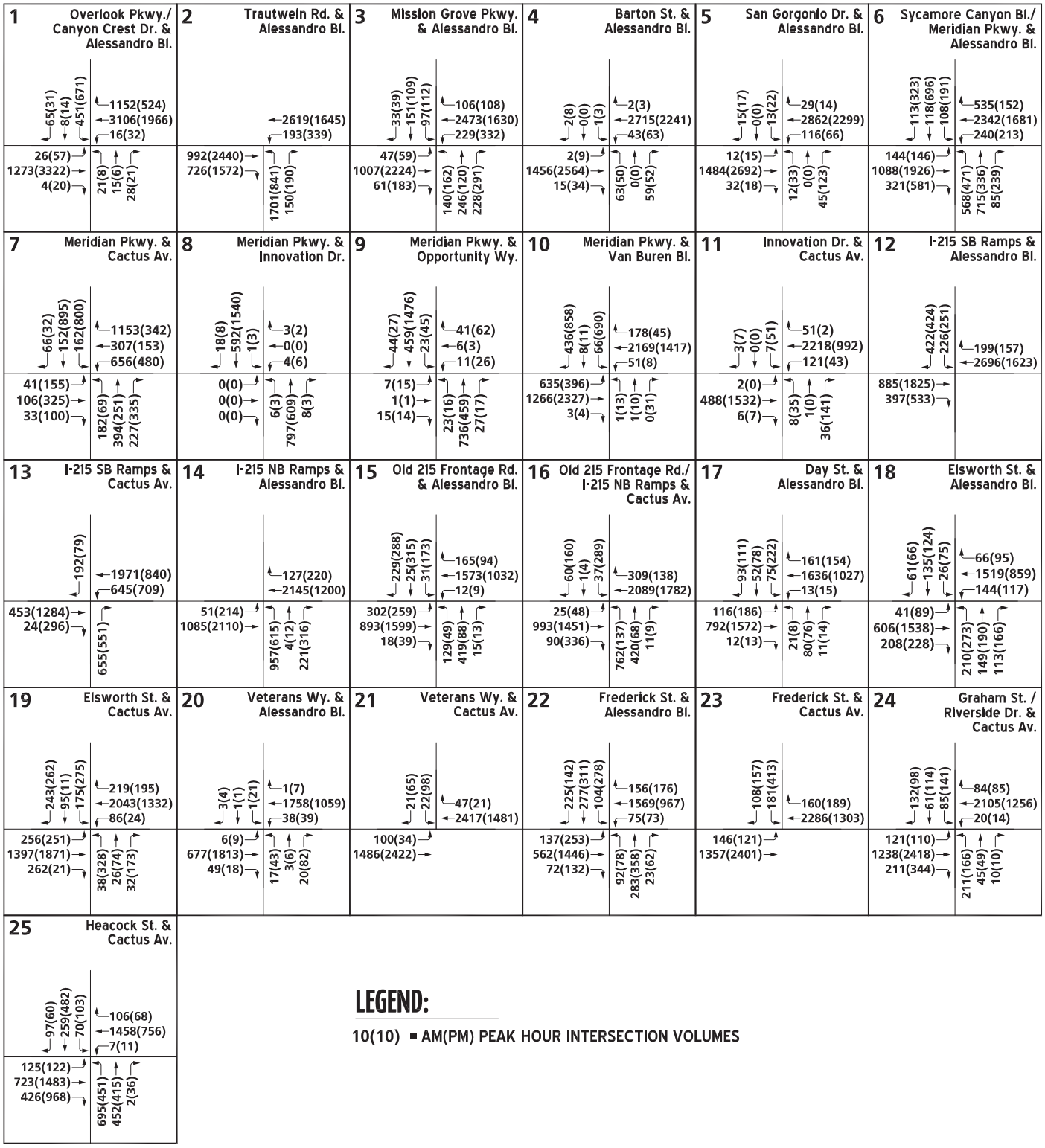
FIGURE 4.11-14

Opening Year (2023) Without Project Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

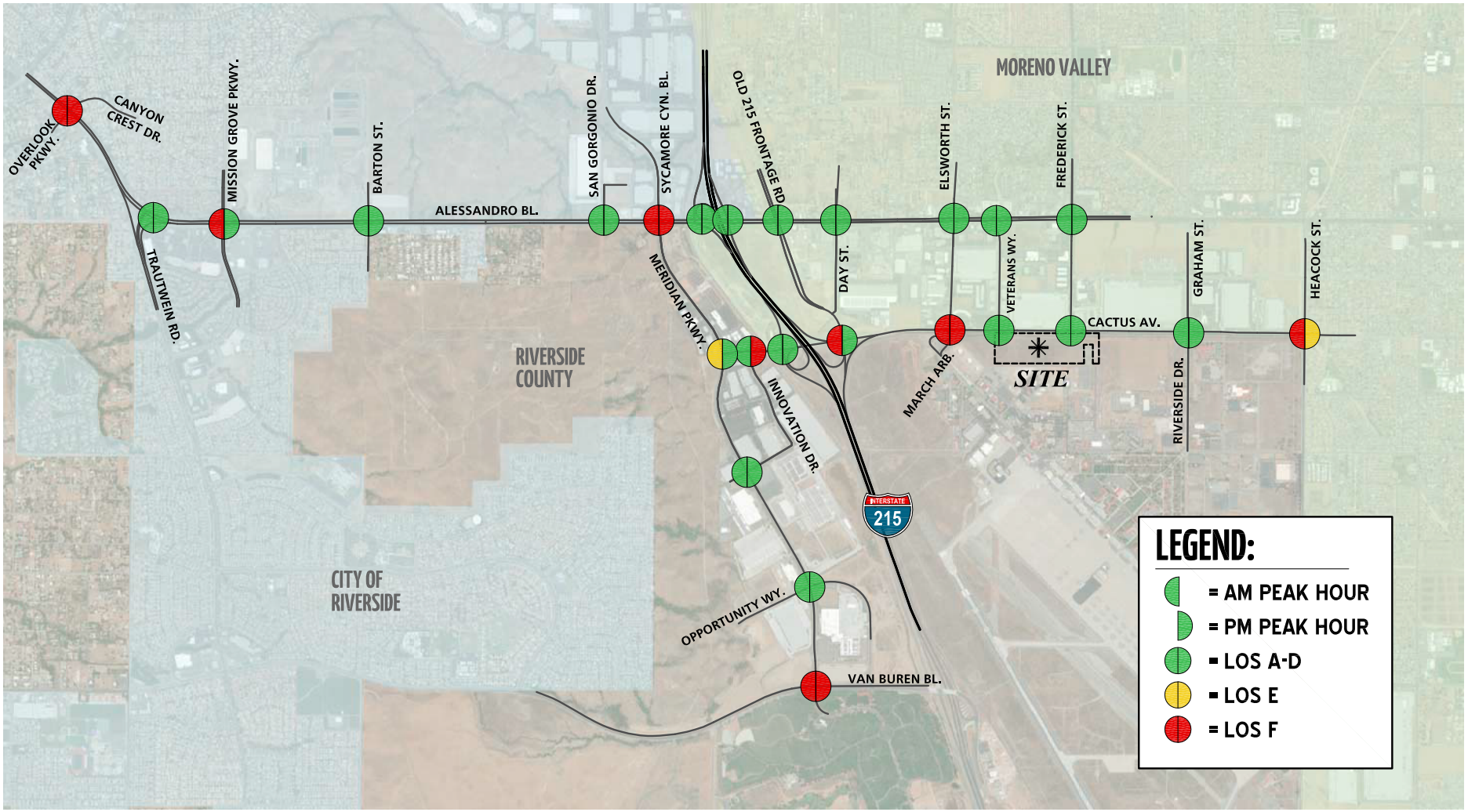
FIGURE 4.11-15

Opening Year Cumulative (2023) Without Project Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

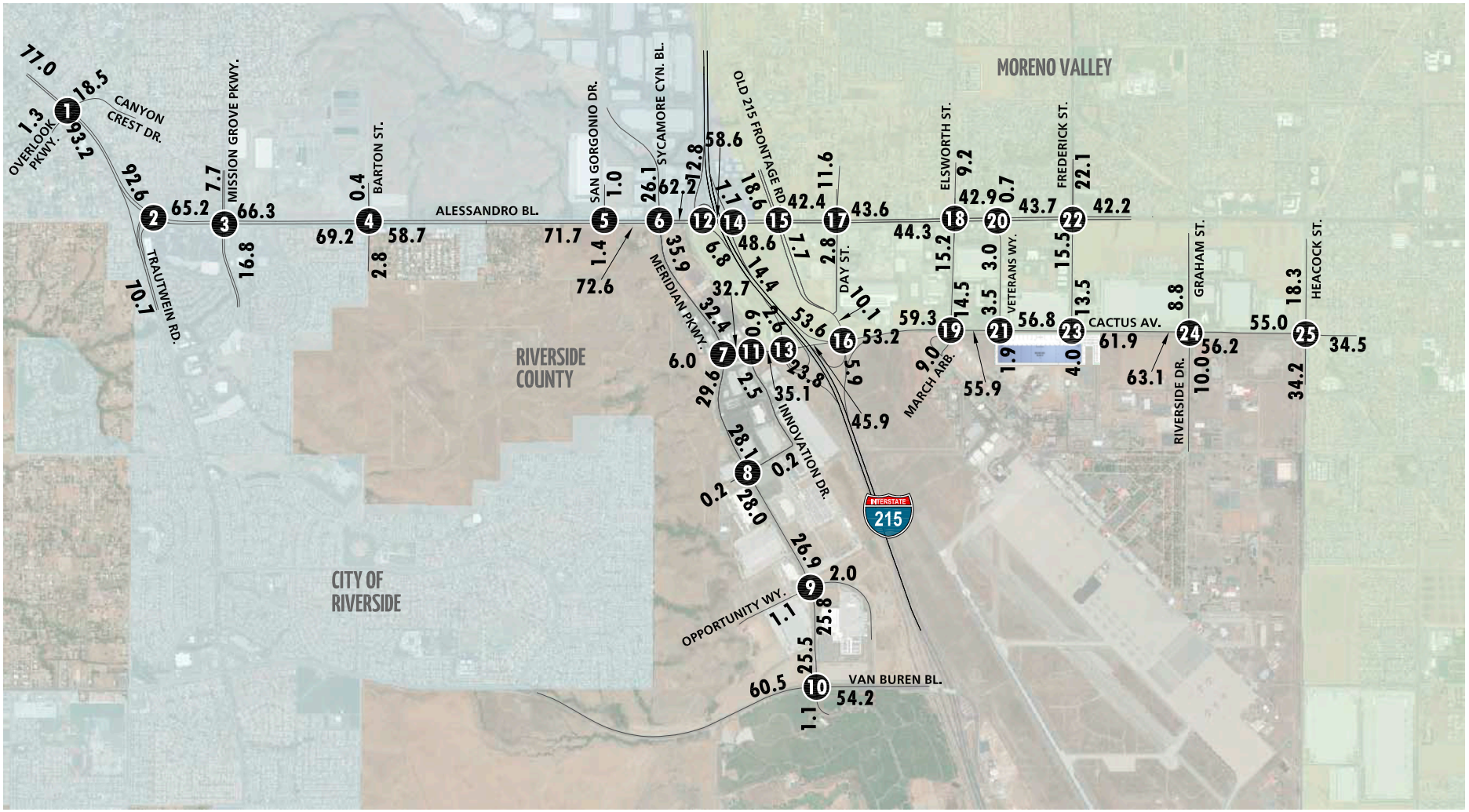
FIGURE 4.11-16

Opening Year Cumulative (2023) Without Project Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

10.0 ▪ VEHICLES PER DAY (1000'S)

N

SOURCE: Urban Crossroads 2018

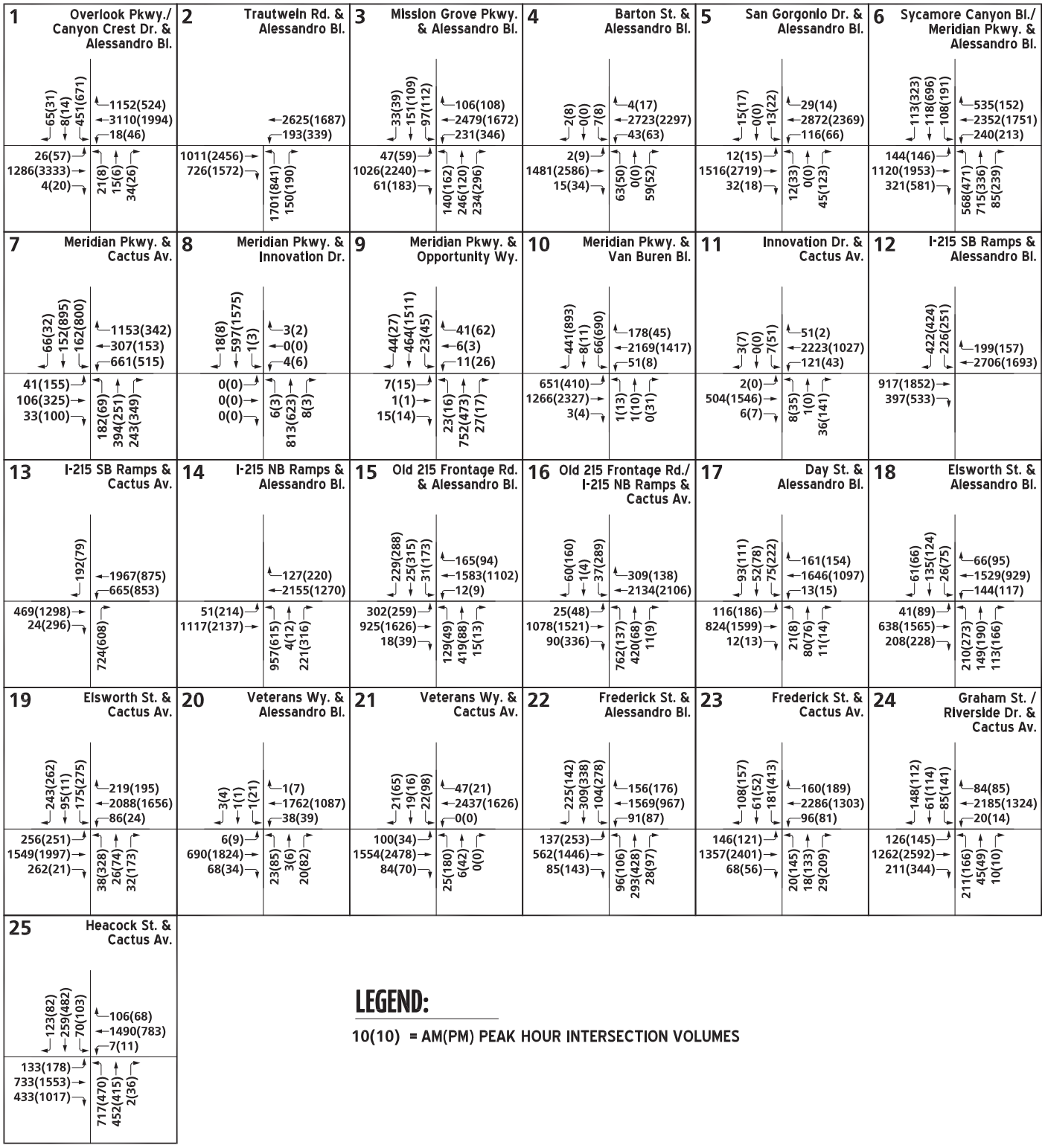
FIGURE 4.11-17

Opening Year Cumulative (2023) With Project Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

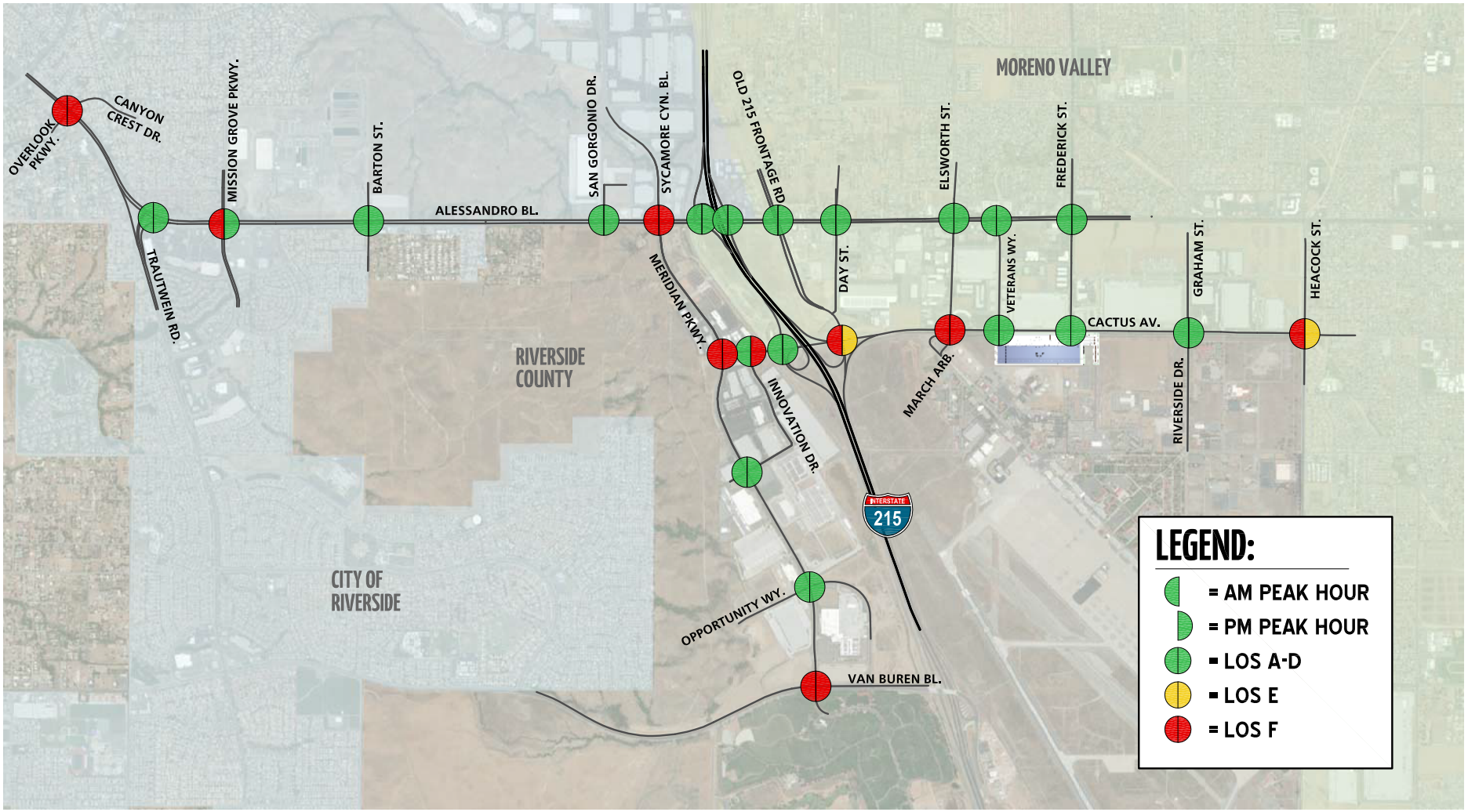
FIGURE 4.11-18

Opening Year Cumulative (2023) With Project Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

FIGURE 4.11-19

Opening Year Cumulative (2023) With Project Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

FIGURE 4.11-20

Opening Year Cumulative (2023) Without Project Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

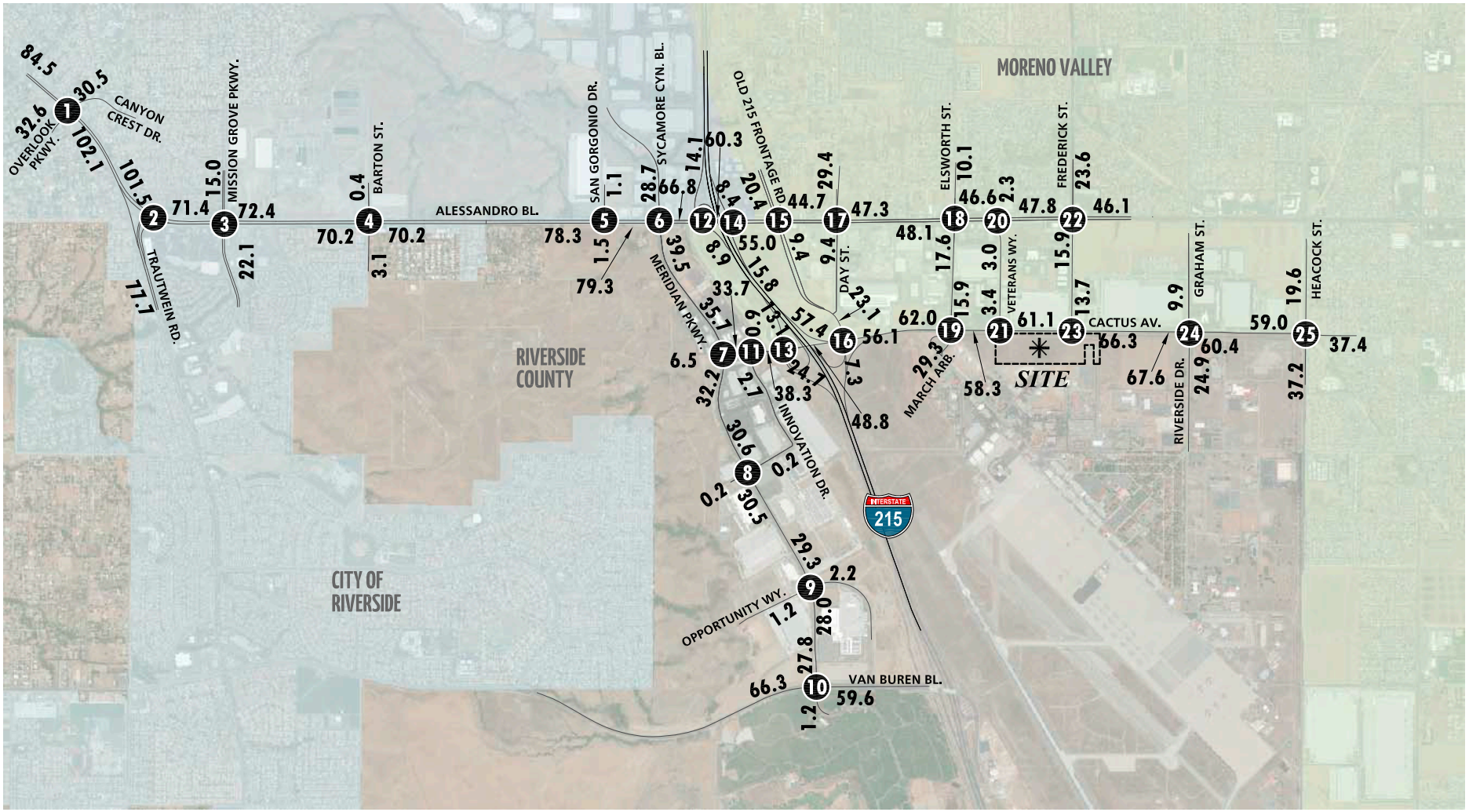
FIGURE 4.11-21

Opening Year Cumulative (2023) With Project Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

10.0 ▪ VEHICLES PER DAY (1000'S)

N

SOURCE: Urban Crossroads 2018

FIGURE 4.11-22

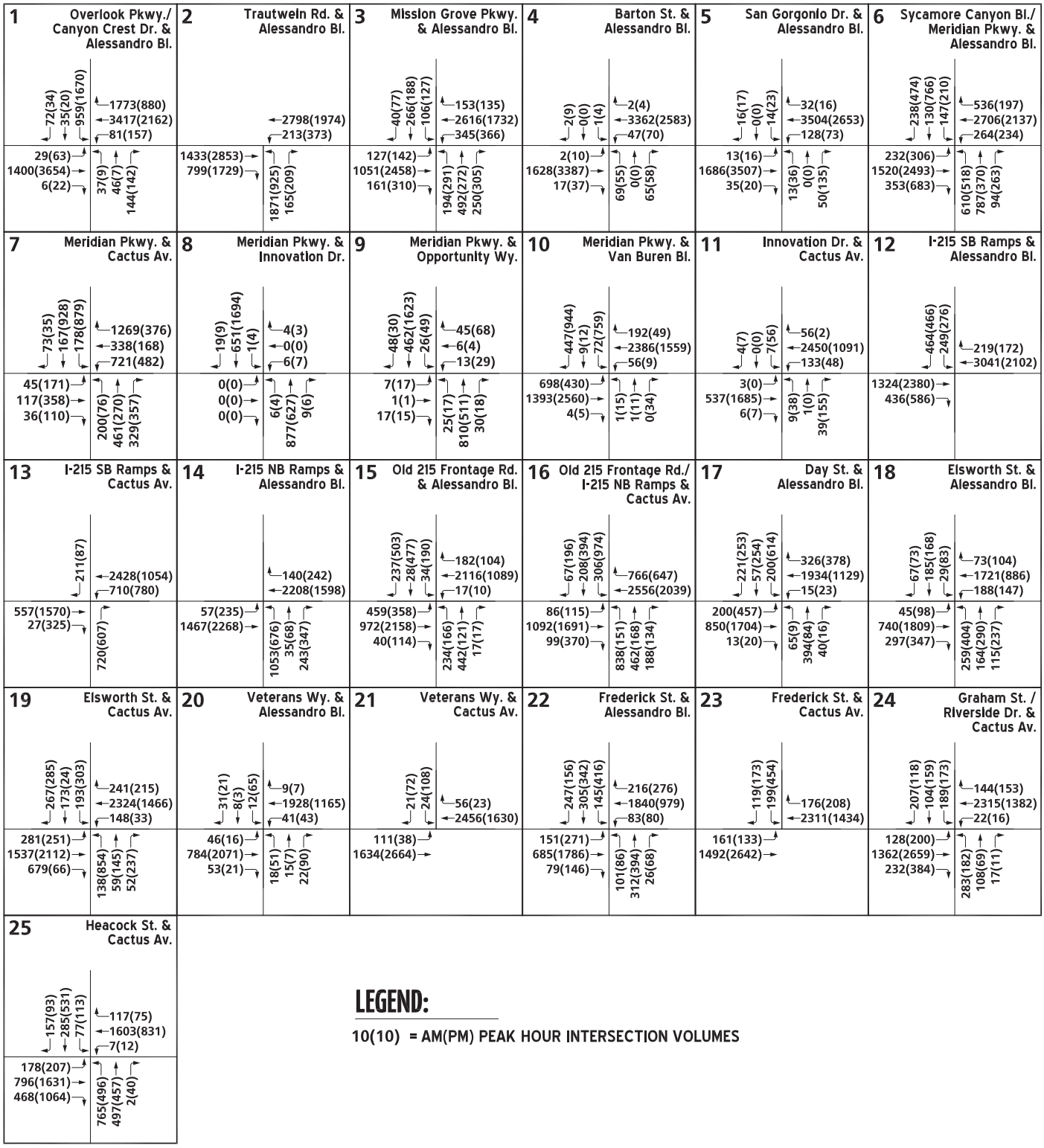
Horizon Year (2040) Without Project Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

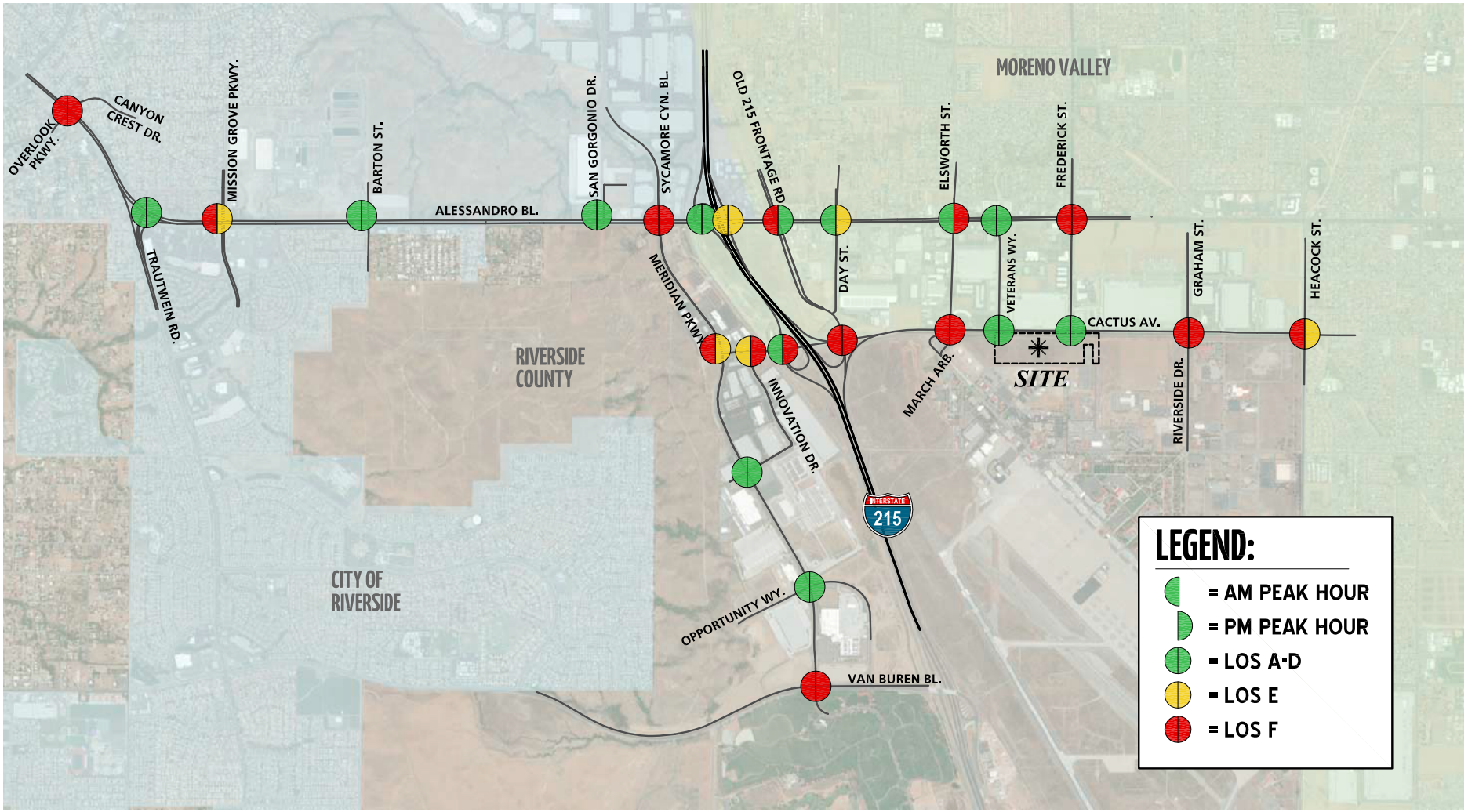
FIGURE 4.11-23

Horizon Year (2040) Without Project Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

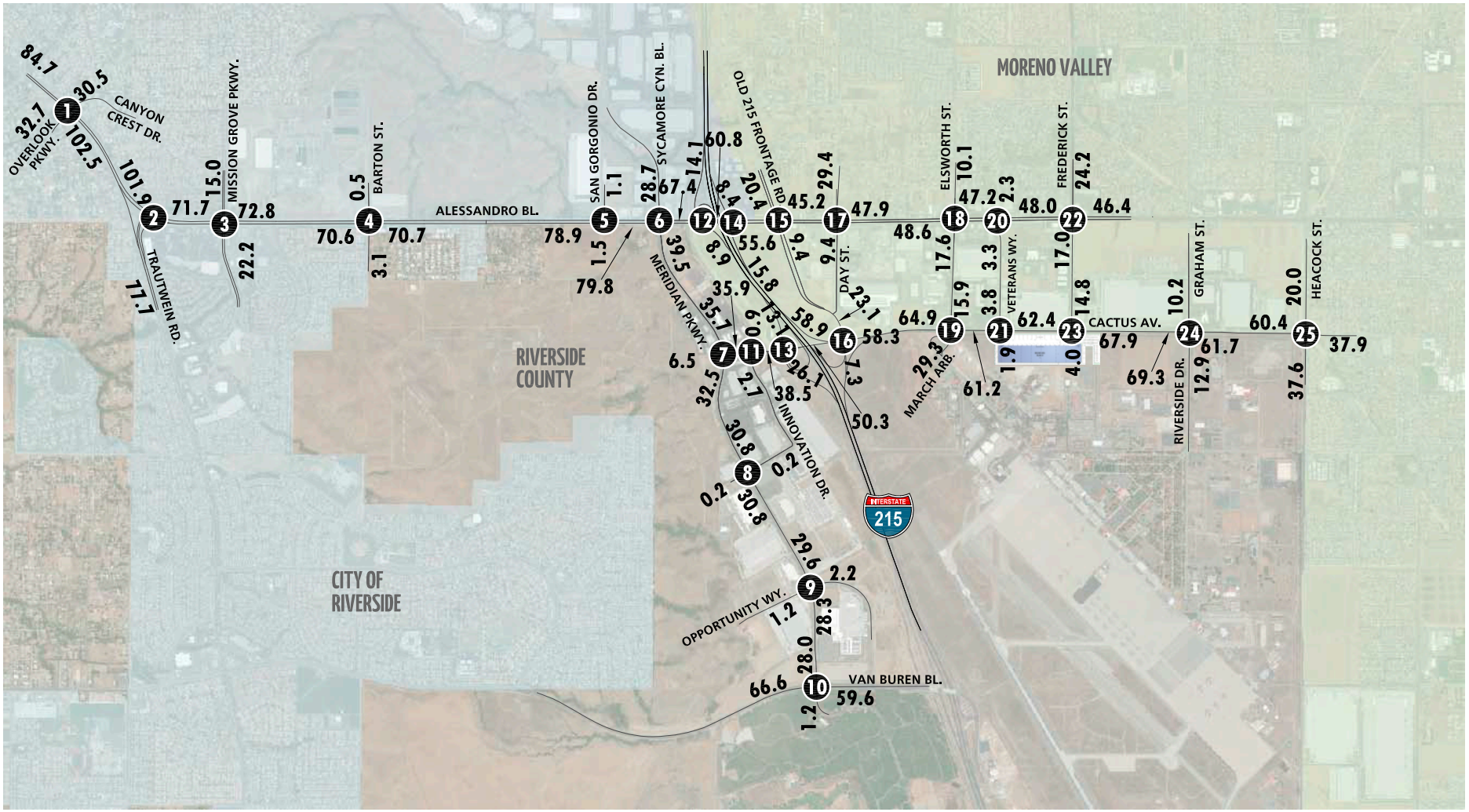
FIGURE 4.11-24

Horizon Year (2040) Without Project Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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LEGEND:

10.0 ▪ VEHICLES PER DAY (1000'S)

N

SOURCE: Urban Crossroads 2018

FIGURE 4.11-25

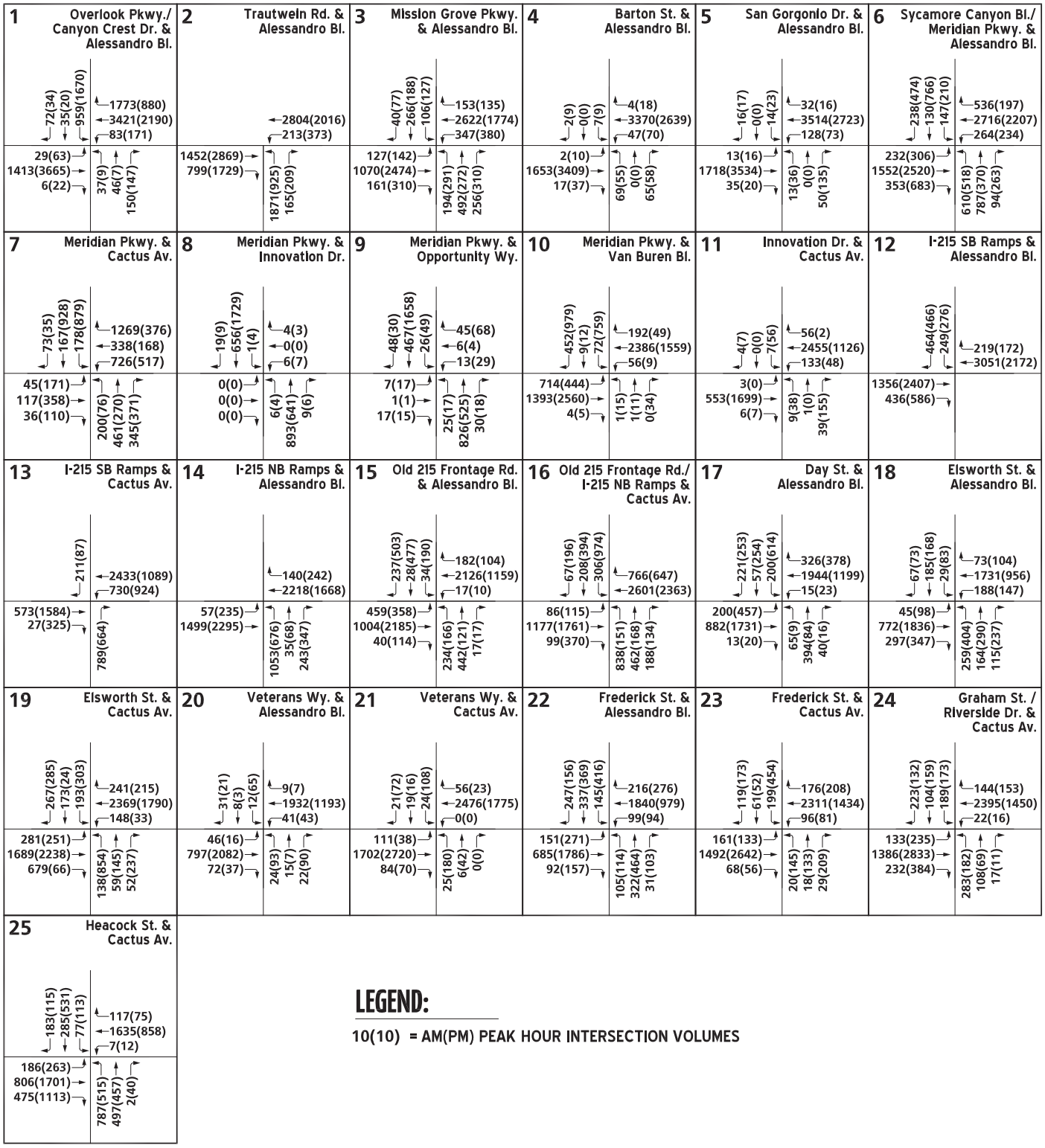
Horizon Year (2040) With Project Average Daily Traffic (ADT)

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

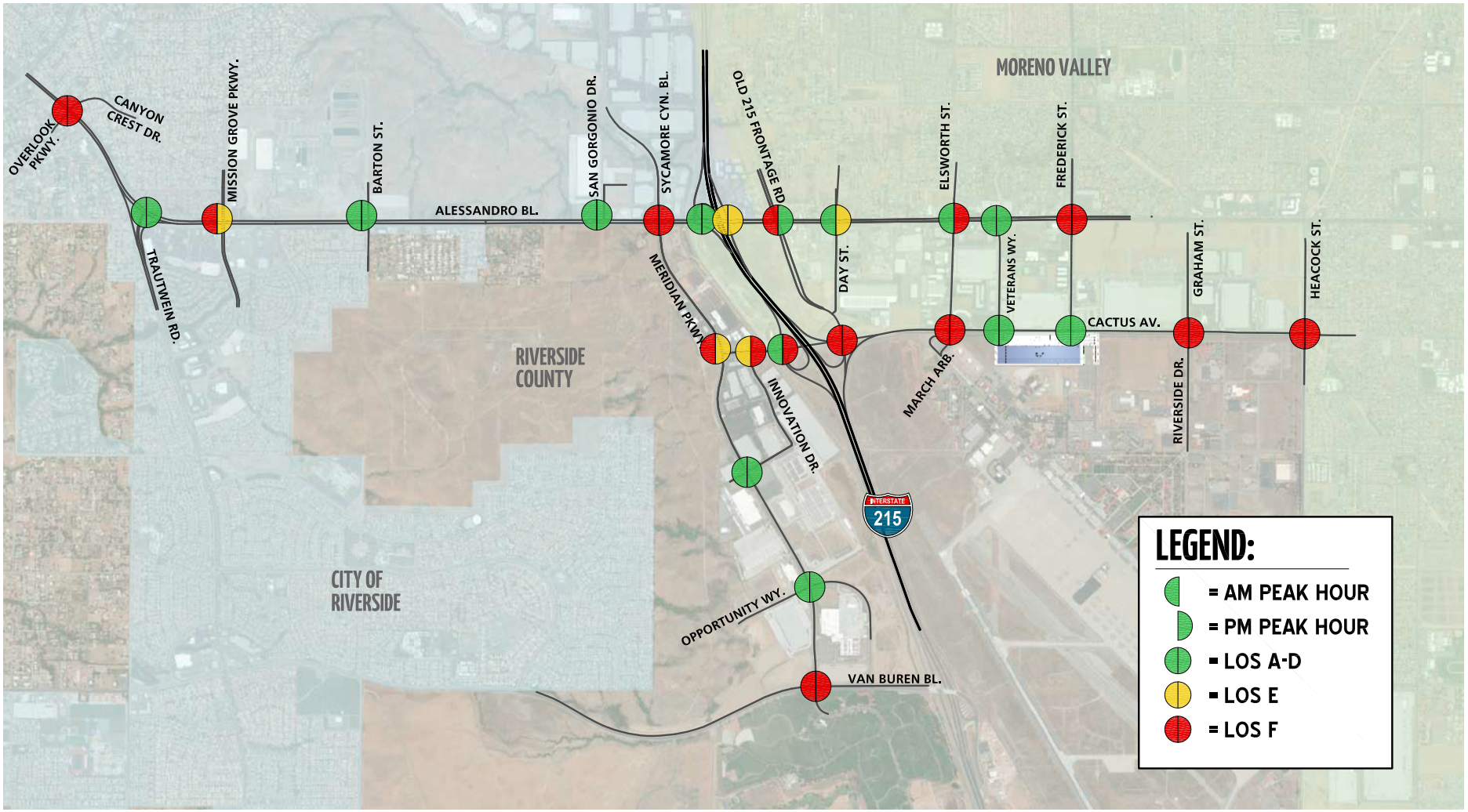
FIGURE 4.11-26

Horizon Year (2040) With Project Traffic Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

FIGURE 4.11-27

Horizon Year (2040) With Project Summary of LOS

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

FIGURE 4.11-28

Horizon Year (2040) Without Project Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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SOURCE: Urban Crossroads 2018

FIGURE 4.11-29

Horizon Year (2040) With Project Freeway Mainline Volumes

K4 Warehouse and Cactus Channel Improvements Project EIR

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4.12 TRIBAL CULTURAL RESOURCES

This section provides an analysis of the potential impacts to tribal cultural resources (TCRs) from the implementation of the K4 Warehouse and Cactus Channel Improvements (proposed Project or Project). This analysis is based on a review of two separate technical studies prepared by CRM TECH in support of the proposed Project. These studies include the following reports: *Identification and Evaluation of Historic Properties K4 Parcel Project* and the *Identification and Evaluation of Historic Properties Cactus Avenue Drainage Channel Improvement Project*, both prepared in August 2018 (Appendices G and H, respectively, of this Environmental Impact Report (EIR)).

Both studies (Appendix G and H) were prepared in compliance with the California Environmental Quality Act (CEQA); however, the Cactus Channel improvements include a federal nexus. The Cactus Channel improvements are subject to federal review by the United States Army Corp of Engineers as a responsible agency under CEQA. Therefore, Appendix H was also completed in accordance with Section 106 of the National Historic Preservation Act (NHPA). Furthermore, this analysis includes the review of existing cultural resources; technical data; and applicable laws, regulations, and guidelines from each study to adequately assess the potential impacts to TCRs.

As discussed in Chapter 2, Project Description, of the EIR, the proposed Project includes the development of an approximately 718,000-square-foot industrial warehouse with 598 automobile parking stalls and 242 truck trailer parking stalls on the K4 Parcel and the conversion of the existing Cactus Avenue Drainage Channel (Cactus Channel) from an open-air earthen channel into an underground concrete culvert for approximately 7,900 linear feet between Elsworth Street on the west and Heacock Street and Heacock Channel on the east. The K4 Parcel is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The proposed Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The proposed Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.12.1 Existing Conditions

The K4 Parcel is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location). The Interstate (I) 215 is located approximately 0.8 miles east of the K4 Parcel. The K4 Parcel is comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The Cactus Channel runs along the south side of Cactus Avenue until it reaches Heacock Street and connected with the Heacock Channel.

The Project Area of Potential Effects (APE), which collectively consists of the K4 Parcel and the Cactus Channel, is located on the south side of Cactus Avenue and immediately north of March Air Reserve Base (ARB). The five parcels within the K4 Parcel consists of undeveloped land situated along the northern perimeter of the March ARB. In addition, the Cactus Channel runs approximately 7,900 linear feet along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the K4 Parcel frontage, and further to the east ending at the Heacock Channel.

Appendices G and H of this EIR, document the results of a California Historical Resources Information System (CHRIS) search conducted at the Eastern Information Center (EIC), and a search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) and tribal coordination.

Eastern Information Center Records Search

CRM TECH completed a CHRIS search at the EIC for the Project APE and surrounding 1-mile radius on May 15, 2018 for the K4 Parcel (Appendix G) and July 19, 2018 for the Cactus Channel (Appendix H). This search included mapped prehistoric, historical, and built-environment resources; Department of Parks and Recreation site records; technical reports; properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Landmarks. Additional consulted sources included the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), and the California Historical Resources Inventory. No prehistoric resources or TCRs were identified in the Project APE as a result of the CHRIS records search (see Section 4.4, Cultural Resources).

Native American Coordination-Sacred Lands File Search and Tribal Outreach

CRM TECH requested a search of the Sacred Lands File (SLF) from the California NAHC for the K4 Parcel on May 14, 2018; this was later deemed adequate for the Cactus Channel Improvement Site. The NAHC responded in a letter dated May 17, 2018, stating that the results of the SFL search failed to indicate the presence of Native American cultural resources within the Project APE. The NAHC also provided a list of Native American groups and/or individuals who may have knowledge of cultural resources in the Project APE. In addition to or in lieu of some of the

individuals recommended by the NAHC, CRM TECH also contacted other spokespersons for the tribes provided by the NAHC. Twelve responses were received related to the K4 Parcel, and ten responses were received related to the Cactus Channel, and are summarized in Table 4.12-1 (Appendices G and H).

Table 4.12-1
Native American Tribal Communications

Native American Tribes	Response Received
K4 Parcel (Appendix G)	
San Manuel Band of Mission Indians	Stated that the Project APE is outside of tribe's ancestral territory and declined consulting party status.
Santa Rosa Band of Cahuilla Indians	No concerns regarding the Proposed Project.
Agua Caliente Band of Cahuilla Indians	Requested all documentation associated with the cultural study for tribal review.
Morongo Band of Mission Indians	Requested all documentation associated with the cultural study for tribal review.
Augustine Band of Cahuilla Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project. The tribe recommended further consultation with other tribes in the vicinity, to be notified of the discovery of any Native American cultural resources, and monitoring of ground-disturbing work in the Project APE.
Cabazon Band of Mission Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the Proposed Project
Cahuilla Band of Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the Proposed Project. However, the tribe requested to be informed on the progress of the Project.
Pauma Band of Luiseno Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the Proposed Project. However, the tribe requested to be informed on the progress of the Project.
Rincon Band of Luiseno Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the Proposed Project
Serrano Nation of Indians	The tribe requested to be notified if any Native American cultural resources are encountered during the implementation of the Proposed Project.
Pechanga Band of Luiseno Indians	The tribe participated in the survey of the Project APE and found the Project vicinity to be culturally sensitive and requested further consultation with March JPA. Furthermore, the tribe requested that a representative from their tribe and monitor for all earth-moving work associated with the Proposed Project along with an archaeological monitor.
Soboba Band of Luiseno Indians	The tribe participated in the survey of the Project APE and found the Project vicinity to be culturally sensitive and requested further consultation with March JPA. Furthermore, the tribe requested that a representative from their tribe monitor for all earth-moving work associated with the Proposed Project.

Table 4.12-1
Native American Tribal Communications

Native American Tribes	Response Received
Cactus Channel (Appendix H)	
Pechanga Band of Luiseño Indians	The representative had no comments regarding the undertaking at this time.
Cabazon Band of Mission Indians	The representative had no specific information on any Native American cultural resources in the APE.
San Manuel Band of Mission Indians	The representative noted that the APE was outside the tribe's ancestral territory and declined to participate in further consultations over this undertaking.
Rincon Band of Luiseño Indians	The representative indicated that their tribes had no information on any Native American cultural resources in or near the APE. The representative requested to review the records search results in this study.
Augustine Band of Cahuilla Indians	The representative indicated that their tribes had no information on any Native American cultural resources in or near the APE, and encouraged further consultation with other tribes in the vicinity and monitoring during ground-disturbing activities in the APE. The representative requested to be notified immediately if any Native American cultural resources were discovered during the undertaking.
Pauma Band of Luiseño Indians	The representative requested to be notified immediately if any Native American cultural resources were discovered during the undertaking.
Agua Caliente Band of Cahuilla Indians	The representative identified the APE as a part of their tribes' traditional use area, and requested copies of the completed cultural resources study for tribal review.
Cahuilla Band of Indians	The representative identified the APE as a part of their tribes' traditional use area, and stated that the tribe was not aware of any Native American cultural resources in or near the APE but requested that tribal monitors be present during all ground-disturbing activities for the undertaking.
Morongo Tribal Historic Preservation Office	The representative identified the APE as a part of their tribes' traditional use area, and requested copies of the completed cultural resources study for tribal review.
Soboba Band of Luiseño Indians	The representative identified the APE to be a part of the tribe's traditional use area and found the location to be culturally sensitive, and requested to participate in further consultation with Lewis Retail Centers, March JPA, and ACOE, and to monitor future ground-disturbing activities associated with the undertaking. In addition, the representative stated that an in-house database search identified "multiple areas of potential impacts" and offered to share specific information during future consultation with March JPA and ACOE.

Notes: APE = area of potential effect; JPA = Joint Powers Authority; ACOE = U.S. Army Corps of Engineers.

The results of the tribal outreach process conducted for both the K4 Parcel and Cactus Channel, are available as Appendix 2 in both Cultural Resources Studies prepared by CRM TECH, which are included as Appendices G and H of this EIR. This outreach was conducted for informational purposes only and did not constitute formal government-to-government consultation as specified by AB 52, which is discussed in detail in the following section.

Assembly Bill 52

A project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment (PRC Section 21084.2). Under AB 52, a TCR must have tangible, geographically defined properties that can be impacted by project implementation. The proposed Project is subject to compliance with AB 52.

The lead agency, March JPA, sent notification of the proposed Project to all California Native American tribal representatives that have requested Project notifications from March JPA pursuant to AB 52 and that are on file with the NAHC as being traditionally or culturally affiliated with the geographic area on March 24, 2018. These notification letters included a Project map and description, and inquired if the tribe would like to consult to discuss the Project and the potential to impact any TCRs. AB 52 allows tribes 30 days after receiving notification to request consultation. If a response is not received within the allotted 30 days, it is assumed that consultation is declined. As discussed in Appendices G and H, requests for comments were sent to 17 tribal representatives. Twelve tribes responded to the request related to the K4 Parcel, and ten tribes responded to the request related to the Cactus Channel. To date, government-to-government consultation initiated by the March JPA has not resulted in the identification of a TCR within or near the Project site.

Senate Bill 18

According to SB 18, March JPA has a responsibility to initiate consultation with tribes/groups listed on the California NAHC's official SB 18 contact list for amendment of a General Plan. SB 18 requires March JPA to send a letter to each contact on the NAHC's SB 18 list, extending an invitation for consultation. Tribes will have 90 days from receipt of the letter to request consultation. March JPA must also send a notice to all contacts 45 days prior to adopting the amended General Plan, as well as a third notice 10 days prior to any public hearing regarding the General Plan amendment.

March JPA sent notification of the proposed Project to all California Native American tribal representatives that have requested Project notifications pursuant to SB 18 and that are on file with the NAHC as being traditionally or culturally affiliated with the geographic area on March 24, 2018. These notification letters included a Project map and description inquiring if the tribe would like to consult on the proposed Project. To date, government-to-government consultation initiated by March JPA has not resulted in the identification of any cultural resources within or near the Project site.

Cultural Resources Survey

CRM TECH conducted a pedestrian survey on June 1, 2018 for the K4 Parcel and on July 27, 2018 for the Cactus Channel and did not result in the identification of Native American cultural resources (see Section 4.4).

In summary, no Native American cultural resources were identified within the Project APE as a result of the CHRIS records search, Native American outreach, or intensive pedestrian survey.

4.12.2 Relevant Plans, Policies, and Ordinances

State

The California Register of Historical Resources

In California, the term "historical resource" includes, but is not limited to, "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC Section 5020.1(j)). In 1992, the California legislature established the CRHR "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP, enumerated as follows. According to Public Resources Code (PRC) Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

> (1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
>
> (2) Is associated with the lives of persons important in our past.
>
> (3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
>
> (4) Has yielded, or may be likely to yield, information important in prehistory or history.

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are the state landmarks and points of interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

California Environmental Quality Act

As described further, the following CEQA statutes (PRC Section 21000 et seq.) and CEQA Guidelines (14 CCR 15000 et seq.) are of relevance to the analysis of archaeological, historic, and TCRs:

- PRC Section 21083.2(g) defines "unique archaeological resource."
- PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) defines "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource"; it also defines the circumstances when a project would materially impair the significance of a historical resource.
- PRC Section 21074(a) defines "tribal cultural resources."
- PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
- PRC Sections 21083.2(b) and 21083.2(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures. Preservation in place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context, and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

More specifically, under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; 14 CCR 15064.5(b)). If a site is listed or eligible for listing in the CRHR, included in a local register of historic resources, or identified as significant in a historical resources survey (meeting the requirements of PRC Section 5024.1(q)), it is an "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (PRC Section 21084.1; 14 CCR 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (PRC Section 21084.1; 14 CCR 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the

resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (14 CCR 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of a historical resource is materially impaired when a project does any of the following:

> (1) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
>
> (2) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
>
> (3) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA (14 CCR 15064.5(b)(2)).

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (PRC Sections 21083.2(a)–(c)).

Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

> (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
>
> (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
>
> (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Section 21083.2(g)).

Impacts on non-unique archaeological resources are generally not considered a significant environmental impact (PRC Section 21083.2(a); 14 CCR 15064.5(c)(4)). However, if a non-unique archaeological resource qualifies as a TCR (PRC Sections 21074(c) and 21083.2(h)), further consideration of significant impacts is required.

CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. Described as follows, these procedures are detailed in PRC Section 5097.98.

California State Assembly Bill 52

AB 52 of 2014 amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. AB 52 established that TCRs must be considered under CEQA and also provided for additional Native American consultation requirements for the lead agency. Section 21074 describes a TCR as a site, feature, place, cultural landscape, sacred place, or object that is considered of cultural value to a California Native American tribe. A TCR is either:

- On the CRHR or a local historic register; Eligible or determined eligible for the CRHR or included in a local historic register; or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

AB 52 formalizes the lead agency–tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the geographic area of the project if the tribe has requested in writing to be informed of projects by the lead agency and if the tribe requested consultation regarding the project in writing within 30 days of receipt of the lead agency's formal notification of the project. Lead agencies are required to begin consultation within 30 days of receiving the tribe's request for consultation and prior to the release of a negative declaration, mitigated negative declaration, or EIR.

Any information submitted by a California Native American tribe during the environmental review process shall not be included in the environmental review document or otherwise disclosed (PRC, Section 21082.3). No document prepared for public examination shall include information about the location of sacred sites (CEQA, Section 15120(d)).

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a TCR has a significant effect on the environment." Effects on TCRs shall be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American

tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to TCRs, the consultation shall include those topics (PRC Section 21080.3.2(a)). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3(a)).

California State Senate Bill 18

The Local and Tribal Intergovernmental Consultation process, commonly known as SB 18 was signed into law September of 2004 and took effect March 1, 2005. SB 18 refers to PRC Sections 5097.9 and 5097.995 which defines cultural places as:

- Native American sanctified cemetery place of worship, religious or ceremonial site, or sacred shrine (PRC Section 5097.9).
- Native American historic, cultural, or sacred site, that is listed or may be eligible for listing in the California Register of Historic Resources pursuant to Section 5024.1, including any historic or prehistoric ruins, any burial ground, any archaeological or historic site (PRC Section 5097.993).

SB 18 established responsibilities for local governments to contact, provide notice to, refer plans to, and consult with California Native American Tribes that have been identified by the NAHC and if that tribe requests consultation after local government outreach as stipulated in Government Code (GC) Section 65352.3. The purpose of this consultation process is to protect the identity of the cultural place and to develop appropriate and dignified treatment of the cultural place in any subsequent Project. The consultation is required whenever a general plan, specific plan, or open space designation is proposed for adoption or to be amended.

In addition to the requirements stipulated above, SB 18 amended GC Section 65560 to "allow the protection of cultural places in open space element of the general plan" and amended Civil Code Section 815.3 to add "California Native American tribes to the list of entities that can acquire and hold conservation easements for the purpose of protecting their cultural places."

As part of the application process, California Native American Tribes must be given the opportunity to consult with the applicant of the Project and with the March JPA for the purpose of preserving, mitigating impacts to, and identifying cultural places located on Project land within the March JPA's jurisdiction. The Project involves a General Plan Amendment to approximately 35.4-acres of the Project APE (APNs 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0); therefore, SB 18 applies to the Project. The consultation process initiated by March JPA for the Project began on [insert date], 2018. The period for the tribes to request consultation is 90 days after this request is received. To date, March JPA has received zero SB 18 letters. Once local governments have sent notification, tribes are responsible for requesting

consultation. Pursuant to GC Section 65352.3(a)(2), each tribe has 90 days from the date on which they receive notification to respond and request consultation.

4.12.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act (CEQA) Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted CEQA Guidelines Appendix G (December 2018), a significant impact related to TCRs would occur if the project would:

- **TCR-1**: Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:
  a. Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
  b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

4.12.4 Impacts Analysis

Threshold TCR-1. ***Would the Project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:***

a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

As described in Section 4.4, a CHRIS records search was conducted at the EIC on May 15, 2018 for the K4 Parcel (Appendix G) and July 19, 2018 for the Cactus Channel (Appendix H), for the proposed Project APE and within a 1-mile buffer around the APE. No Native American cultural resources were identified within the Project APE as a result of the CHRIS records search. To date, government-to-government consultation initiated

by the March JPA has not resulted in the identification of a TCR within or near the Project site. Further, no TCRs have been identified by California Native American tribes as part of March JPA's AB 52 or SB 18 notification and consultation process. **Impacts are considered less than significant.** No mitigation is required.

b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

As discussed previously in this section, there are no resources on the Project APE that have been determined by March JPA to be significant pursuant to the criteria set forth in PRC Section 5024.1. To date, government-to-government consultation initiated by the March JPA has not resulted in the identification of a TCR within or near the Project site. Further, no TCRs were identified in the Project APE by California Native American tribes as part of the March JPA's AB 52 or SB 18 notification and consultation process.

As no information regarding TCRs has been received by March JPA, it has determined that no TCRs are present on the Project APE. However, there is still a low potential for unknown subsurface TCRs to be impacted by the Project. The following approach (see mitigation measure **MM-TCR-1**) for the inadvertent discovery of TCRs has been prepared to ensure there are no impacts to unanticipated resources. Should a potential TCR be inadvertently encountered, construction activities near the encounter would be temporarily halted within 50 feet of the discovery and March JPA notified. March JPA will notify Native American tribes that have been identified by the NAHC to be traditionally and culturally affiliated with the geographic area of the Project. If the unanticipated resource is archaeological in nature, appropriate management requirements would be implemented, as outlined in mitigation measure **MM-CUL-1** (see Section 4.4). If March JPA determines that the potential resource appears to be a TCR (as defined by Public Resources Code, Section 21074), any affected tribes consulting under AB 52 would be provided a reasonable period of time, typically five days from the date a new discovery is made, to conduct a site visit and make recommendations regarding future ground-disturbance activities, as well as the treatment and disposition of any discovered TCRs. Depending on the nature of the potential resource and tribal recommendations, review by a qualified archaeologist may be required. Implementation of proposed recommendations will be made based on the determination of March JPA that the approach is reasonable and feasible. With the implementation of mitigation measure MM-TCR-1, all activities would be conducted

in accordance with regulatory requirements. As such, impacts are considered **less than significant with mitigation incorporated.**

4.12.5 Mitigation Measures

The following mitigation measures would ensure that the Project has a less-than-significant impact on TCRs.

MM-TCR-1 **Inadvertent Discovery of Tribal Cultural Resources.** While no Tribal Cultural Resources (TCRs) have been identified that may be affected by the proposed Project, the following approach for the inadvertent discovery of TCRs has been prepared to ensure there are no impacts to unanticipated resources. Should a potential TCR be encountered, construction activities near the encounter shall be temporarily halted within 50 feet of the discovery and March Joint Powers Authority (JPA) notified. March JPA will notify Native American tribes that have been identified by the Native American Heritage Commission (NAHC) to be traditionally and culturally affiliated with the geographic area of the Project. If the potential resource is archaeological in nature, appropriate management requirements shall be implemented as outlined in Mitigation Measure **MM-CUL-1** (see Section 4.4.5, Mitigation Measures). If March JPA determines that the potential resource is a TCR (as defined by PRC, Section 21074), tribes consulting under AB 52 and SB 18 would be provided a reasonable period of time, typically 5 days from the date of a new discovery is made, to conduct a site visit and make recommendations regarding future ground disturbance activities as well as the treatment and disposition of any discovered TCRs. A qualified archaeologist shall implement a plan for the treatment and disposition of any discovered TCRs based on the nature of the resource and considering the recommendations of the tribe(s). Implementation of proposed recommendations made pursuant to **MM-TCR-1** will be made based on the determination of March JPA that the approach is reasonable and feasible.

4.12.6 Level of Significance After Mitigation

With adherence to the aforementioned mitigation measure, the potential for impacts to TCRs would be **less than significant**.

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4.13 UTILITIES AND SERVICE SYSTEMS

This section describes the existing utilities setting of the K4 Warehouse and Cactus Channel Improvement Project (proposed Project or Project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. The section will analyze stormwater drainage facilities, water supplies, wastewater treatment, solid waste disposal, and compliance with applicable statues and regulations related to utilities and service systems.

In addition to other documents, the following references were used in preparation of this section of the EIR.

- Greenhouse Gas Technical Report (prepared by Ramboll, December 2018) (Appendix J)
- Water Supply Assessment K-4 Industrial Project (prepared for Western Municipal Water District, September 2018) (Appendix P)
- Hydrology Study for Cactus Avenue K-4 Parcel Industrial (prepared for Meridian Park LLC, July 2018) (Appendix M)
- Hydrology Study for Cactus Avenue Channel (prepared for Meridian Park LLC, August 2018) (Appendix N)
- Project Specific Water Quality Management Plan (prepared for Meridian Park LLC, March 2018) (Appendix O)

As mentioned in Chapter 2, Project Description, of this EIR, the proposed Project involves the development of the K4 Parcel with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use and improvements to the Cactus Avenue Drainage Channel at the Channel Improvement Site. The Project includes the following components for Project approval:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.

- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into one 35.4-acre parcel.

4.13.1 Existing Conditions

The Project site, which collectively consists of the K4 Parcel and the Cactus Avenue Drainage Channel (Cactus Channel), is located south of Cactus Avenue and immediately north of March Air Reserve Base (ARB). The K4 Parcel is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California. The K4 Parcel is located within the former boundaries of the March Air Force Base (now known as the March ARB), in the northern area. The Cactus Channel portion of the Project is located along the south side of Cactus Avenue, extending from Elsworth Street on the west to Heacock Street and Heacock Channel on the east. The portion of the Cactus Channel that would be improved as part of the proposed Project runs a total of 7,900 linear feet.

The surrounding area consists of vacant land, commercial and industrial properties and the March ARB. Adjacent to the north of the K4 Parcel and Cactus Channel, across Cactus Avenue, is an industrial and commercial center. To the east, the K4 Parcel is bounded by vacant land and an electrical substation. To the south, the K4 Parcel is bordered by March ARB and to the west the K4 Parcel is bordered by a vacant lot and March ARB.

Stormwater

The existing site is approximately 35.4 acres of natural open brush. Generally, surface flows on the Project drain in a southeast direction, onto the March ARB, eventually entering the Heacock Channel, located approximately 1.5 miles to the southeast (Appendix M). Flows within the existing Cactus Channel flow from west to east, where they then turn south and flow into the Heacock Channel.

The Project site is located in the Santa Ana River Region, which is within the Riverside County Drainage Area Management Plan area. The plan addresses the requirements of the municipal separate storm sewer system (MS4) permits issued to the Riverside County co-permittees by the Santa Ana Regional Water Quality Control Board (RWQCB). The March JPA is not a co-permittee of the Riverside County MS4 Permit; however, the March JPA has chosen to meet the intent of the Riverside County MS4 Permit related to compliance with stormwater discharge requirements by establishing submittal requirements – including design guidelines for best management practices and Water Quality Management Plans – for projects under its authority.

Existing Watersheds

The majority of the March JPA planning area, where the Project site is located, is within the San Jacinto Watershed. The San Jacinto Watershed is one of the three major geographical subdivisions

of the Santa Ana Basin and encompasses 760 square miles, including the San Jacinto River, which is the major drainage feature in the region. The northwest corner and part of the southwestern corner of the March JPA planning area are within the Upper Santa Ana watershed, which drains tributaries of the Upper Santa Ana River.

Water Supplies

The Western Municipal Water District (WMWD) supplies water for customers in Riverside County. WMWD serves eight wholesale customers and approximately 24,000 retail customers. WMWD's water supply portfolio consists mainly of imported supplies from the Colorado River and the State Water Project (SWP) but also includes recycled water and supplemental water obtained from the cities of Corona and Riverside, and other local projects. Various legal, regulatory, climatic, and environmental factors have the potential to affect the availability and reliability of SWP supplies. The California Department of Water Resources specifically accounts for these and other factors in evaluating the projected delivery capability of SWP supplies to MWD and other state contractors. The California Department of Water Resources' 2015 Final Report demonstrates the projected long-term average delivery amounts of the contractual SWP supply is projected to be 62% under current conditions. The goal for SWP supplies is to adaptively manage flow and export regulations in the near term and to achieve a long-term Delta solution that addresses ecosystem and water reliability challenges. Achieving this goal will require continued participation and a successful outcome in the California WaterFix and the California EcoRestore efforts. This approach targets an average of 980,000 AF of SWP supplies in the near term and 1.2 million AF on average starting in 2030 when a long-term Delta solution is estimated to be in place (Appendix P).

WMWD's general district consists of a 527-square-mile area of western Riverside County and an estimated population of more than 860,000. As a member agency of the Metropolitan Water District of Southern California (MWD), WMWD provides supplemental water on a wholesale basis to the cities of Corona, Norco, and Riverside and the water agencies of Box Springs Mutual Water Company, Eagle Valley Mutual Water Company, Elsinore Valley Municipal Water District, Temescal Valley Water District, and Rancho California Water District. WMWD serves retail customers in the unincorporated areas of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Mathews, and March Air Reserve Base.

In addition, the Project could be served by the Eastern Water District who has jurisdiction for water supply across the street and also has existing facilities directly across the street from the site that have sufficient capacity to serve the site. The option of water supply from Eastern Water District would require the approval of the Local Agency Formation Commission. Thus, a Water Supply Assessment (WSA) has been requested from Eastern Water District as an alternative option for water supply.

As discussed in Chapter 2, once constructed, the Project site could potentially be used up to 7 days per week and 24 hours per day. The anticipated water use is 12 acre-feet per year (AFY), which includes the estimated water demand of 130,212 square feet of landscaping and water use estimates of 750 employees (Appendix P).

Imported Water Supplies

Under normal water year conditions, WMWD service area relies on imported water supplies from MWD. The MWD is legislatively created agency charged with regional water supply management for large parts of Southern California. MWD holds contractual rights to receive SWP and Colorado River water supplies, and has developed other water supply programs and projects to expand its overall water portfolio. From that perspective, MWD has developed comprehensive and highly specialized modeling techniques to evaluate short, intermediate, and long-term availability and reliability of its total project supplies that are used to serve and supplement the needs of member agencies, including WMWD. The MWD's 2015 Regional Urban Water Management Plan has evaluated projected near, intermediate, and long-term water supply availability and reliability using historic hydrology. The MWD has capabilities that are sufficient to meet expected demands for its member agencies from 2020 through 2040 under single dry-year and multiple dry-year conditions. Additionally, the MWD has plans for supply implementation and continued development of a diversified resource portfolio including the Colorado River and SWP supplies, Central Valley transfers, local resource projects, and in-region storage that enables MWD to meet the water supply needs of its member agencies, including WMWD.

Potable Water

WMWD's retail service area covers approximately 104 square miles and provides water to an estimated population of 95,000 via about 24,000 service connections. WMWD purchases water from MWD that consists of both Colorado River and SWP supplies to serve its wholesale and retail customers. Most of the water purchased by WMWD is imported from the SWP with about 20% from the Colorado River. WMWD also obtains water through several local water supply projects and agreements.

WMWD's retail service area covers about 104 square miles and provides water to an estimated population of 95,000, via approximately 24,000 service connections. WMWD purchases water from MWD comprised of Colorado River and SWP supplies to serve its wholesale and retail customers. Most of the water purchased by WMWD is imported from the SWP with about 20% from the Colorado River. As set forth below, WMWD also obtains water through several local water supply projects and agreements. WMWD's main retail service area is within the County of Riverside.

Based on the total number of domestic customers, WMWD's retail service area experienced an annual average growth of approximately 5.8% between 2001 and 2010. WMWD's growth rate

was influenced by the undeveloped land in its retail service area compared to historically urban areas. This annual average growth rate then attenuated to approximately 1.14% between 2010 and 2015.5 The Southern California Association of Governments (SCAG) projected the annual growth rate for regional population will be only 0.7% through the year 2040.6 WMWD's 2015 Urban Water Management Plan projected the annual population growth rate within WMWD's service area at an average of 1.4% through the year 2040.

Groundwater

Groundwater resources in the Riverside County portion of the San Jacinto River hydrologic unit include the Perris, San Jacinto and Elsinore Valley hydrologic areas. The proposed Project is located within the San Jacinto Valley hydrologic area, and within the Perris Valley Hydrologic Subarea. The main aquifer in the Perris Valley is formed by coarse grained alluvial deposits. These deposits are highly permeable and can yield large amounts of water under unconfined conditions, The groundwater system in the Perris and Moreno Valleys is almost completely surrounded by non-water bearing rock to the extent that the amount of the water flowing into our out of the basin in negligible. Additionally, natural recharge to the aquifer results from primarily infiltration and precipitation. Recharge occurs by both natural and artificial means. Within the central portion of the March JPA planning area, artificial recharge occurs due to the Peacock Channel and irrigated areas within March Air Reserve Base and the Northeast Planning Subarea. The artificial recharge causes localized groundwater heights, which may impact the direction of groundwater flows. Groundwater movement in the region tends to follow surface topography. East of the planning area, groundwater primarily flows southwest through the Moreno Valley and into Perris Valley while groundwater gradient slopes gently to the southeast. In the northwest portion of the planning area, groundwater tends to flow towards the northwest, which is illustrative of the presence of a groundwater divide. North of the divide, groundwater flows generally to Sycamore Canyon. Most of the wells in the planning area have been abandoned due to insufficient yield and trichloroethylene (TCE) contamination.

Recycled Water

WMWD provides wastewater service to the unincorporated Riverside County areas north and east of Lake Matthews within its retail water service boundaries. This area is served by the Western Water Recycling Facility (WWRF). Treated water from the facility is provided to the Riverside National Cemetery and General Archie Old Golf Course as well as parks, schools, groves, and nurseries, representing a set of customers who previously were dependent on MWD supplies. With conversion of the distribution system from a non-potable system (when delivering raw MWD non-potable CRA water) to a recycled water system, those customers now have a new local and reliable supply which offsets demands for imported potable water supplies.

Wastewater Treatment

As stated above, WMWD provides wastewater service to the unincorporated Riverside County areas, which is served by the Wester Water Recycling Facility (WWRF), which is currently a three million gallon per day wastewater treatment facility producing tertiary treated recycled water.

Solid Waste

The Riverside County Waste Management Department (RCWMD) is responsible for the landfill disposal of non-hazardous county waste. RCWMD operates six active landfills and administers a contract agreement for waste disposal at the private El Sobrante Landfill. All of the active landfills currently located in Riverside County are rated as Class III landfills according to Title 27 of the California Code of Regulations (CCR). Class III landfills accept nonhazardous, municipal solid wastes including household refuse and yard trimmings as well as furniture, household appliances, televisions and computers, and other electronic wastes. According to the Riverside County General Plan EIR, waste originating from anywhere within Riverside County may be accepted for disposal at any of the County's sites. Table 4.13-1 summarizes the permitted daily capacity, current design capacity, remaining capacity, and estimated closure dates of the active landfills in Riverside County.

Table 4.13-1
Riverside County Active Landfills

Active Landfill	Permitted Daily Capacity (tons/day)	Current Design Capacity (cubic yards)	Remaining Capacity (cubic yards)	Estimated Landfill Closure Date
Badlands	4,800	34,400,000	15,748,799	1/1/2022
Blythe	400	6,229,670	3,834,470	8/1/2047
Desert Center	60	115,341	35,714	4/1/2087
El Sobrante	16,054	209,910,000	143,977,170	1/1/2051
Lamb Canyon	5,000	38,935,653	19,242,950	4/1/2029
Mecca II	400	452,182	6,371	1/1/2098
Oasis	400	1,097,152	433,779	9/1/2055
Total:	**N/A**	**291,139,998**	**183,279,253**	**N/A**

Source: CalRecycle 2018.

Electricity

Electricity is provided to unincorporated Riverside County and the Project site by Southern California Edison (SCE). SCE provides electricity to March JPA. SCE, a subsidiary of Edison International, serves approximately 180 cities in 11 counties across central and Southern California. According to the California Public Utilities Commission (CPUC), approximately 76 billion kilowatt-hours (kWh) of electricity were used in SCE's service area in 2014. Demand

forecasts anticipate that approximately 75 billion kWh of electricity will be used in SCE's service area in 2020 (CPUC 2016).

SCE receives electric power from a variety of sources. According to CPUC's 2016 Biennial RPS Program Update, 23.2% of SCE's power came from eligible renewables, such as biomass/waste, geothermal, small hydroelectric, solar, and wind sources during the 2014–2016 compliance period (CPUC 2016). This is an increase from the 19.9% that SCE maintained for the 2011–2013 compliance period (CPUC 2014). SCE maintains a lower percentage of renewable energy procurement when compared with California's two other large Investor-Owned Utilities. The other two large utilities, Pacific Gas and Electric Company and San Diego Gas and Electric Company, procured 28% and 36% of their electric power, respectively, from eligible renewables in the 2014–2016 compliance period (CPUC 2016). SCE also maintains a slightly lower percentage of renewables relative to statewide procurement. The California Energy Commission estimates that about 26% of the state's electricity retail sales in 2015 came from renewable energy (CEC 2017). The RPS Program establishes a goal for California to increase the amount of electricity generated from renewable energy resources to 20% by 2010 and to 33% by 2020. Recent legislation revised the current RPS target for California to obtain 50% of total retail electricity sales from renewable sources by 2030, with interim targets of 40% by 2024, and 45% by 2027 (CPUC 2016).

The Air Quality Technical Report and Greenhouse Gas Technical Report, prepared by Ramboll (Appendices C and J), provides electricity consumption estimates for the proposed Project. The energy consumption developed for this Project uses factors published in the Southern California Air Quality Management District (SCAQMD) "CEQA Air Quality Handbook." Background information and energy sector forecasts were collected from a number of reports issued by the CEC and CPUC, which regulate these utilities, as well as the providers themselves. In situations where projects with large power loads are planned, this is considered together with other loads in the project vicinity, and electrical substations are upgraded.

Natural Gas

According to the CEC California Energy Consumption Database, California used approximately 10,054 million therms of natural gas in 2015 (CEC 2016), which is the most recent year of data available. The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas & Electric, Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. Pacific Gas & Electric and Southern California Gas own and operate several natural gas storage fields that are located in Northern and Southern California. These storage fields, and four independently owned storage utilities help meet peak seasonal natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently (CPUC 2017). SoCalGas would provide natural gas service to the land uses proposed for the Project site. SoCalGas provides March

JPA with natural gas service. SoCalGas' service territory encompasses approximately 20,000 square miles and more than 500 communities. In the California Energy Demand mid-energy demand scenario, natural gas demand is projected to have an annual growth rate of 0.03% in SoCalGas' service territory. As of 2012, approximately 7,357 million therms[1] were used in SoCalGas' service area per year. Around the time of Project building in 2020, natural gas demand is anticipated to be approximately 7,388 million therms per year in SoCalGas' service area (CEC 2014). The total capacity of natural gas available to SoCalGas in 2016 is estimated to be 3.9 billion cubic feet per day. In 2020, the total capacity available is also estimated to be 3.9 billion cubic feet per day[2] (California Gas and Electric Utilities 2016). This amount is approximately equivalent to 3.98 billion thousand British thermal units (kBTU) per day or 39.8 million therms per day. Over the course of a year, the available capacity would therefore be 14.5 billion therms per year, which is well above the existing and future anticipated natural gas demand in SoCalGas' service area.

Telecommunication

Communications systems for telephones, computers, and cable television are serviced by utility providers such as Verizon, Frontier, Spectrum, and other independent cable companies. In addition, television services are available from the two satellite services, Direct TV and Dish. Facilities are located aboveground and belowground within private easements. The County also works with service providers to underground overhead wires, cables, conductors, and other overhead structures associated with communication systems in accordance with proposed development projects. The proposed Project site would be serviced by Verizon and Frontier for communication services.

4.13.2 Relevant Plans, Policies, and Ordinances

Federal

National Pollution Discharge Elimination System

Section 402 of the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) to regulate the discharge of pollutants from point sources. The U.S. Environmental Protection Agency has authorized California to administer its NPDES permitting program. The program is administered at the local level by the RWQCBs, as described below.

[1] One therm is equal to 100,000 Btu or 100 kBtu.

[2] One cubic foot of natural gas has approximately 1,020 BTUs of natural gas or 1.02 kBTUs of natural gas.

State

Urban Water Management Planning Act

In 1983, the California legislature enacted the Urban Water Management Planning Act (California Water Code, Sections 10610–10656), which requires specified urban water suppliers within the state to prepare an urban water management plan (UWMP) and update it every 5 years. State and local agencies and the public frequently use UWMPs to determine if agencies are planning adequately to reliably meet water demands in various service areas. As such, UWMPs serve as an important element in documenting water supply availability and reliability for purposes of compliance with Senate Bill (SB) 610 and SB 221, which link water supply sufficiency to large land-use development project approvals. Urban water suppliers also must prepare UWMPs, pursuant to the Urban Water Management Planning Act, to be eligible for state funding and drought assistance.

A UWMP provides information on water usage, water supply sources, and water reliability planning within a specified water agency service area. It also may provide implementation schedules to meet projected demands over the planning horizon, a description of opportunities for new development of desalinated water, groundwater information (where groundwater is identified as an existing or planned water source), description of water quality over the planning horizon, and identification of water management tools that maximize local resources and minimize imported water supplies. Additionally, a UWMP evaluates the reliability of water supplies within the specified service area. This includes a water supply reliability assessment, water shortage contingency plan, and development of a plan in case of an interruption of water supplies.

Senate Bills 610 and 221

On January 1, 2002, SB 610 took effect. SB 610, which was codified in the Water Code beginning with Section 10910, requires the preparation of a WSA for projects within cities and counties that meet any of the following criteria:

1. A residential development of more than 500 units;
2. A business/shopping center with more than 1,000 employees or 500,000 square feet of floor space;
3. A commercial office building with more than 1,000 employees or 250,000 square feet of floor space;
4. A hotel/motel with more than 500 rooms;
5. An industrial/manufacturing/processing plant or industrial park with more than 1,000 employees, encompassing more than 650,000 square feet of floor space, or occupying more than 40 acres of land (however after January 1, 2017, a photovoltaic or wind energy

generation facility project does not require a WSA if the facility would demand no more than 75 acre-feet of water annually);

6. A mixed-used development Project that includes one or more of the Projects specified in subsections 1) through 5), above;
7. A Project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit Project; or
8. For a supplier with 5,000 or fewer connections, a Project that will increase the number of connections by 10% or more.

SB 610 stipulates that when environmental review of certain development projects is required, the water agency that is to serve the development must complete the WSA to evaluate water supplies that are or will be available during normal, single-dry, and multiple-dry years during a 20-year projection to meet existing and planned future demands, including the demand associated with a proposed project.

SB 221, enacted in 2001 and codified in the Water Code, requires a city, county, or local agency to include a condition to any tentative subdivision map that a sufficient water supply shall be available to serve the subdivision. The term "sufficient water supply" is defined as the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that would meet the proposed subdivision project's projected water demand, in addition to existing and planned future water uses, including agricultural and industrial uses, within the specified service area. SB 221 further requires any verification of "projected" water supplies to be based on entitlement contracts, capital outlay programs and regulatory permits and approvals.

California SB 7

SB 7 (SB X7-7) was enacted in November 2009 to require all water suppliers to increase water use efficiency. The legislation sets an overall goal of reducing per-capita urban water use by 20% by December 31, 2020 (California Water Code Section 10608.20). To reach this goal, SB X7-7 requires each urban retail water supplier to report progress in meeting water use targets (California Water Code Section 10608.40). The law also requires wholesale water suppliers to support their retail member agencies' efforts to comply with SB X7-7 through a combination of regionally and locally administered active and passive water conservation measures, programs, and policies, as well as the use of recycled water.

California Water Code

California's Porter–Cologne Water Quality Control Act (1969), which became Division 7 (Water Quality) of the California Water Code, establishes the responsibilities and authorities of the nine RWQCBs and the State Water Resources Control Board (SWRCB). Among other things, it directs

each RWQCB to formulate and adopt a water quality control plan—known as a basin plan—for all areas within the region. The water quality objectives used for this study are primarily those set forth in the Water Quality Control Plan for the Santa Ana Basin (Region 8) adopted by the RWQCB. The basin plan defines existing and potential beneficial uses and water quality objectives for coastal waters, groundwater, surface waters, imported surface waters, and reclaimed waters in the basin (RWQCB 2016).

Statewide Storm Water Management Plan

The Statewide Storm Water Management Plan (SWMP) (Caltrans 2016) describes a program to reduce the discharge of pollutants associated with the stormwater drainage systems that serve highways and highway-related properties, facilities, and activities. It identifies how the California Department of Transportation will comply with the provisions of the NPDES permit (Order No. 99-06-DWQ) (permit) issued by the SWRCB on July 15, 1999. The permit requires that the previous edition of the statewide SWMP be revised to include or describe procedures for implementing the requirements stated in several provisions of the permit. This statewide SWMP has been revised to show compliance with this requirement, although the format employed differs somewhat from the specific chapter designations outlined in the permit.

Urban Water Management Plans

UWMPs are prepared by California's urban water suppliers to support their long-term resource planning and ensure adequate water suppliers are available to meet existing and future water demands. Urban water purveyors are required to prepare and update a UWMP every 5 years. UWMPs address water supply, treatment, reclamation, water conservation, and contain a water shortage contingency plan. Local UWMPs are supplemental to the regional plans prepared by the MWD. The Water Conservation Bill of 2009 (SB X7-7) requires each urban retail water supplier to develop an urban water use target and an interim urban water use target. SB X7-7 authorizes urban retail water suppliers to determine and report progress toward achieving these targets on an individual agency basis.

Executive Order – Conditions of Statewide Drought

On April 1, 2015, Governor Brown issued an Executive Order calling for a 25% reduction in consumer water use in response to the historically dry conditions throughout California. The Executive Order also includes mandatory actions aimed at reducing water demands, with a particular focus on outdoor water use. In addition to the broad call for mandatory use reductions, the order announces initiatives to do the following:

- Remove and replace turf with drought-tolerate landscape options.
- Support rebate programs for water efficient devices.

- Restrict water use on commercial, industrial, and institutional properties to achieve 25% reduction in potable water use.
- Prohibit irrigation of ornamental turf on street medians with potable water supplies.
- Prohibit irrigation of new construction with potable water unless drip or micro spray systems are used.
- Direct water supplies to develop rate structures and pricing mechanisms to maximize water conservation consistent with statewide restrictions.

State Board Emergency Water Conservation Regulations

In May 2015, pursuant to the Governor's Executive Order, the SWRCB adopted emergency regulations designed to achieve an overall 25% reduction in potable urban water use across California. The regulations are in response to the current 4-year drought and mark the first time in the state's history for such action. Under the regulations, the state's 411 urban water suppliers (e.g., those serving more than 3,000 customers or delivering more than 3,000 acre-feet of water per year, but not including suppliers functioning solely in a wholesale capacity) must achieve assigned water saving targets that collectively would result in a 25% reduction in potable urban water production across the state. The regulations are effective through February 2016. The regulations include a tiered framework designed to place the greatest conservation demands on those agencies with the highest residential gallons per capita/per day water usage. The nine tiers have construction standards ranging from 4% to 36%. Urban water suppliers are assigned to the tiers based on 3 months of summer residential gallons per capita/per day water usage data (July through September of 2014). The SWRCB adjusted a provision in the final regulations to enable urban water suppliers to subtract the amount of water provided for commercial agricultural use from their potable water production total, subject to reporting and other criteria.

Urban water suppliers must reduce total potable water production by the amount in their assigned conservation tiers. Compliance would be determined by comparing total potable water production between June 2015 and February 2016 with total potable water production in the same months of 2013. Urban water suppliers would have discretion in deciding how to achieve their conservation standards across residential, commercial, industrial, and institutional sectors. The SWRCB would assess compliance on a rolling cumulative basis starting July 15, 2015, and urban suppliers must submit monthly reports on water production. The regulations include enforcement provisions, including the ability of the state to issue conservation orders requiring additional actions on the part of suppliers not complying with their conservation standard. The SWRCB has indicated that the emphasis would be working cooperatively with agencies that are having difficulty achieving their mandated water savings.

WMWD's Water Conservation and Management Measures

WMWD's tier under the emergency regulations provides that WMWD must reduce its water use by 32% as compared to water use in 2013. In response to the emergency regulations, WMWD's Board adopted Resolution 2910 on May 20, 2015, implementing Water Shortage Stage 4(b) of WMWD's Retail Customer Water Supply Shortage Contingency Program (Program) as provided in WMWD's Ordinance 384. The Program establishes five stages of water conservation and supply shortage response measures that may be implemented. Stage One establishes permanent water use standards intended to alter behavior related to efficiency for non-shortage conditions. Stages Two through Five further establish levels of shortage response actions to be implemented during times of water supply shortage. Stage 4(b) provides conservation and supply shortage measures, such as the following:

- Tier 3 and Tier 4 water rates in the WMWD's water budget rate structure have been removed, and all water use above a customer's water budget would be charged the applicable Tier 5 water rate.
- All outdoor water budgets are reduced by 30%. Residential customers whose water use exceeds 100% of their Tier 1 and 70% of their Tier 2 rates would be charged at the applicable Tier 5 water rates. Landscapes customers whose water use exceeds 70% of their water budget would be charged the applicable Tier 5 water rates.
- Commercial, industrial, or institutional customers shall reduce their water consumption by 10% and would be charged Tier 5 water rates if their water use exceeds 90% of their water budget.

Water budgeted tiered rates are intended to promote the efficient use of water and provide customers with economic signals as their water use increases. Essentially, the rate structure is based upon providing customers with the water they need at a lower rate, while inefficient use is penalized with higher rates. WMWD's budgeted tiered rate system has demonstrated the ability to result in reductions in water consumptions. Implementation of the measures outlined in Stage 4(b), plus additional measures defined in Resolution 2910, are designed to maximize water conservation and reduce retail water demands throughout WMWD's retail service area in an effort to comply with the SWRCB's regulations.

As discussed above, WMWD also updated its Drought Allocation Plan (DAP) in May 2015 to provide WMWD's wholesale customers with a means for potentially allocating limited imported water supplies from MWD under shortage conditions. The updated 2015 DAP is consistent with the allocation methodology adopted as part of MWD's 2014 WSAP and provides a range of potential imported water shortage scenarios. The goal of 2015 DAP is to equitably share potential water shortage allocations by MWD between WMWD and its wholesale agencies, and to avoid proposed MWD penalty rates, should allocation be imposed.

The updated 2015 DAP would be used to allocate water for municipal and industrial purposes among WMWD's wholesale water customers:

- City of Corona
- City of Norco
- City of Riverside
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Temescal Valley Water District
- Rancho California Water District
- WMWD Retail Customers (including Box Springs Mutual Water Company)

The 2015 DAP was prepared with the input and support from WMWD's wholesale customers. Recognizing the importance of wholesale customer involvement, WMWD created a DAP Workgroup, made up of staff from WMWD and its wholesale customers. The DAP allocates supply to wholesale agencies based on the following:

- Demand during the base period using data for the two most recent non-allocation years
- Base period local supplies
- Base period gallons per capita daily
- Adjustments for growth

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989, also known as Assembly Bill (AB) 939, requires local jurisdictions to meet solid waste diversion goals of 25% by 1995 and 50% by 2000. A number of changes to the municipal solid waste diversion requirements under the Integrated Waste Management Act were adopted, including a revision to the statutory requirement for 50% diversion of solid waste. In 2011, AB 341 was passed, requiring the California Department of Resources Recycling and Recovery (CalRecycle) to require local agencies to include strategies to enable the diversion of 75% of all solid waste by 2020. The March JPA does not have its own integrated waste management plan; but since the Project site is located within unincorporated Riverside County, the County's integrated waste management plan is used as part of this analysis. In 2015, the County's reported waste diversion rate was in compliance with disposal rate requirements in the Integrated Waste Management Act (CalRecycle 2019).

Local

March JPA General Plan

The Land Use Element of the March JPA General Plan includes goals and policies that are relevant to the Project related to flood hazards and stormwater runoff. The following goals and policies from the March JPA General Plan (March JPA 1999) apply to the Project. Consistency with these goals and policies is discussed in Section 4.9, Land Use and Planning.

Goal 12: Ensure, plan, and provide adequate infrastructure for all facility reuse and new development, including but not limited to, integrated infrastructure planning, financing, and implementation.

Policy 12.1: Coordinate the provision of all public utilities and services to ensure a consistent, complete and efficient system of service to development.

Policy 12.2: Require new construction to pay its "fair share" for the regional infrastructure system by providing appropriate dedications, improvements, and/or fee assessment districts or other financing mechanisms.

Policy 12.3: Require new development projects to provide for the extension of infrastructure to serve the development, including over-sizing facilities for future needs.

Goal 13: Secure adequate water supply system capable of meeting normal and emergency demands for existing and future land uses.

Policy 13.1: Only approve development which can demonstrate an adequate and secure water supply for the proposed use.

Goal 14: Establish, extend, maintain, and finance a safe and efficient wastewater collection, treatment, and disposal system which maximizes treatment and water recharges, minimizes water use, and prevents groundwater contamination.

Policy 14.1: Require all development to adequately collect, treat, and dispose of wastewater in accordance with the Santa Ana Regional Water Quality Control Board requirements.

Policy 14.3: Encourage reuse of reclaimed and treated non-potable water for irrigation and maintenance of recreation areas, landscaping, and open space preservation.

Goal 15: In compliance with state law, ensure solid waste collection, siting and construction of transfer and/or disposal facilities, operation of waste reduction and recycling

programs, and household hazardous waste disposal programs and education are consistent with the County Solid Waste Management Plan.

Policy 17.1: Provide for the adequate drainage of storm runoff to protect the lives and property within the Planning Area.

Policy 17.3: Require new development to construct new or upgrade existing drainage facilities to accommodate the additional storm runoff caused by the development.

Policy 17.4: Require all storm drain and flood control facilities to be approved and operational prior to the issuance of certificates of occupancy for the associated development.

March JPA Development Code 9.10.080 Liquid and Solid Wastes

No operation or action otherwise permitted under this Title shall discharge at any point into any public street, public sewer, private sewage disposal system, stream, body of water or into the ground, any materials which can contaminate any water supply, interfere with bacterial processes in sewage treatment, or otherwise cause the emission of dangerous or offensive elements, except in accordance with standards approved by the California Department of Public Health or other governmental agency having jurisdiction over liquid and solid waste.

March JPA Ordinance No. JPA 09-05

March JPA's Water Efficient Landscape Ordinance implements the JPA's General Plan policies for water conservation, including Resource Management pursuant to Policies 1.4 and 1.5 of the General Plan, which promote the use of efficient irrigation systems, reclaimed irrigation water, and low and moderate water use plants. Water-efficient landscape regulations pursuant to this ordinance include the following (March JPA 2016):

1. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average irrigation efficiency of 0.71.
2. All irrigation systems shall be designed to prevent runoff, over-spray, low head drainage, and other similar conditions where water flows off site on to adjacent property, non-irrigated areas, walk, roadways, or structures. Irrigation systems shall be designed, constructed, installed, managed, and maintained to achieve as high an overall efficiency as possible.
3. Landscaped areas shall be provided with a smart irrigation controller which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions unless the use of the property would otherwise prohibit use of a timer.

Riverside County Waste Management Department – Design Guidelines

The Riverside County Waste Management Department (RCWMD) Design Guidelines for Refuse and Recyclables Collection and Loading Areas are intended to assist Project proponents in identifying space and other design considerations for refuse/recyclables collection and loading areas per the California Solid Waste Reuse and Recycling Act of 1991. The Design Guidelines require one 4-cubic-yard refuse bin and one 4-cubic-yard recyclables bin per each 20,000 square feet of office, general commercial, or industrial space. Compliance with the Design Guidelines is necessary for obtaining an RCWMD clearance for issuance of a building permit. Prior to building permit issuance, a site plan that indicates the location and capacity of solid waste and recycling collection and loading areas must be submitted to the RCWMD for review and approval (RCWMD 2019).

Riverside County Waste Management Department – Construction and Demolition Recycling

The RCWMD also requires that projects that have the potential to generate construction and demolition waste complete a waste recycling plan to identify the estimated quality and location of recycling of construction and demolition waste from the project. A waste recycling report is then required upon completion of the project that demonstrates that the project recycled a minimum of 50% of its construction and demolition waste (RCWMD 2018).

County of Riverside Ordinance No. 657 - Regulating the Collection, Transfer, and Removal of Solid Waste

Section 4. Solid Waste Removal Responsibility. A) Every tenant, occupier, operator, or owner of a residence or construction or demolition site shall, not less than once a week, cause to be removed all solid waste created, produced or brought upon the property to an approved disposal facility. Every person in charge of a commercial unit or industrial unit shall, not less than twice a week, cause to be removed from the property upon which the building is located all solid waste created, produced or brought upon the property. Reduced commercial, or industrial collection may be allowed upon written approval of the Health Officer. Should conditions warrant at any commercial, industrial or multiresidential unit, the Health Officer may require increased frequency of collection.

Section 5. D) No person shall accept solid waste at any place, location, tract of land, area or premises that is not a solid waste facility as defined in Public Resources Code 40194, which facility is duly licensed, permitted, properly zoned and approved by all governmental bodies and agencies having jurisdiction.

4.13.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act (CEQA) Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted CEQA

Guidelines Appendix G (December 2018), the Project could have a significant impact on utilities and service systems if the Project would:

- **UTL-1**: Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects.
- **UTL-2**: Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.
- **UTL-3**: Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments.
- **UTL-4**: Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals.
- **UTL-5**: Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

4.13.4 Impacts Analysis

Threshold UTL-1. Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Water Facilities

The Project would be served by WMWD. Upon implementation, the proposed Project would add demand for water services within the service area of WMWD. Since the Project consists of an industrial development exceeding 650,000 square feet in floor area, in accordance with SB 610, a WSA shall be considered for approval by WMWD (Appendix P). The WSA evaluated the total projected water supplies available to WMWD during normal, single-dry, and multiple-dry water years during a 20-year Project and whether WMWD's total projected supplies are sufficient to meet the projected water demand associated with the Project, in addition to existing and planned future uses.

Assuming the Project's total employee count would be 750 employees with an anticipated water use of 12 AFY which includes the estimated water demand of 130,312 square feet of landscaping. As explained in the WSA, treated water from the WWRF is projected to provide recycled water supply ranges from 1,304 acre-feet in 2015 to 2,700 acre-feet in 2040. As discussed in the WSA,

water supplies through 2040 would be sufficient to meet the projected annual water demand of 12 acre-feet associated for the Project (Appendix P).

WMWD's ability to meet these demands in combination with the projected future demands throughout WMWD, is dependent in part upon the available supply of water that can be purchased from MWD each year and completion of several water supply projects, including the Chino II Desalter Expansion and the 2017 Cooperative Agreement for Long-Term Wheeling and Surplus Water Sales. These WMWD water supply projects have been completed and can therefore be relied upon as a source of water for the Project (WMWD 2017; Inland Empire Utilities Agency 2019). The Arlington Desalter Project is still underway, however is expected to supply an additional 6.4 million gallons per day of new water for the region (WMWD 2018). WMWD currently has 6,000 acre-feet of water stored in the Bunker Hill Basin, and plans to purchase replenishment water from MWD when water is available in the future.

The WSA concluded the total projected water supplies available to WMWD during normal, single-dry, and multiple-dry years over the next 20-year period are sufficient to meet the projected water demand associated with the proposed Project. As a conservative measure, the WSA specifically analyzed how WMWD would address potential shortfalls in the availability and reliability of imported water supplies in demonstrating that sufficient water supplies are available to WMWD to serve the proposed Project according to the standards set forth by SB 610. As shown in Tables 1, 2, 3-1, and 3-2 in the WSA, WMWD has sufficient supplies in all analyzed scenarios to serve the projected Project demands, in addition to existing and planned future uses over the 20-year projection.

In addition, the Project could be served by the Eastern Water District who has jurisdiction for water supply across the street and also has existing facilities directly across the street from the site that have sufficient capacity to serve the site. The option of water supply from Eastern Water District would require the approval of the Local Agency Formation Commission. Thus, a WSA has been requested from Eastern Water District as an alternative option for water supply.

Based on the above, and the information included within the WSA, WMWD has adequate water supplies exist to serve the proposed Project, assuming implementation of required conditions or approval, as detailed **Mitigation Measure (MM) UTL-1**. Thus, with implementation of the conditions identified in **MM-UTL-1**, impacts to water supplies would be **less than significant**.

Wastewater Facilities

The proposed Project site is serviced by Western Municipal Water District (WMWD). Upon its implementation, the proposed Project would add demand for wastewater services within the service area of WMWD. The proposed Project's wastewater flows would be treated at the (WWRF), which is currently a 3 million gallons a day (MGD) treatment facility producing tertiary treated recycled water. As calculated in the Greenhouse Gas Technical Report (Appendix J), Project indoor water usage was estimated assuming each employee resulted in a water demand of 10 gallons/day. Therefore, the

indoor water usage would be 3,285,000 gallons/year for the proposed Project, as such the estimated amount of wastewater generated by the Project would be comparable. The estimated outdoor water usage for the proposed Project was estimated at 1,755,193 gallons/year. Based upon the anticipated wastewater generated from the Project, it is anticipated that off-site improvements to the WWRF facilities would not be required for the anticipated occupancy and use.

The WWRF is subject to the waste discharge requirements set forth in RWQCB Order No R8-2015-0013 (NPDES No CA8000316), which expires July 31, 2020. The anticipated water use for the proposed K4 Warehouse component is 12 AFY (Appendix P). The Cactus Channel improvements would not generate a demand for wastewater treatment at the WWRF. Considering the WWRF's capacity of 3 MGD (3,360 AFY), the proposed Project's 12 AFY which represents about 0.36% of WMWD's total demand of the 2015 Calendar Year (Appendix P). Therefore, the proposed Project would not generate a substantial demand for wastewater and would not exceed wastewater treatment requirements. Since the proposed Project would be served by the existing WWRF, which operates in compliance with the treatment and discharge requirements of the Santa Ana RWQCB, impacts would be less than significant. Additionally, the proposed Project would not result in the construction of new wastewater treatment facilities or expansion of existing facilities; thus, impacts to wastewater supplies would be **less than significant**.

Storm Water Drainage Facilities

The existing site is approximately 35.4 acres of mass graded land with surface flows draining in the northeast direction into an existing stormwater collection basin that connect to an existing storm drain pipe (Appendix O). The K4 Parcel would include the operations of a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The K4 Parcel would also include paved parking areas, drive aisles, storm drains, utilities, and associated landscaping areas. As detailed in the Preliminary WQMP (Appendix O) the K4 Parcel will be divided into three Drainage Management Areas (DMAs). On-site runoff would be conveyed to the proposed on-site detention basins via proposed on-site catch basins and storm drains. The proposed basins will be located along the northern boundary of the site, separated into Detention Basin 'A', Detention Basin 'B', and Detention Basin 'C'. Detention system 'A' will consist of 14 rows of 750 linear feet of 42" diameter pipe for a total volume provided of 101,042 cubic feet (cf). The central 15.37 acres of the Project site will drain to underground detention system 'B'. Detention system 'B' will consist of 13 rows of 685 linear feet of 42" diameter pipe for a total volume provided of 85,693 cf. The easterly 2.47 acres of the Project site will drain to underground detention system 'C'. Detention system 'C' will consist of 10 rows of 515 linear feet of 42" diameter pipe for a total volume provided of 49,559 cf. Table 4.13-2 summarizes the data and results for the 100-year storm in the proposed Project conditions.

Table 4.13-2
100-Year 24-Hour Storm Hydrograph Table

	Existing Total	Proposed System A	Proposed System B	Proposed System C	Proposed Total	Difference
Flowrate	14.85 cfs	7.44 cfs	7.73 cfs	1.22 cfs	16.37 cfs	—
Volume to be detained	—	96,028 cf	75,152 cf	13,206 cf	184,386 cf	—
Flowrate after detention	—	6.90 cfs	6.98 cfs	0.90 cfs	14.78 cfs	0.5% decrease

Source: Appendix M.
Notes: cfs = cubic feet per second; — = no data available.

Under proposed K4 Parcel conditions, the low flows will outlet from the detention system to a Modular Wetlands treatment system. The highflows will bypass the treatment system and outlet to the Cactus Channel. Flows that enter the Cactus Channel would drain to the Heacock Channel, then the Perris Valley Channel, San Jacinto River Reach 1, and finally Lake Elsinore. The proposed Project would contain measures to control the peak flows and would not have a negative impact on downstream facilities (Appendix M).

The Cactus Channel improvements component of the Project consists of channel improvements that would provide increased flood protection and contain 100-year storm flows. Thus, the Cactus Channel improvements would not generate a need for new or expanded stormwater drainage facilities. Considering the proposed Project would provide increased flood protection and contain 100-year storm flows, and would not have a negative impact on downstream facilities, the proposed stormwater drainage facilities would not cause significant environmental effects.

Electric Power Facilities

Temporary electric power for as-necessary lighting and electronic equipment such as computers inside temporary construction trailers would be provided by SCE. The amount of electricity used during construction would be minimal because typical demand stems from the use of several construction trailers that are used by managerial staff during the hours of construction activities in addition to electrically powered hand tools. The majority of the energy used during construction would be from petroleum. The electricity used for such activities would be temporary and negligible.

Long-term energy consumption associated with the Project includes electricity consumption by employees, energy from water conveyance, and long-term vehicle operations by employees. The Project would use electricity for lighting, appliances, and other uses associated with the Project's industrial land use. As later discussed in Section 4.14, Energy, the operation of the Project is estimated to have an electricity demand of approximately 1,928,892 kilowatt hours per year not accounting for mitigation measures such as Energy Star lighting. This equates to

approximately 1,929 megawatt-hours (MWh) per year. Including mitigation measures, the Project would consume approximately 1,633,043 kWh per year or 1,633 MWh.

The electricity demand calculation for the Project assumes compliance with Title 24 standards for 2016. The Project would be required to meet the California Building Energy Efficiency Standards (24 CCR, Part 6) which improve the energy efficiency of non-residential buildings. The Title 24, Part 6, standards are updated every three years.

Although electricity consumption would increase due to the implementation of the Project, the building envelope, HVAC, lighting, and other systems, such as electric motor equipment, shall be designed to maximize energy performance. The Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. Prior to Project approval, March JPA would ensure that the Project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Project-consumed electricity is also subject to the cap-and-trade regulation. For these reasons, the electricity consumption of the Project would not be considered inefficient or wasteful, and impacts would be less than significant.

Natural Gas Facilities

The proposed Project would be served by existing utility lines, including natural gas. There is an existing transmission line that the Project would connect to approximately 0.26 miles north of the Project site that operates at pressures above 200 pounds per square inch (psi) and transports gas from supply points to the gas distribution system.

The Air Quality and Greenhouse Gas Emissions Analysis also provides natural gas consumption data for Riverside County from the California Energy Commission (CEC). San Diego Gas and Electric and Southern California Gas Company serve all of Southern California, a total of over 20,000 square miles, including Riverside County.

In unincorporated western Riverside County, much of the area is urbanized and existing infrastructure networks are present. As such, additional connections to such networks would be feasible without extensive new pipelines. Natural gas is not anticipated to be required during construction of the Project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed below under the "petroleum" subsection. Any minor amounts of natural gas that may be consumed as a result of Project construction would be substantially less than that required for Project operation and would have a negligible contribution to the Project's overall energy consumption.

Natural gas consumption during operation would be required for various purposes, including, but not limited to, building heating and cooling. Default natural gas generation rates in CalEEMod for the proposed land use and climate zone were used and adjusted based on compliance with 2016 Title 24 (see Appendix J for calculations). According to these estimations, the Project would consume approximately 1,457,540 thousand British thermal units (kBTU) per year.

As with electricity demand, natural gas demand calculation for the Project assumes compliance with Title 24 standards for 2016. Although natural gas consumption would increase due to the implementation of the Project, the building envelope, HVAC, lighting, and other systems shall be designed to maximize energy performance. The Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. Prior to Project approval, March JPA would ensure that the Project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Project-consumed natural gas is also subject to the cap-and-trade regulation. For these reasons, the natural gas consumption of the Project would not be considered inefficient or wasteful, and impacts would be less than significant.

Telecommunications Facilities

The proposed Project site would be serviced by Verizon and Frontier as the communications providers. Connections to Verizon and Frontier infrastructure would be made via existing undergrounded lines. No specific systems upgrades are proposed with the proposed Project, and the location and extent of future facilities is not known at this time. Future siting of communications infrastructure would be in accordance with the March JPA Development Code, including Section 9.14.130 and 9.09.040 regulating electrical and communications facilities. Therefore, impacts would be less than significant.

Threshold UTL-2. Would the Project have sufficient water supplies available to serve the Project and reasonably foreseeable future development during normal, dry, and multiple dry years?

As discussed in Threshold UTL-1 and the K-4 Industrial Project WSA, under normal water year conditions, WMWD's retail service area relies on imported water supplies from MWD which is supplied by the Colorado River and SWP, but received recycled water and supplemental water from the cities of Corona and Riverside. The WSA analyzed availability of water supplies to serve the K4 Parcel. The WSA includes an analysis of whether the total projected water supplies available to the water provider over the next 20-year period during normal, single-dry, and multiple-dry years, are sufficient to meet the projected water demand associated with the proposed K4 Parcel, in addition to the water provider's other existing and planned future uses.

As concluded in the WSA, the projected water demand associated with the K4 Parcel is 12 AF per year, WMWD concludes that the total projected water supplies available to WMWD during normal, single-dry and multiple-dry years throughout the next 20-year period are sufficient to meet the projected water demands of the proposed Project in addition to WMWD's existing and planned future uses, including agricultural and manufacturing uses. As such, the K4 Parcel would not require the construction of new water treatment facilities or the expansion of existing facilities. The Cactus Channel improvements would not involve activities that would require new or expanded permanent water supplies. As such, impacts would be considered **less than significant**.

Threshold UTL-3. Would the Project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

WMWD provides wastewater service to the unincorporated Riverside County areas, which is served by the Western Water Recycling Facility (WWRF), which is currently a 3 MGD wastewater treatment facility producing tertiary treated recycled water. The K4 Parcel would connect to existing wastewater infrastructure beneath Cactus Avenue. The receiving wastewater pipes would have the capacity for the K4 Parcel. The Cactus Channel improvements would not generate wastewater. Thus, no new wastewater facilities are required as a result of the Cactus Channel improvements.

As such, the existing wastewater facilities would have adequate capacity to serve the proposed Project's demand; impacts would be **less than significant**.

Threshold UTL-4. Would the Project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

The proposed Project site would be served by Waste Management (17700 Indian Avenue, Moreno Valley, California 92551) for solid waste pickup and removal. In the future, Waste Management or another waste hauling company is expected to collect solid waste generated on the site and transport it to the Moreno Valley Transfer Station, which is owned and operated by the City of Moreno Valley. From the transfer station, the solid waste is expected to be transferred to the El Sobrante Landfill; however, waste could also be transferred to either the Badlands Landfill or the Lamb Canyon Landfill.

Construction of the Project would generate construction waste (e.g., concrete rubble, asphalt rubble, wood, drywall) that would result in an increased demand for solid waste collection and disposal capacity. As stated in Section 4.13.2, Relevant Plans, Policies, and Ordinances, the RCWMD would require the completion and submittal of a waste recycling plan to the RCWMD for approval prior to issuance of building permits for the site, which would be required as a Condition of Approval and is therefore included as **MM-UTL-2**. The waste recycling plan would identify and estimate the

materials to be recycled during construction and demolition activities and would specify where and how the recyclable materials would be stored on the site. A waste recycling report that demonstrates that the Project recycles a minimum of 50% of its construction and demolition waste must then be submitted to and approved by the RCWMD prior to issuance of occupancy permits.

Waste generated from the Project was calculated using California Emissions Estimator Model (CalEEMod) generation. The proposed Project would generate approximately 245.46 tons (approximately 909 cubic yards) per year of solid waste annually with consideration of required solid waste diversion rates (Appendix J). As previously shown in Table 4.13-1, the total remaining capacity for the six active landfills in Riverside County is 183,279,253 cubic yards. Waste generated by the proposed Project could have the potential to affect landfill capacity, but the permitted capacity of the landfills where the proposed Project's waste would be taken are currently sufficient to handle the waste that would be generated by the proposed Project. However, to further reduce waste generated by and transported away from the Project site, **MM-UTL-3**, requiring the use of mulch and/or compost in the development and maintenance of landscaped areas, and **MM-UTL-4**, requiring the use of drought tolerant low maintenance vegetation in all landscaped areas of the Project, would further reduce waste generated by and transported from the Project site. Thus, impacts would be **less than significant** with implementation of mitigation.

Threshold UTL-5. Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

During both construction and operation of the proposed Project, the Project would comply with all state and local statutes or regulations related to solid waste generation, storage, and disposal, including the California Integrated Waste Management Act as amended. There are no federal regulations or statutes related to solid waste that apply to the Project. As noted above, during construction, all wastes would be recycled to the maximum extent possible, and per **MM-UTL-2**, the Project shall prepare a recycling plan addressing how its construction waste would be recycled. All non-hazardous solid waste generated from the Project site, once operational (such as plastic and glass bottles and jars, paper, newspaper, metal containers, and cardboard), would be recycled, with a goal of 75%, in compliance with the Integrated Waste Management Act. Incorporation of **MM-UTL-5** requires that the RCWMD approve recycling plans on the building plans for the Project, ensuring that proper space for recycling efforts has been allowed on the Project site. The remaining non-hazardous solid waste would be disposed of at one of the County landfills (hazardous waste is managed and disposed of in compliance with all applicable federal, state, and local laws). Additionally, a Recyclables Collection and Loading Area plot plan would be prepared by the Project applicant and provided to the March JPA for review and approval prior to building permit issuance. Since the Project would comply with state and local statutes and regulations related to solid waste during construction and operation of the Project, impacts would be considered **less than significant**. However, **MM-UTL-2** and **MM-UTL-5** have been included to ensure preparation of waste recycling plans.

4.13.5 Mitigation Measures

The following mitigation measures would reduce potentially significant impacts to utilities and service systems to a less-than-significant level. Additionally, mitigation measures have been included to ensure preparation of waste recycling plans:

MM-UTL-1 **WMWD Conditions of Approval.** Prior to issuance of building permits, the applicant shall follow the conditions of approval specified in the Water Supply Assessment expected to be shortly adopted by the Western Municipal Water District (WMWD). The conditions of approval must include:

1. The Applicant shall meet with WMWD to determine if the proposed Project should include the construction of on-site and off-site water facilities as needed near the Project area.
2. The Applicant shall promptly pay all applicable fees and charges as specified in WMWD's Rules and Regulations Governing Water Service and Water Users, Water Rate Schedules and Water Rate Schedules by Service Area, Cost Recovery charges and connection and Added Facilities Charges and Fees.
3. The Applicant shall ensure that all landscape plans are compliant with applicable requirements. In WMWD's area, those requirements may include, but are not limited to, landscape ordinances of the County of Riverside (Water Efficient Landscape Requirements Ordinance No. 859), City of Riverside (Municipal Code 19.570), City of Murrieta (Ordinance 443-10), and March JPA Ordinance No. JP 09-05 (Water Efficient Landscape Ordinance).
4. The Applicant shall be required to plan and install water efficient devices and landscaping in accordance with applicable ordinances and requirements.
5. The Applicant shall use recycled water for landscaped areas. The proposed Project is located near existing recycled water distribution infrastructure on Cactus Avenue and the Applicant shall be required to use recycled water for landscaped areas.
6. If WMWD deems it necessary, the Applicant shall develop a specific plan of service for the proposed Project and coordination of land use decisions and water supply planning with WMWD to ensure sufficient and reliable water supply for WMWD's existing and future uses. Thereby, if WMWD adopts and implement rules, regulations, policies and procedures within its authority that may apply to the proposed Project, they will be implemented.

7. The proposed Project shall be subject to any special or additional requirements imposed by the Metropolitan Water District or WMWD on water deliveries, including increased pricing or a different pricing structure.

8. Prior to certificate of occupancy, the Applicant shall demonstrate the proposed Project complies with all provisions within the March Joint Powers Authority Ordinance No. JP 09-05 (Water Efficient Landscape Ordinance) including but not limited to:

   - Irrigation systems shall be designed, maintained, and managed to meet or exceed an average irrigation efficiency of 0.71.
   - All irrigation systems shall be designed to prevent runoff, over-spray, low head drainage, and other similar conditions where water flows off site onto adjacent property, non-irrigated areas, walk, roadways, or structures. Irrigation systems shall be designed, constructed, installed, managed, and maintained to achieve as high an overall efficiency as possible.
   - Landscaped areas shall be provided with a smart irrigation controller which automatically adjusts the frequency and/or duration of irrigation events in response to changing weather conditions unless the use of the property would otherwise prohibit use of a timer.

MM-UTL-2 **Construction Waste Recycling Plan and Waste Recycling Report.** Prior to issuance of building permits, the applicant shall complete a Construction Waste Recycling Plan and submit the plan to the Riverside County Waste Management Department (RCWMD) for approval. The plan shall identify and estimate the materials to be recycled during construction activities and shall specify where and how the recyclable materials will be stored on the site. Compliance with the plan will be a requirement in all construction contracts. The RCWMD-approved plan shall be attached to all construction plans and distributed to all construction contractors. Once construction is complete, the applicant shall prepare a Waste Recycling Report that demonstrates that the Project recycled a minimum of 50% of its construction and demolition waste. The waste recycling report shall be submitted to and approved by the RCWMD prior to issuance of occupancy permits.

MM-UTL-3 **Use of Mulch and/or Compost.** The use of mulch and/or compost shall be used in the development and maintenance of all landscaped areas within the Project. Green waste shall be recycled through either on-site composting of grass (i.e., leaving the grass clippings on the lawn) or sending separated green waste to a composting facility.

MM-UTL-4 **Drought-Tolerant Vegetation.** The Project shall use xeriscaping and drought-tolerant low-maintenance vegetation in all landscaped areas of the Project site.

MM-UTL-5 **RCWMD Approval of Building Plans.** Prior to issuance of building permits, the Applicant shall submit building plans to the Riverside County Waste Management Department (RCWMD) and obtain approval from the RCWMD for compliance with the Riverside County Design Guidelines for Refuse and Recyclables Collection and Loading Areas, which include specifications for recyclable storage space, location and access, signage, protection and security, compatibility, and overall compliance with federal, state, and local laws.

4.13.6 Level of Significance After Mitigation

The Project would result in less-than-significant impacts related to storm drain and wastewater services. Implementation of **MM-UTL-1** would reduce potential impacts related to water services to below a level of significance. Because mitigation measures (**MM-UTL-2** and **MM-UTL-5**) require the Project to prepare and submit plans that outline and provide for recycling of construction and operation waste that are already required by regulations, as well as limit the amount of green waste generated by the proposed Project (**MM-UTL-3** and **MM-UTL-4**), solid waste impacts would be less than significant.

4.13.7 References

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4.14 ENERGY

The following discussion and analysis is based on the California Environmental Quality Act (CEQA) Guidelines, Section 15126.4, and Appendix F of the CEQA Guidelines, which require that environmental impact reports (EIRs) include a discussion of the potential energy impacts of projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy (14 CCR 15000 et seq.). The section is also related to the potential impacts to energy consumption, including electricity, natural gas, and gasoline, from implementation of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). This analysis is based on emission calculations and California Emissions Estimator Model (CalEEMod) outputs presented in the Greenhouse Gas Technical Report, incorporated by reference, and included in Appendix J.

As mentioned in Chapter 2, Project Description, of this EIR, the Project includes the development of the five parcels on approximately 35.4-acre site ("K4 Parcel") with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day. Additionally, the Project includes regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) within the Cactus Channel Improvement Site. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of its Master Plan, which would convert the existing Cactus Channel drainage ditch into a box culvert, which would either be constructed contemporaneously with the Project or built separately depending on permitting and timing.

4.14.1 Existing Conditions

Electricity

According to the CEC's *California Energy Demand Updated Forecast 2016–2026*, California used approximately 280,536 gigawatt-hours of electricity in 2014 (CEC 2016). Electricity usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. Because of the state's energy efficiency standards and efficiency and conservation programs, California's per capita energy use has remained stable for more than 30 years, while the national average has steadily increased.

Southern California Edison (SCE) provides electricity to March JPA. SCE, a subsidiary of Edison International, serves approximately 180 cities in 11 counties across central and Southern California. According to the CPUC, approximately 76 billion kilowatt-hours (kWh) of electricity were used in SCE's service area in 2014. Demand forecasts anticipate that approximately 75 billion kWh of electricity will be used in SCE's service area in 2020 (CPUC 2016).

SCE receives electric power from a variety of sources. According to CPUC's 2016 Biennial RPS Program Update, 23.2% of SCE's power came from eligible renewables, such as biomass/waste, geothermal, small hydroelectric, solar, and wind sources during the 2014–2016 compliance period (CPUC 2016). This is an increase from the 19.9% that SCE maintained for the 2011–2013 compliance period (CPUC 2014). SCE maintains a lower percentage of renewable energy procurement when compared with California's two other large Investor-Owned Utilities. The other two large utilities, Pacific Gas and Electric Company and San Diego Gas and Electric Company, procured 28% and 36% of their electric power, respectively, from eligible renewables in the 2014–2016 compliance period (CPUC 2016). SCE also maintains a slightly lower percentage of renewables relative to statewide procurement. The California Energy Commission estimates that about 26% of the state's electricity retail sales in 2015 came from renewable energy (CEC 2017). The RPS Program establishes a goal for California to increase the amount of electricity generated from renewable energy resources to 20% by 2010 and to 33% by 2020. Recent legislation revised the current RPS target for California to obtain 50% of total retail electricity sales from renewable sources by 2030, with interim targets of 40% by 2024, and 45% by 2027 (CPUC 2016).

Natural Gas

According to the California Energy Commission, the state used approximately 12,571 million therms of natural gas in 2017 (CEC 2019a). By sector, industrial uses utilize 35.9% of the state's natural gas, followed by 35.5% from electric power, 16.9% from residential, 10.1% from commercial, and 1.6% from transportation uses (EIA 2016a). While the supply of natural gas in the United States and production in the lower 48 states has increased greatly since 2008, California produces little, and imports 90% of its supply of natural gas (CEC 2019a).

The Southern California Gas Company (SoCalGas) provides March JPA with natural gas service. SoCalGas' service territory encompasses approximately 20,000 square miles and more than 500 communities. In the California Energy Demand mid-energy demand scenario, natural gas demand is projected to have an annual growth rate of 0.03% in SoCalGas' service territory. As of 2012, approximately 7,357 million therms[1] were used in SoCalGas' service area per year. Around the time of Project building in 2020, natural gas demand is anticipated to be approximately 7,388 million therms per year in SoCalGas' service area (CEC 2014). The total capacity of natural gas available to SoCalGas in 2016 is estimated to be 3.9 billion cubic feet per day. In 2020, the total

[1] One therm is equal to 100,000 BTU or 100 kBTU.

capacity available is also estimated to be 3.9 billion cubic feet per day[2] (California Gas and Electric Utilities 2016). This amount is approximately equivalent to 3.98 billion thousand British thermal units kBTU per day or 39.8 million therms per day. Over the course of a year, the available capacity would therefore be 14.5 billion therms per year, which is well above the existing and future anticipated natural gas demand in SoCalGas' service area.

Petroleum

According to the California Energy Commission, the state used approximately 18.6 billion gallons of petroleum in 2017 (CEC 2019b). This equates to a daily use of approximately 51 million gallons of petroleum.

By sector, transportation uses utilize 86.7% of the state's petroleum, followed by 11.6% from industrial, 1.0% from commercial, 0.8% from residential, and 0.02% from electric power uses (EIA 2016b). In California, petroleum fuels refined from crude oil are the dominant source of energy for transportation sources. Petroleum usage in California includes petroleum products such as motor gasoline, distillate fuel, liquefied petroleum gases, and jet fuel. Production of petroleum in the United States was 9.7 million barrels per day during April 2015, which was the highest output since April 1971 (CEC 2015).

4.14.2 Relevant Plan, Policies, and Ordinances

Federal

Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the act, the National Highway Traffic Safety Administration (NHTSA) is responsible for establishing additional vehicle standards.

Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act of 2007 was signed into law. In addition to setting increased Corporate Average Fuel Economy standards for motor vehicles, the act includes other provisions related to energy efficiency:

- Renewable fuel standard (RFS) (Section 202)
- Appliance and lighting efficiency standards (Sections 301–325)
- Building energy efficiency (Sections 411–441)

[2] One cubic foot of natural gas has approximately 1,020 BTUs of natural gas or 1.02 kBTUs of natural gas.

This federal legislation requires ever-increasing levels of renewable fuels to replace petroleum (Section 202, RFS). The U.S. Environmental Protection Agency (EPA) is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States. As required under the act, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act of 2007 (EISA), the RFS program was expanded in several key ways that laid the foundation for achieving significant reductions of greenhouse gas (GHG) emissions through the use of renewable fuels, for reducing imported petroleum, and for encouraging the development and expansion of our nation's renewable fuels sector. The updated program is referred to as RFS2 and includes the following:

- EISA expanded the RFS program to include diesel, in addition to gasoline.
- EISA increased the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022.
- EISA established new categories of renewable fuel and set separate volume requirements for each one.
- EISA required the EPA to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces (EPA 2015).

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

Federal Vehicle Standards

In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Barack Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards

projected to achieve 163 grams per mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for carbon dioxide (CO_2) emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

In August 2018, The USEPA and NHTSA released a notice of proposed rulemaking called Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). This rule would modify the existing Corporate Average Fuel Economy (CAFE) standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026. SAFE standards are expected to uphold model year 2020 standards through 2026 (NHTSA 2018).

Clean Power Plan and New Source Performance Standards for Electric Generating Units

On October 23, 2015, EPA published a final rule (effective December 22, 2015) establishing Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units (80 FR 64510–64660), also known as the Clean Power Plan. These guidelines prescribe how states must develop plans to reduce GHG emissions from existing fossil-fuel-fired electric generating units. The guidelines establish CO_2 emission performance rates representing the best system of emission reduction for two subcategories of existing fossil-fuel-fired electric generating units: (1) fossil-fuel-fired electric utility steam-generating units and (2) stationary combustion turbines. The rule includes state-specific CO_2 goals reflecting the CO_2 emission performance rates and guidelines for the development, submittal, and implementation of state plans that establish emission standards or other measures to implement the CO_2 emission performance rates. Initial plan compliance with state emission goals begins in 2022 with full compliance with final goals

required in 2030. The goals are established by state in units of pounds of CO_2 per net megawatt-hour (MWh) or total short tons of CO_2. For California, the goals for 2030 are 828 pounds of CO_2 per net megawatt-hour or 96.8 million short tons of CO_2. CARB anticipates that the state's plan will rely heavily on existing programs such as the cap-and-trade program, Renewable Portfolio Standard, energy efficiency standards, and Mandatory GHG Reporting Regulation (for compliance determinations) (CARB 2015).

Concurrently, EPA published a final rule (effective October 23, 2015) establishing Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units (80 FR 64661–65120). The rule prescribes CO_2 emission standards for newly constructed, modified, and reconstructed affected fossil fuel-fired electric utility generating units. Separate standards of performance were set for fossil fuel-fired electric utility steam-generating units and fossil fuel-fired stationary combustion turbines. The standards apply to new units commencing construction after January 8, 2014, or existing units commencing modification or reconstruction after June 18, 2014. The rule applies only to units with a base load rating greater than 250 million Btu of fossil fuel per hour and serving a generator or generators capable of selling greater than 25 MW of electricity to a utility power distribution system. Implementation of the Clean Power Plan has been stayed by the US Supreme Court pending resolution of several lawsuits.

State

Title 24 of the California Code of Regulations

Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Energy consumption by new buildings in California is regulated by the State Building Energy Efficiency Standards, embodied in Title 24 of the California Code of Regulations. The efficiency standards apply to new construction of both residential and non-residential buildings, and regulate energy consumed for heating, cooling, ventilation, water heating, and lighting. The building efficiency standards are enforced through the local building permit process. Local government agencies may adopt and enforce energy standards for new buildings, provided these standards meet or exceed those provided in Title 24 guidelines. The standards are updated periodically to allow consideration and possible incorporation of new energy-efficiency technologies and methods. The premise for the standards is that energy-efficient buildings require less electricity, natural gas, and other fuels. The Title 24, Part 6 standards are updated every three years. The most recent amendments to Title 24, Part 6, referred to as the 2016 standards, will become effective on January 1, 2017. The previous amendments were referred to as the 2013 standards and are currently effective. The 2013 standards are 21.8% and 16.8% more efficient for electricity and natural gas in non-residential construction as compared to the 2008 standards. The Project will comply with Title 24 Part 6 per state requirements.

Title 24 also includes Part 11, known as California's Green Building Standards (CALGreen). The CALGreen standards took effect in January 2011, and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential and state-owned buildings, as well as schools and hospitals. The mandatory standards require:

- 20% mandatory reduction in indoor water use
- 50% of construction and demolition waste must be diverted from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency
- Low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards

The Project will comply with Title 24 Part 11 per state requirements.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented per the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements through more strict water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements through even more strict water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 30% cement reduction, and cool/solar reflective roofs.

Senate Bill 1368

On September 29, 2006, Governor Arnold Schwarzenegger signed into law Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006). The law limits long-term investments in baseload generation by the state's utilities to those power plants that meet an emissions performance standard jointly established by the CEC and the California Public Utilities Commission (CPUC).

The CEC has designed regulations that:

- Establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, of 1,100 pounds CO_2 per megawatt-hour. This would encourage the development of power plants that meet California's growing energy needs while minimizing their emissions of GHGs;

- Require posting of notices of public deliberations by publicly owned utilities on long-term investments on the CEC website. This would facilitate public awareness of utility efforts to meet customer needs for energy over the long-term while meeting the state's standards for environmental impact; and
- Establish a public process for determining the compliance of proposed investments with the emissions performance standard (EPS) (Perata, Chapter 598, Statutes of 2006).

Executive Order S-1-07

Issued on January 18, 2007, Executive Order S-1-07 sets a declining Low Carbon Fuel Standard for GHG emissions measured in CO_2-equivalent grams per unit of fuel energy sold in California. The target of the Low Carbon Fuel Standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste. In addition, the Low Carbon Fuel Standard would drive the availability of plug-in hybrid, battery electric, and fuel-cell power motor vehicles. The Low Carbon Fuel Standard is anticipated to lead to the replacement of 20% of the fuel used in motor vehicles with alternative fuels by 2020.

Senate Bill 375

In August 2008, the legislature passed, and on September 30, 2008, Governor Schwarzenegger signed, SB 375 (Steinberg), which addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. Regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035, as determined by CARB, are required to consider the emission reductions associated with vehicle emission standards (see Assembly Bill 1493), the composition of fuels (see Executive Order S-1-07), and other CARB-approved measures to reduce GHG emissions. Regional metropolitan planning organizations will be responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a development plan for the region, which, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If an SCS is unable to achieve the GHG reduction target, a metropolitan planning organization must prepare an alternative planning strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for "transit priority projects," as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the SCS or alternative planning strategy.

In September 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations. The targets for the Southern California Association of Governments are an 8% reduction in emissions per capita by 2020 and a 13% reduction by 2035. Achieving these goals through adoption of a SCS will be the responsibility of the metropolitan planning organizations. The Southern California Association of Governments prepared its Final RTP/SCS, which was adopted by the Southern California Association of Governments Regional Council in April 2016. The plan quantified a 8% reduction by 2020 and a 18% reduction by 2035.

California Air Resources Board's Airborne Toxics Control Measures

CARB's Airborne Toxic Control Measures (ATCMs) was approved by CARB on April 26, 2007. The list of Mobile and Stationary Source ATCMs are codified in the CCR. Regulatory measures apply to in-use off-road and on-road regulations, and the California Cap-and-Trade Program.

Advanced Clean Cars Program

In January 2012, CARB approved the Advanced Clean Cars program, a new emissions-control program for model years 2015 through 2025. The program combines the control of smog- and soot-causing pollutants and GHG emissions into a single coordinated package. The package includes elements to reduce smog-forming pollution, reduce GHG emissions, promote clean cars, and provide the fuels for clean cars (CARB 2011). To improve air quality, CARB will propose new emission standards to reduce smog-forming emissions beginning with 2015 model year vehicles. It is estimated that in 2025 cars will emit 75% less smog-forming pollution than the average new car sold today. To reduce GHG emissions, CARB, in conjunction with the EPA and the NHTSA, has adopted new GHG standards for model year 2017 to 2025 vehicles; the new standards are estimated to reduce GHG emissions by 34% in 2025. The zero-emissions vehicles (ZEV) program will act as the focused technology of the Advanced Clean Cars program by requiring manufacturers to produce increasing numbers of ZEVs and plug-in hybrid electric vehicles in the 2018 to 2025 model years. The Clean Fuels Outlet regulation will ensure that fuels such as electricity and hydrogen are available to meet the fueling needs of the new advanced technology vehicles as they come to the market.

Heavy-Duty Vehicle Greenhouse Gas Regulation

CARB adopted a regulation in December 2008 (and issued amendments in December 2010) to reduce GHG emissions by improving the fuel efficiency of heavy-duty tractors that pull 53-foot or longer box-type trailers. Fuel efficiency is improved through improvements in tractor and trailer aerodynamics and the use of low rolling resistance tires. The tractors and trailers subject to this regulation must use EPA SmartWay certified tractors and trailers, or retrofit their existing fleet with SmartWay verified technologies. Trucks serving the Project that are not drayage trucks will be regulated under this statute and required to comply with SmartWay standards to reduce GHG emissions. As part of the regulatory package for the Heavy-Duty Vehicle GHG Regulation, CARB

also reviewed and implemented the Drayage Truck Regulation and Truck and Bus Regulation. These three regulations were collectively adopted to address emissions from trucks (CARB 2010).

Executive Order B-16-12

Governor Brown issued Executive Order B-16-12 on March 23, 2012. The Executive Order requires that state entities under the governor's direction and control support and facilitate the rapid commercialization of ZEVs. It orders CARB, the CEC, the CPUC, and other relevant agencies work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to help achieve the following by 2015:

- The state's major metropolitan areas will be able to accommodate ZEVs, each with infrastructure plans and streamlined permitting
- The state's manufacturing sector will be expanding ZEV and component manufacturing
- The private sector's investment in ZEV infrastructure will be growing
- The state's academic and research institutions will be contributing to ZEV research, innovation and education.

CARB, the CEC, and CPUC, are also directed to establish benchmarks to help achieve the following goals by 2020:

- The state's ZEV infrastructure will be able to support up to one million vehicles
- The costs of ZEV will be competitive with conventional combustion vehicles
- ZEVs will be accessible to mainstream consumers
- There will be widespread use of ZEVs for public transportation and freight transport
- Transportation sector GHG emissions will be falling as a result of the switch to ZEVs
- Electric vehicle charging will be integrated into the electricity grid
- The private sector's role in the supply chain for ZEV component development and manufacturing will be expanding.

Benchmarks are also to be established to help achieve the following goals by 2025:

- Over 1.5 million ZEVs will be on California roads and their market share will be expanding
- Californians will have easy access to ZEV infrastructure
- The ZEV industry will be a strong and sustainable part of California's economy

- California's clean, efficient vehicles will annually displace at least 1.5 billion gallons of petroleum fuels.

On a statewide basis, the Executive Order establishes a target reduction of GHG emissions from the transportation sector equaling 80% less than 1990 levels by 2050.

Renewable Energy Sources

Established in 2002 under Senate Bill (SB) 1078, and accelerated by SB 107 (2006) and SB 2 (2011), California's Renewables Portfolio Standard obligates investor-owned utilities, energy service providers, and community choice aggregators to procure 33% of their electricity from renewable energy sources by 2020. Eligible renewable resources are defined in the 2013 Renewables Portfolio Standard to include biodiesel; biomass; hydroelectric and small hydro (30 megawatts or less); Los Angeles Aqueduct hydro power plants; digester gas; fuel cells; geothermal, landfill gas; municipal solid waste; ocean thermal, ocean wave, and tidal current technologies; renewable derived biogas; multifuel facilities using renewable fuels; solar photovoltaic; solar thermal electric; wind; and other renewables that may be defined later. Governor Jerry Brown signed SB 350 on October 7, 2015, which expands the RPS by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses upon which an energy efficiency program is focused) of retail customers through energy conservation and efficiency. The bill also requires the CPUC, in consultation with the CEC, to establish efficiency targets for electrical and gas corporations consistent with this goal. SB 350 also provides for the transformation of the California Independent System Operator into a regional organization to promote the development of regional electricity transmission markets in the western states and to improve the access of consumers served by the California Independent System Operator to those markets, pursuant to a specified process. In 2013, Southern California Edison (SCE) produced 21.6% of its electricity from renewable sources. By 2020, SCE is required to produce 33% of its electricity from renewable sources. This represents the off-site renewable sources available to the Project through electricity provided by SCE.

On September 10, 2018, SB 100 was signed, which revised RPS goals to a 50% renewable resources target by December 21, 2026, and to a 60% target by December 31, 2030.

Executive Order B-55-18

On September 10, 2018, Governor Brown signed EO B-55-18, to achieve carbon neutrality by moving the State of California to 100% clean energy by 2045. This Executive Order also includes specific measures to reduce GHG emissions via clean transportation, energy efficient buildings, directing cap-and-trade funds to disadvantaged communities, and better management of state's forest land.

Local

March JPA General Plan

The Noise/Air Quality Element of the March JPA General Plan (March JPA 1999) includes the following policies related to energy conservation that would be applied to the Project. The following policies from the March JPA General Plan apply to the Project. Consistency with these policies is discussed in Section 4.9, Land Use and Planning.

Policy 7.1: Support the use of energy-efficient equipment and design in the March JPA Planning Area for facilities and infrastructure.

Policy 7.2: Encourage incorporation of energy conservation features in development.

Policy 7.3: Support passive solar design in new construction.

Policy 7.5: Support drought-resistant vegetation in landscaping areas to reduce energy needed to pump water.

4.14.3 Thresholds of Significance

The CEQA Guidelines provide no specific thresholds for impacts associated with energy consumption. However, Appendix F of the CEQA Guidelines (14 CCR 15000 et seq.) provides guidance for evaluating whether a development project may result in significant impacts with regard to energy. Based on Appendix F of the CEQA Guidelines, a project could have a significant impact on energy conservation if the project would:

- **ENG-1**: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.
- **ENG-2**: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

4.14.4 Impacts Analysis

Threshold ENG-1. Would the Project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Implementation of the Project would increase the demand for electricity and natural gas at the Project site and gasoline consumption in the region during construction and operation.

Electricity

Construction Use. Temporary electric power for as-necessary lighting and electronic equipment such as computers may be needed inside temporary construction trailers. However, the electricity used for such activities would be temporary and would be substantially less than that required for Project operation and would have a negligible contribution to the Project's overall energy consumption.

Operational Use. The operational phase would require electricity for multiple purposes including, but not limited to, building heating and cooling, lighting, appliances, and electronics.

CalEEMod (version 2016.3.2) was used to estimate Project emissions from energy uses (see Appendix J for calculations). Default electricity generation rates in CalEEMod were used (based on the proposed land use and climate zone) based on compliance with 2016 Title 24. According to these estimations, the Project would consume approximately 1,928,892 kilowatt-hours (kWh) per year, not accounting for mitigation measures such as Energy Star lighting. This equates to approximately 1,929 megawatt-hours (MWh) per year. Including mitigation measures, the Project would consume approximately 1,633,043 kWh per year or 1,633 MWh.

As described above, the electricity demand calculation for the Project assumes compliance with Title 24 standards for 2016. The Project would be required to meet the California Building Energy Efficiency Standards (24 CCR, Part 6) which improve the energy efficiency of non-residential buildings. The Title 24, Part 6, standards are updated every three years.

Although electricity consumption would increase due to the implementation of the Project, the building envelope, HVAC, lighting, and other systems, such as electric motor equipment, shall be designed to maximize energy performance. The Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. Prior to Project approval, March JPA would ensure that the Project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Project-consumed electricity is also subject to the cap-and-trade regulation. For these reasons, the electricity consumption of the Project would not be considered inefficient or wasteful, and impacts would be less than significant.

Natural Gas

Construction Use. Natural gas is not anticipated to be required during construction of the Project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed below under the "petroleum" subsection. Any minor amounts of natural gas that may be consumed

as a result of Project construction would be substantially less than that required for Project operation and would have a negligible contribution to the Project's overall energy consumption.

Operational Use. Natural gas consumption during operation would be required for various purposes, including, but not limited to, building heating and cooling.

Default natural gas generation rates in CalEEMod for the proposed land use and climate zone were used and adjusted based on compliance with 2016 Title 24 (see Appendix J for calculations). According to these estimations, the Project would consume approximately 1,457,540 thousand British thermal units (kBTU) per year.

As with electricity demand, natural gas demand calculation for the Project assumes compliance with Title 24 standards for 2016. Although natural gas consumption would increase due to the implementation of the Project, the building envelope, HVAC, lighting, and other systems shall be designed to maximize energy performance. The Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. Prior to Project approval, March JPA would ensure that the Project would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. Project-consumed natural gas is also subject to the cap-and-trade regulation. For these reasons, the natural gas consumption of the Project would not be considered inefficient or wasteful, and impacts would be **less than significant**.

Petroleum

Construction Use

Petroleum would be consumed throughout construction of the Project. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, and vehicle miles traveled (VMT) associated with the transportation of construction materials and construction worker commutes would also result in petroleum consumption. Heavy-duty construction equipment associated with construction activities, and haul trucks involved in relocating dirt around the Project site would rely on diesel fuel. Construction workers would travel to and from the Project site throughout the duration of construction. It is assumed that construction workers would travel to and from the Project site in gasoline-powered vehicles.

Heavy-duty construction equipment of various types would be used during construction. CalEEMod was used to estimate construction equipment usage; results are included in Appendix J of this EIR. Based on that analysis, diesel-fueled construction equipment would operate for an estimated 19,042 hours, as summarized in Table 4.14-1.

Table 4.14-1
Hours of Operation for Construction Equipment

Phase	Hours of Equipment Use
Rough Grading and Utility Installation	1,760
Pad/Site-Specific Grading Activities	1,120
Building Construction	10,070
Paving	672
Architectural Coatings	156
Cactus Channel Phase 1	4,224
Cactus Channel Phase 2	1,040
Total	**19,042**

Source: Appendix J.

Fuel consumption from construction equipment was estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. The conversion factor for gasoline is 9.13 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.35 kilograms per metric ton CO_2 per gallon (The Climate Registry 2018). The estimated diesel fuel use from construction equipment is shown in Table 4.14-2.

Table 4.14-2
Construction Equipment Diesel Demand

Phase	Pieces of Equipment[a]	Equipment CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Rough Grading and Utility Installation	4	57.53	10.35	5,558.22
Pad/Site-Specific Grading Activities	7	61.74	10.35	5,964.97
Building Construction	7	149.93	10.35	14,486.33
Paving	6	14.02	10.35	1,354.57
Architectural Coatings	2	3.32	10.35	320.70
Cactus Channel Phase 1	4	135.31	10.35	13,073.18
Cactus Channel Phase 2	1	33.12	10.35	3,199.92
			Total	**43,957.88**

Sources:
[a] Appendix J.
[b] The Climate Registry 2018.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Fuel consumption from worker and vendor trips was estimated by converting the total CO_2 emissions from the construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline fueled, and vendor/hauling vehicles are assumed to be diesel fueled.

Calculations for total worker, vendor, and hauler fuel consumption are provided in Table 4.14-3, Table 4.14-4, and Table 4.14-5.

Table 4.14-3
Construction Worker Vehicle Gasoline Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Rough Grading and Utility Installation	550	2.61	9.13	286.02
Pad/Site-Specific Grading Activities	360	1.71	9.13	187.22
Building Construction	110,770	516.93	9.13	56,618.66
Paving	210	0.97	9.13	105.76
Architectural Coatings	1,521	6.99	9.13	765.99
Cactus Channel Phase 1	1,320	6.27	9.13	686.46
Cactus Channel Phase 2	390	1.81	9.13	197.89
			Total	**58,848.01**

Sources:
[a] Appendix J.
[b] The Climate Registry 2018.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Table 4.14-4
Construction Vendor Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg/CO_2/Gallon[b]	Gallons
Rough Grading and Utility Installation	0	0.00	10.35	0.00
Pad/Site-Specific Grading Activities	0	0.00	10.35	0.00
Building Construction	43,130	531.96	10.35	51,397.42
Paving	0	0.00	10.35	0.00
Architectural Coatings	0	0.00	10.35	0.00
Cactus Channel Phase 1	0	0.00	10.35	0.00
Cactus Channel Phase 2	0	0.00	10.35	0.00
			Total	**51,397.42**

Sources:
[a] Appendix J.
[b] The Climate Registry 2018.
Notes: CO_2 = carbon dioxide; MT = metric ton; kg = kilogram.

Table 4.14-5
Construction Haul Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Rough Grading and Utility Installation	27,500	308.67	10.35	29,823.22
Pad/Site-Specific Grading Activities	0	0.00	10.35	0.00
Building Construction	0	0.00	10.35	0.00
Paving	0	0.00	10.35	0.00
Architectural Coatings	0	0.00	10.35	0.00

Table 4.14-5
Construction Haul Truck Diesel Demand

Phase	Trips	Vehicle CO_2 (MT)[a]	kg CO_2/Gallon[b]	Gallons
Cactus Channel Phase 1	7,500	274.70	10.35	26,541.49
Cactus Channel Phase 2	0	0.00	10.35	0.00
			Total	**56,364.71**

Sources:
[a] Appendix J.
[b] The Climate Registry 2018.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

As shown in Tables 4.14-2 through 4.14-5, the Project is estimated to consume 210,568 gallons of petroleum during the construction phase. By comparison, approximately 15.4 billion gallons of petroleum would be consumed in California over the course of the Project's construction phase based on the California daily petroleum consumption estimate of approximately 52.9 million gallons per day (CEC 2019b). The Project would be required to comply with CARB's Airborne Toxics Control Measures, which restrict heavy-duty diesel vehicle idling time to 5 minutes. Therefore, because petroleum use during construction would be temporary and relatively minimal, and would not be wasteful or inefficient, impacts would be **less than significant**.

Operational Use

The majority of fuel consumption resulting from the Project's operational phase would be attributable to workers traveling to and from the Project site, and worker vehicles traveling around the Project site.

Petroleum fuel consumption associated with motor vehicles and water trucks traveling to and from the Project site during operation is a function of VMT. As shown in Appendix R, Traffic Impact Analysis, the annual VMT attributable to the Project is expected to be 31,661,414 VMT per year. Similar to construction worker and vendor trips, fuel consumption for operation was estimated by converting the total CO_2 emissions from each land use type to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. The worker vehicles were assumed to be gasoline powered and the water trucks were assumed to be diesel.

Calculations for annual mobile-source fuel consumption are provided in Table 4.14-6. Mobile sources from the Project would result in approximately 759,255 gallons of gasoline per year and 953,720 gallons of diesel consumed per year beginning in 2020. By comparison, California as a whole consumes approximately 19.3 billion gallons of petroleum per year (CEC 2019b).

Table 4.14-6
Petroleum Consumption – Operation

Fuel	Vehicle MT CO_2	kg CO_2/Gallon	Gallons
Gasoline	6,932	9.13	759,255.20
Diesel	9,871	10.35	953,719.81
		Total	**1,712,975.01**

Sources:
[a] Appendix J.
[b] The Climate Registry 2018.
Notes: CO_2 = carbon dioxide; kg = kilogram; MT = metric ton.

Over the lifetime of the Project, the fuel efficiency of the vehicles being used by the employees is expected to increase. As such, the amount of petroleum consumed as a result of vehicular trips to and from the Project site during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, CARB has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and GHG emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the number of plug-in hybrids and zero-emissions vehicles in California (CARB 2013). Additionally, in response to SB 375, CARB adopted the goal of reducing per-capita GHG emissions from 2005 levels by 8% by 2020, and 18% by 2035 for light-duty passenger vehicles in the planning area for the Southern California Association of Governments. As such, operation of the Project is expected to use decreasing amounts of petroleum over time due to advances in fuel economy.

In summary, although the Project would increase petroleum use during operation as a result of employees commuting to the site and haul trucks, the use would be a small fraction of the statewide use and, due to efficiency increases, would diminish over time. Given these considerations, petroleum consumption associated with the Project would not be considered inefficient or wasteful and would result in a **less-than-significant** impact. Also, although not quantified herein, **MM-AQ-5** would reduce petroleum use during operation as it would reduce the amount of VMT generated by employees. **MM-AQ-6** would also reduce petroleum use from trucks during operation as SmartWay trucks use less fuel than non-SmartWay trucks.

Threshold ENG-2. Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency ?

Title 24 of the California Code of Regulations contains energy efficiency standards for residential and non-residential buildings based on a state mandate to reduce California's energy demand. Specifically, Title 24 addresses a number of energy efficiency measures that impact energy used for lighting, water heating, heating, and air conditioning, including the energy impact of the building envelope such as windows, doors, skylights, wall/floor/ceiling assemblies, attics, and roofs.

Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California in order to reduce energy demand and consumption. The Project would comply with Title 24, Part 6 per state regulations. In accordance with Title 24 Part 6, March JPA would have: (a) sensor based lighting controls—for fixtures located near windows, the lighting would be adjusted by taking advantage of available natural light; and, (b) efficient process equipment—improved technology offers significant savings through more efficient processing equipment.

Title 24, Part 11, contains voluntary and mandatory energy measures that are applicable to the Project under the California Green Building Standards Code. As discussed under the previous threshold, the Project would result in an increased demand for electricity, natural gas, and petroleum. In accordance with Title 24 Part 11 mandatory compliance, the March JPA would have: (a) 50% of its construction and demolition waste diverted from landfills; (b) mandatory inspections of energy systems to ensure optimal working efficiency; (c) low-pollutant emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring and particle boards; and, (d) a 20% reduction in indoor water use. Compliance with all of these mandatory measures would decrease the consumption of electricity, natural gas, and petroleum.

Because the Project would comply with Title 24, Part 6 and Part 11, no conflict with existing energy standards and regulations would occur. Therefore, impacts would be considered **less than significant**.

4.14.5 Mitigation Measures

Impacts to energy were found to be less than significant. Therefore, no mitigation measures are required.

4.14.6 Level of Significance After Mitigation

Since there would be no significant impacts requiring mitigation, residual impacts would be **less than significant.** However, there are various Project design features, compliance with state and local regulations, and mitigation measures (**MM-AQ-4** through **MM-AQ-6**) as identified in the Air Quality section of the EIR which would further reduce the Project's impacts. As discussed in Section 4.14.4, Impacts Analysis, **MM-AQ-5** would reduce petroleum use during operation as it would reduce the amount of VMT generated by employees. **MM-AQ-6** would also reduce petroleum use from trucks during operation as SmartWay trucks use less fuel than non-SmartWay trucks.

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4.2 AIR QUALITY

This section analyzes the potential impacts of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) on air quality resulting from construction and operation of the Project. This analysis is based on emission calculations and California Emissions Estimator Model (CalEEMod) outputs presented in the *Air Quality Technical Report* (Appendix C) and the *Health Risk Assessment Technical Report* (Appendix D).

As mentioned in Chapter 2, Project Description, of this EIR, the Project includes the development of the five parcels on approximately 35.4-acre site ("K4 Parcel") with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel ("Channel improvement site"). This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan, which would convert the existing Cactus Channel into a box culvert, which would either be constructed contemporaneously with the Project or built separately depending on permitting and timing.

4.2.1 Existing Conditions

The Project is located within the South Coast Air Basin (SCAB). The SCAB is characterized as having a Mediterranean climate (typified as semiarid with mild winters, warm summers, and moderate rainfall). The SCAB is a 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. It includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

Climate and Meteorology

The SCAB generally lies in the semi-permanent, high-pressure zone of the eastern Pacific. As a result, the climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the SCAB is a function of the

area's natural physical characteristics (e.g., weather and topography) as well as of human-made influences (e.g., development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the SCAB.

Climate

Moderate temperatures, comfortable humidity, and limited precipitation characterize the climate in the SCAB. The average annual temperature varies little throughout the basin, averaging 75°F. However, with a less pronounced oceanic influence, the eastern inland portions of the basin show greater variability in annual minimum and maximum temperatures. All portions of the SCAB have recorded temperatures over 100°F in recent years. Although the SCAB has a semiarid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70% at the coast and 57% in the eastern part of the basin. Precipitation in the SCAB is typically 9 to 14 inches annually and is rarely in the form of snow or hail, due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the basin. The March Air Reserve Base, located proximate to the Project, is an area that is characterized by relatively low rainfall, with warm summers and mild winters. Average temperatures range from a high of 95°F in July to a low of 40°F in December (City-Data 2015).

Sunlight

The presence and intensity of sunlight are necessary prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain "primary" pollutants (mainly reactive hydrocarbons and oxides of nitrogen (NO_x)) react to form "secondary" pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind of the emission sources. Due to the prevailing daytime winds and time-delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of Southern California.

Temperature Inversions

Under ideal meteorological conditions and irrespective of topography, pollutants emitted into the air mix and disperse into the upper atmosphere. However, the Southern California region frequently experiences temperature inversions in which pollutants are trapped and accumulate close to the ground. The inversion, a layer of warm, dry air overlaying cool, moist marine air, is a normal condition in coastal Southern California. The cool, damp, and hazy sea air capped by coastal clouds is heavier than the warm, clear air, which acts as a lid through which the cooler marine layer cannot rise. The height of the inversion is important in determining pollutant concentration. When the

inversion is approximately 2,500 feet above mean sea level (amsl), the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet amsl, the terrain prevents the pollutants from entering the upper atmosphere, resulting in the pollutants settling in the foothill communities. Below 1,200 feet amsl, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the daylight hours. Mixing heights for inversions are lower in the summer and inversions are more persistent, being partly responsible for the high levels of ozone (O_3) observed during summer months in the SCAB. Smog in Southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods, allowing them to form secondary pollutants by reacting in the presence of sunlight. The basin has a limited ability to disperse these pollutants due to typically low wind speeds and the surrounding mountain ranges.

The Project site is located in an area that is susceptible to air inversions. This traps a layer of stagnant air near the ground where pollutants are further concentrated. These inversions produce haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

4.2.1.1 Air Quality Characteristics

Air quality varies as a direct function of the amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. Air quality problems arise when the rate of pollutant emissions exceeds the rate of dispersion for the pollutants. Reduced visibility, eye irritation, and adverse health impacts on people who are deemed sensitive receptors are the most serious hazards that can result from changes in existing air quality conditions in the area. Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, and people with cardiovascular and chronic respiratory diseases. According to the South Coast Air Quality Management District (SCAQMD), sensitive receptors include residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993).

The Project area's local ambient air quality is monitored by the SCAQMD. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The Perris Monitoring Station, located at 237½ North D Street, Perris, California, is approximately 8.9 miles south of the Project site and is characterized by topography that resembles the Project area. Both are proximate to Interstate 215. The data collected at this station are considered representative of the air quality experienced in the Project vicinity. Air quality data from 2015 through 2017 for the Perris Monitoring Station are provided in Table 4.2-1. Because particulate matter with an aerodynamic diameter equal to or less than 2.5

microns ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), and sulfur dioxide (SO_2) levels were not monitored at the Perris Monitoring Station, reported values were taken from the Riverside-Magnolia Monitoring Station, located approximately 6.9 miles northwest of the Project site or from the Riverside-Rubidoux Monitoring Station, located approximately 9.3 miles northwest of the Project site, which are the next closest monitoring stations to the Project site that monitor those pollutants.

Table 4.2-1
Ambient Air Quality Data
(ppm unless otherwise indicated)

Pollutant	Averaging Time	2015	2016	2017	Most Stringent Ambient Air Quality Standard	Monitoring Station
O_3	1 hour	0.124	0.131	0.120	0.09 ppm (State)	Perris[a]
	State exceedances	25	23	33	—	
	8 hours	0.103	0.099	0.106	0.070 ppm (State/National)	
	Federal exceedances	49	55	52	—	
	State exceedances	50	56	86	—	
PM_{10}	24 hours	188.0	76.0	75.4	50 µg/m³ (State)	Perris[a]
	Federal exceedances (Estimated)	6.6	0.0	0.0	—	
	State exceedances (Estimated)	25.7	—	—	—	
	Annual	31.4	—	—	20 µg/m³ (State)	
$PM_{2.5}$	24 hours	54.7	51.5	50.3	35 µg/m³ (National)	Riverside-Rubidoux[b]
	Federal exceedances (Estimated)	10.3	5.1	7.2	—	
	Annual	11.8	12.5	12.2	12 µg/m³ (National)	
SO_2	1 hour	0.002	0.006	0.003	0.075 ppm (State)	Riverside-Rubidoux[b]
	24 hours	0.001	0.001	0.001	0.04 ppm (State)	
NO_2	1 hour	0.057	0.073	0.063	0.100 ppm (National)	Riverside-Rubidoux[b]
	Annual	0.014	0.014	0.014	0.030 ppm (State)	
CO	1 hour	4	1.7	2.4	20 ppm (State)	Riverside-Rubidoux[b]
	8 hours	1.5	1.3	1.8	9.0 ppm (State)	

Sources: CARB 2017; EPA 2018a.
Notes: ppm = parts per million; O_3 = ozone; PM_{10} = coarse particulate matter; µg/m3 = micrograms per cubic meter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; NO_2 = nitrogen dioxide; CO = carbon monoxide.
Data were taken from California Air Resources Board (CARB) iADAM (http://www.arb.ca.gov/adam) or Environmental Protection Agency (EPA) AirData (http://www.epa.gov/airdata/) and represent the highest concentrations experienced over a given year. Exceedances of federal and state standards are only shown for ozone and particulate matter. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. All other criteria pollutants did not exceed either federal or state standards during the years shown. There is no federal standard for 1-hour ozone, annual PM_{10}, or 24-hour $S0_2$, nor is there a state 24-hour standard for $PM_{2.5}$.
[a] Perris Monitoring Station is located at 237½ North D Street, Perris, California.
[b] Riverside-Rubidoux Monitoring Station is located at 5888 Mission Boulevard, Rubidoux, California.

The SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SCAB, where the Project is located. The entire SCAB is designated as a nonattainment area for federal and state O_3 standards. EPA has classified the SCAB as an extreme nonattainment area and has mandated that it achieve attainment no later than June 15, 2024. The SCAB is designated as an attainment area for state and federal CO standards. The SCAB is designated as an attainment area under the state and federal standards for NO_2. The entire SCAB is in attainment with both federal and state SO_2 standards. Only the Los Angeles County portion of the SCAB has been designated as nonattainment for the federal rolling 3-month average lead standard, and the SCAB is designated attainment for the state lead standard. The SCAB is designated as a nonattainment area for state PM_{10} standards; however, it is designated as an attainment area for federal standards. In regard to $PM_{2.5}$ attainment status, the SCAB is designated as a nonattainment area by CARB and the EPA. The attainment classifications for these criteria pollutants are outlined in Table 4.2-2.

Table 4.2-2
South Coast Air Basin Attainment Classification

Pollutant	Averaging Time	Designation/Classification
Federal Standards		
O_3	8 hours	Nonattainment/Extreme
NO_2	1 hour	Unclassifiable/attainment
	Annual arithmetic mean	Attainment (maintenance)
CO	1 hour; 8 hours	Attainment (maintenance)
SO_2	24 hours; annual arithmetic mean	Unclassifiable/attainment
PM_{10}	24 hours	Attainment (maintenance)
$PM_{2.5}$	24 hours; annual arithmetic mean	Nonattainment (serious)
Lead	Quarter	Unclassifiable/attainment
	3-month average	Nonattainment (partial)[a]
State Standards		
O_3	1 hour; 8 hours	Nonattainment
NO_2	1 hour; annual arithmetic mean	Attainment
CO	1 hour; 8 hours	Attainment
SO_2	1 hour; 24 hours	Attainment
PM_{10}	24 hours; annual arithmetic mean	Nonattainment
$PM_{2.5}$	Annual arithmetic mean	Nonattainment
Lead[b]	30-day average	Attainment
Sulfates (SO_4)	24 hours	Attainment
Hydrogen sulfide (H_2S)	1 hour	Unclassified
Vinyl chloride[b]	24 hours	No designation
Visibility-reducing particles	8 hours (10:00 a.m.–6:00 p.m.)	Unclassified

Source: EPA 2016a (federal); CARB 2016b (state).

Notes: O_3 = ozone; NO_2 = nitrogen dioxide; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns.

[a] Partial Nonattainment designation – Los Angeles County portion of Basin only for near-source monitors. Expected to remain in attainment based on current monitoring data.

[b] California Air Resources Board (CARB) has identified lead and vinyl chloride as toxic air contaminants (TACs) with no threshold level of exposure for adverse health effects determined.

4.2.1.2 Pollutants and Effects

Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive people from illness or discomfort. Pollutants of concern include O_3, NO_2, CO, sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}), $PM_{2.5}$, and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. These pollutants are discussed in the following paragraphs.[1]

Ozone. O_3 is a colorless gas that is formed in the atmosphere when volatile organic compounds (VOCs), sometimes referred to as reactive organic gases, and NO_x react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NO_x, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Nitrogen Dioxide. Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_x and are major contributors to O_3 formation. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere, causing reduced visibility. There is some indication of a relationship between NO_2

[1] The descriptions of health effects for each of the criteria air pollutants associated with Project construction and operation are based on the U.S. Environmental Protection Agency's (EPA's) "Six Common Air Pollutants" (EPA 2015), the CARB "Glossary of Air Pollutant Terms" (CARB 2015), and the CARB "Fact Sheet: Air Pollution Sources, Effects, and Control" (CARB 2009).

and chronic pulmonary fibrosis, and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million (ppm) by volume.

Carbon Monoxide. CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the Project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions, where a layer of warm air sits atop cool air, are more frequent and can trap pollutants close to the ground. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits placed on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs, and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Particulate Matter. Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and VOCs. Inhalable or coarse particulate matter, or PM_{10}, is about one-seventh the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

Lead. Lead in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline; the manufacturing of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Sulfates. Sulfates are the fully oxidized form of sulfur, which typically occur in combination with metals or hydrogen ions. Sulfates are produced from reactions of SO_2 in the atmosphere. Sulfates can result in respiratory impairment, as well as reduced visibility.

Vinyl Chloride. Vinyl chloride is a colorless gas with a mild, sweet odor, which has been detected near landfills, sewage plants, and hazardous waste sites, due to the microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air can cause nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure through inhalation can cause liver damage, including liver cancer.

Hydrogen Sulfide. Hydrogen sulfide is a colorless and flammable gas that has a characteristic odor of rotten eggs. Sources of hydrogen sulfide include geothermal power plants, petroleum refineries, sewers, and sewage treatment plants. Exposure to hydrogen sulfide can result in nuisance odors, as well as headaches and breathing difficulties at higher concentrations.

Visibility-Reducing Particles. Visibility-reducing particles are any particles in the air that obstruct the range of visibility. Effects of reduced visibility can include obscuring the view shed of natural scenery, reduced airport safety, and discouraging tourism. Sources of visibility-reducing particles are the same as for $PM_{2.5}$ described above.

Non-Criteria Pollutants

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure or acute and/or chronic non-cancer health effects. A toxic substance released into the air is considered a hazardous air pollutant (HAP) by the U.S. Environmental Protection Agency (EPA), or a toxic air contaminant (TAC) by the California Air Resources Board (CARB).[2] Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and non-carcinogenic effects. Non-carcinogenic effects typically affect one or more target organ systems and may be experienced either on short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter. Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. The CARB classified "particulate emissions from diesel-fueled engines" (i.e., DPM) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars, and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000).

4.2.2 Relevant Plans, Policies, and Ordinances

Regulatory oversight for air quality in the SCAB is maintained by the EPA at the federal level, CARB at the state level, and by the SCAQMD at the local level. Applicable laws, regulations, and standards of these three agencies are described in the following subsections.

[2] The EPA defines HAPs as air pollutants that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. The CARB defines TACs as air pollutants which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. Since the CARB's TAC list includes all federal HAPs (as discussed in Section 4.2.2, Relevant Plans, Policies, and Ordinances), the term TAC is used in this analysis to represent air toxics in general.

Federal

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including the setting of National Ambient Air Quality Standards (NAAQS; federal standards) for major air pollutants, HAP standards, approval of state attainment plans, motor vehicle emission standards, stationary source emission standards and permits, acid rain control measures, stratospheric O_3 protection, and enforcement provisions. Federal standards are established for criteria pollutants under the Clean Air Act, which are O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The federal standards describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation. The federal standards (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. Federal standards for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the federal standards at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the federal standards must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames.

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the federal standards to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels.

The 1977 federal Clean Air Act Amendments required the EPA to identify National Emission Standards for Hazardous Air Pollutants to protect public health and welfare. HAPs include certain volatile organic chemicals, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 federal Clean Air Act Amendments, which expanded the control program for HAPs, 189 substances and chemical families were identified as HAPs.

State

CARB, which became part of the California EPA in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established California Ambient Air Quality Standards (CAAQS; state standards), which are generally more restrictive than the federal standards. The state standards describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard.

The state standards for O_3, CO, SO_2 (1 hour and 24 hours), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The federal and state standards are presented in Table 4.2-3.

Table 4.2-3
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
O_3	1 hour	0.09 ppm (180 µg/m³)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 µg/m³)	0.070 ppm (137 µg/m³)[f]	
NO_2[g]	1 hour	0.18 ppm (339 µg/m³)	0.100 ppm (188 µg/m³)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 µg/m³)	0.053 ppm (100 µg/m³)	
CO	1 hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	None
	8 hours	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)	
SO_2[h]	1 hour	0.25 ppm (655 µg/m³)	0.075 ppm (196 µg/m³)	—
	3 hours	—	—	0.5 ppm (1,300 µg/m³)
	24 hours	0.04 ppm (105 µg/m³)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 µg/m³	150 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m³	—	
$PM_{2.5}$[i]	24 hours	—	35 µg/m³	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m³	12.0 µg/m³	15.0 µg/m³
Lead[j,k]	30-day Average	1.5 µg/m³	—	—
	Calendar Quarter	—	1.5 µg/m³ (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 µg/m³	
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m³)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 µg/m³)	—	—
Sulfates	24- hours	25 µg/m³	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%	—	—

Source: CARB 2016a.

Notes: O_3 = ozone; μg/m^3 = micrograms per cubic meter; ppm = parts per million by volume; NO_2 = nitrogen dioxide; CO = carbon monoxide; mg/m^3= milligrams per cubic meter; SO_2 = sulfur dioxide; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; PST = Pacific Standard Time.

[a] California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility-reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the primary and secondary NAAQS for O_3 were lowered from 0.075 ppm to 0.070 ppm

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 μg/m^3 to 12.0 μg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 μg/m^3, as was the annual secondary standard of 15 μg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 μg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[j] CARB has identified lead and vinyl chloride as toxic air contaminant (TACs) with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 μg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

The state Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) was enacted by the legislature in 1987 to address public concern over the release of TACs into the atmosphere. AB 2588 law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years. TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment (HRA), and if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines (CARB 2000). Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation (CARB 2014), the On-Road Heavy Duty (New) Vehicle Program (CARB 2005a), the In-Use Off-Road Diesel Vehicle Regulation (CARB 2011), and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program (CARB 2008). All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. Several Airborne Toxic Control Measures that reduce diesel emissions including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

Local

South Coast Air Quality Management District

The SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the SCAB, where the Project is located. The SCAQMD operates monitoring stations in the SCAB, develops rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. The SCAQMD's Air Quality Management Plans (AQMPs) include control measures and strategies to be implemented to attain state and federal ambient air quality standards in the SCAB. The SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

The most recent adopted AQMP is the 2016 AQMP (SCAQMD 2017), which was adopted by the SCAQMD governing board on March 3, 2017. The 2016 AQMP is a regional blueprint for achieving air quality standards and healthful air. The 2016 AQMP represents a new approach, focusing on available, proven, and cost effective alternatives to traditional strategies, while seeking to achieve multiple goals in partnership with other entities promoting reductions in greenhouse gases and toxic risk, as well as efficiencies in energy use, transportation, and goods movement (SCAQMD 2017). Because mobile sources are the principal contributor to the SCAB's air quality challenges, the SCAQMD has been and will continue to be closely engaged with CARB and the EPA, who have primary responsibility for these sources. The 2016 AQMP recognizes the critical importance of working with other agencies to develop funding and other incentives that encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits not only air quality but also local businesses and the regional economy. These "win-win" scenarios are key to implementation of this 2016 AQMP with broad support from a wide range of stakeholders. The SCAQMD 2016 AQMP (SCAQMD 2017) applies the updated Southern California

Association of Governments (SCAG) growth forecasts assumed in the *2016–2040 Regional Transportation Plan/Sustainable Communities Strategy* (2016 RTP/SCS) (SCAG 2016).

Potentially Applicable Rules

Emissions that would result from stationary and area sources during operation under the Project may be subject to SCAQMD rules and regulations. The SCAQMD rules applicable to the Project may include the following:

Rule 201: **Permit to Construct.** This rule establishes an orderly procedure for the review of new and modified sources of air pollution through the issuance of permits. Rule 201 specifies that any facility installing nonexempt equipment that causes or controls the emissions of air pollutants must first obtain a permit to construct from SCAQMD.

Rule 401: **Visible Emissions.** This rule establishes the limit for visible emissions from stationary sources.

Rule 402: **Nuisance.** This rule prohibits the discharge of air pollutants from a facility that cause injury, detriment, nuisance, or annoyance to the public or damage to business or property.

Rule 403: **Fugitive Dust.** This rule requires fugitive dust sources to implement best available control measures for all sources to ensure all forms of visible particulate matter are prohibited from crossing any property line. SCAQMD Rule 403 is intended to reduce PM_{10} emissions from any transportation, handling, construction, or storage activity that has the potential to generate fugitive dust.

Rule 431.2: **Sulfur Content of Liquid Fuel.** The purpose of this rule is to limit the sulfur content in diesel and other liquid fuels for the purpose of both reducing the formation of SO_x and particulates during combustion and enabling the use of add-on control devices for diesel-fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers, such as distributors, marketers, and retailers, as well as to users of diesel, low-sulfur diesel, and other liquid fuels for stationary-source applications in the district. The rule also affects diesel fuel supplied for mobile-source applications.

Rule 1113: **Architectural Coatings.** This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Regulation XIV: Toxics and Other Non-Criteria Pollutants. This regulation includes rules that regulate toxics and other non-criteria pollutants. It provides specifications for maximum individual cancer risk, cancer burden, and noncancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing

permit units that emit TACs. The rules establish allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.

March Joint Powers Authority (JPA) General Plan

The Noise/Air Quality Element of the adopted March JPA General Plan includes goals and policies that will be applied to the Project related to air quality (March JPA 1999). The following goals and policies are from the March JPA General Plan that would apply to the Project. Consistency with these goals and policies is discussed in Section 4.9, Land Use and Planning.

Goal 6: Reduce emissions associated with vehicle/engine use.

Policy 6.1: Reduce idling emissions by increasing traffic flow through synchronized traffic signals.

Policy 6.2: Work with Riverside Transit Authority to develop a local transit system and facilitate connections of the local transit system with regional transit systems.

Policy 6.3: Encourage diversion of peak hour truck traffic, whenever feasible, to off-peak periods to reduce roadway congestion and associated emissions.

Policy 6.4: Work with Caltrans and traffic engineers to insure that roadways and freeway on-ramps that are heavily utilized by trucks are designed to safely accommodate trucks.

Policy 6.5: Encourage trucks operating within March JPA Planning Area to maintain safety equipment and operate at safe speeds so as to reduce the potential for accidents which create congestion and related emissions.

Policy 6.6: Reduce vehicle emissions through improved parking design and management that provide for safe pedestrian access to and from various facilities.

Policy 6.8: Encourage the use of compressed natural gas, clean diesel and/or alternative fuels in engines.

Goal 8: Reduce air pollution emissions and impacts through siting and building design.

Policy 8.1: Support the use of low polluting construction materials and coatings.

Policy 8.3: Encourage the separation of sensitive receptors from potential carbon monoxide hotspots.

Goal 9: Reduce fugitive dust and particulate matter emissions.

Policy 9.1: Require all feasible fugitive dust reduction techniques to be utilized during construction activities.

Policy 9.3: Support land division design which minimizes grading and maintains the natural topography to the maximum extent feasible.

Local Attainment Status

Pursuant to the 1990 federal Clean Air Act Amendments, the EPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutant, based on whether the NAAQS have been achieved. Generally, if the recorded concentrations of a pollutant are lower than the standard, the area is classified as "attainment" for that pollutant. If an area exceeds the standard, the area is classified as "nonattainment" for that pollutant. If there is not enough data available to determine whether the standard is exceeded in an area, the area is designated as "unclassified" or "unclassifiable." The designation of "unclassifiable/attainment" means that the area meets the standard or is expected to be meet the standard despite a lack of monitoring data. Areas that achieve the standards after a nonattainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the standards. The California Clean Air Act, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment," but based on CAAQS rather than the NAAQS.

4.2.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act (CEQA) Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted CEQA Guidelines Appendix G (December 2018), the Project could have a significant impact on air quality if the Project would:

- **AQ-1**: Conflict with or obstruct implementation of the applicable air quality plan.
- **AQ-2**: Result in a cumulatively considerable new increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
- **AQ-3**: Expose sensitive receptors to substantial pollutant concentrations.
- **AQ-4**: Result in other remissions (such as those leading to odors) adversely affecting a substantial number of people.

Appendix G of the CEQA Guidelines indicates that, where available, the significance criteria established by the applicable air quality management district or pollution control district may be relied

upon to determine whether the Project would have a significant impact on air quality. The SCAQMD *CEQA Air Quality Handbook* (SCAQMD 1993, 2015a), as revised in March 2015, sets forth quantitative emission significance thresholds below which a project would not have a significant impact on ambient air quality (SCAQMD 2015b). Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 4.2-4 are exceeded.

A project would result in a substantial contribution to an existing air quality violation of the NAAQS or CAAQS for O_3 (see Table 4.2-2), which is a nonattainment pollutant, if the project's construction or operational emissions would exceed the SCAQMD VOC or NO_x thresholds shown in Table 4.2-4. These emission-based thresholds for O_3 precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse O_3 impacts to occur) because O_3 itself is not emitted directly (see the previous discussion of O_3 and its sources), and the effects of an individual project's emissions of O_3 precursors (VOC and NO_x) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods.

Table 4.2-4
South Coast Air Quality Management District Air Quality Significance Thresholds

Pollutant	Construction	Operation
Criteria Pollutants Mass Daily Thresholds		
VOCs	75 lb/day	55 lb/day
NO_x	100 lb/day	55 lb/day
CO	550 lb/day	550 lb/day
SO_x	150 lb/day	150 lb/day
PM_{10}	150 lb/day	150 lb/day
$PM_{2.5}$	55 lb/day	55 lb/day
Lead[a]	3 lb/day	3 lb/day
TACs and Odor Thresholds		
TACs[b]	Maximum incremental cancer risk ≥10 in 1 million Chronic and acute hazard index ≥1.0 (project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402	
Ambient Air Quality Standards for Criteria Pollutants[c]		
NO_2 1-hour average NO_2 annual arithmetic mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.030 ppm (state) and 0.0534 ppm (federal)	
CO 1-hour average CO 8-hour average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)	
PM_{10} 24-hour average PM_{10} annual average	10.4 μg/m^3 (construction)[d] 2.5 μg/m^3 (operation) 1.0 μg/m^3	

Table 4.2-4
South Coast Air Quality Management District Air Quality Significance Thresholds

Pollutant	Construction	Operation
$PM_{2.5}$ 24-hour average	10.4 μg/m³ (construction)[d] 2.5 μg/m³ (operation)	

Source: SCAQMD 2015b.
Notes: VOC = volatile organic compounds; lb/day = pounds per day; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; TAC = toxic air contaminant; SCAQMD = South Coast Air Quality Management District; NO_2 = nitrogen dioxide; ppm = parts per million; μg/m³ = micrograms per cubic meter.
[a] The phase-out of leaded gasoline started in 1976. Since gasoline no longer contains lead, the proposed Project is not anticipated to result in impacts related to lead; therefore, it is not discussed in this analysis.
[b] TACs include carcinogens and non-carcinogens.
[c] Ambient air quality standards for criteria pollutants based on SCAQMD Rule 1303, Table A-2, unless otherwise stated.
[d] Ambient air quality threshold based on SCAQMD Rule 403.

In addition to the emission-based thresholds in Table 4.2-4, the SCAQMD also recommends the evaluation of localized air quality impacts to sensitive receptors in the immediate vicinity of the Project as a result of construction and operation activities. Such an evaluation is referred to as a localized significance threshold (LST) analysis. The LST significance thresholds for NO_2 and CO represent the allowable increase in concentrations above background levels in the vicinity of a project that would not cause or contribute to an exceedance of the relevant ambient air quality standards, while the threshold for PM_{10} represents compliance with Rule 403 (Fugitive Dust). The LST significance threshold for $PM_{2.5}$ is intended to ensure that construction emissions do not contribute substantially to existing exceedances of the $PM_{2.5}$ ambient air quality standards. The allowable emission rates depend on the following parameters:

a. Source receptor area in which the project is located
b. Size of the project site
c. Distance between the project site and the nearest sensitive receptor (e.g., residences, schools, hospitals).

Based on the Project location, LSTs for Source Receptor Area 23 (Metropolitan Riverside County) would be applicable. As detailed in Appendix C, the construction LST thresholds were conservatively determined based on a disturbed Project area of 5-acres, which is conservative since the Project site is approximately 35.4 acres. This approach is conservative as the LSTs increase with increasing project activity area size. Thus, evaluating the current Project as though it will be over a 5-acre area is conservative since if it were over a larger area it would be allowed to have more emissions before triggering the LST. The thresholds for receptor distances of 25 meters for each pollutant were used to linearly interpolate thresholds for the closest receptor, located approximately 30 meters (98 feet) from the Project boundary. The LSTs applicable to construction and operation of the Project are shown in Table 4.2-5. Notably, if localized emissions exceed the applicable LSTs and refined dispersion

modeling is required, the most stringent NAAQS or CAAQS (included in Table 4.2-2) would be used as the threshold of significance.

Table 4.2-5
Localized Significance Thresholds for the Project

Pollutant	Threshold[a,b] (pounds/day)
Construction	
NO_x	270
CO	1,577
PM_{10}	13
$PM_{2.5}$	8
NO_2	150[c]
Operations	
NO_x	270
CO	1,577
PM_{10}	4
$PM_{2.5}$	2
NO_2	150[c]

Source: SCAQMD 2008. See also Appendix C of this Environmental Impact Report (EIR) for a description of localized significance threshold (LST) determination.
Notes: NO_x = oxides of nitrogen; CO = carbon monoxide; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; NO_2 = nitrogen dioxide.
[a] South Coast Air Quality Management District (SCAQMD) localized significance thresholds are shown for a 5-acre project site at 25 meters and are assumed to be conservative thresholds for larger project areas.
[b] Allowable emissions are the maximum emissions that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard (based on site size and distance to receptor).
[c] An approximated LST was estimated to evaluate the federal 1-hour NO2 standard, as the SCAQMD significance threshold has not been updated to reflect this standard. Calculated by scaling the Metropolitan Riverside County NO_2 LST for a 5-acre site by the ratio of 1-hour NO_2 standards (federal/state). The federal standard is 0.10 ppm and the state standard is 0.18 ppm (i.e., interpolated LST * (0.10/0.18)).

4.2.4 Approach and Methodology

Construction Emissions

The proposed land uses would consist of approximately 718,000 square feet of warehouse space a parking lot of 289 automobile parking stalls and 317 truck trailer parking stalls, and improvements to Cactus Channel. Construction of the Project would result in criteria air pollutant emissions that are primarily associated with use of off-road construction equipment and on-road construction trucks and worker vehicles. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be estimated, with a corresponding uncertainty in precise ambient air quality impacts. Construction emissions associated with the Project were calculated using the CalEEMod Version 2016.3.2. Construction emissions were calculated for the estimated worst-case day over the construction period associated with each phase and reported as the maximum daily emissions estimated during each year of construction (2019 and 2020). The emissions analysis

conservatively assumed a construction start year of 2019, although it is likely to start in 2020. Default values provided by the program were used where detailed Project information was not available.

For this analysis, construction of the Project would begin in May 2019 and be completed in June 2020. The analysis presented herein assumes a construction start date of May 2019, which represents the earliest date at which construction would initiate. Assuming the earliest start date for construction represents the worst-case scenario for criteria air pollutant emissions because equipment and vehicle emission factors for later years would be slightly less due to more stringent standards for in-use off-road equipment and heavy-duty trucks, as well as fleet turnover replacing older equipment and vehicles in later years. Thus, for purposes of estimating Project construction emissions, the analysis contained herein is conservatively based on the following assumptions as described in Appendix C (duration is approximate):

Warehouse

- Rough Grading and Utility Installation: May 2019 (55 days)
- Pad/Site-Specific Grading Activities: August 2019 (20 days)
- Building Construction: September 2019 through May 2020 (190 days)
- Paving: May 2020 through June 2020 (14 days)
- Architectural Coating: June 2020 (13 days)

Cactus Channel

- Phase 1 Site Preparation: May 2019 through November 2019 (132 days)
- Phase 2 Site Preparation: November 2019 through May 2020 (130 days)

The construction equipment mix and estimated hours of equipment operation per day used for the air emissions modeling of the Project are shown in Table 4.2-6. For this analysis, it was assumed that heavy construction equipment would operate 5 days a week (22 days per month) and up to 8 hours per day during Project construction. Because no specific information regarding on-road trips during construction is known at this time, worker, vendor, and haul truck trips were estimated using CalEEMod defaults. Project construction is anticipated to involve approximately 220,000 cubic yards of import of soil and 60,000 cubic yards of export. Vendor truck trips were estimated using CalEEMod default values, which are based on building square footage. The lengths of worker, vendor, and haul truck trips were estimated using CalEEMod defaults (worker trip length: 14.7 miles; vendor trip length: 6.9 miles; hauling trip length: 20 miles). Estimated daily worker and vendor trips and total estimated haul truck trips are provided in Appendix C.

Table 4.2-6
Construction Scenario Assumptions

Construction Phase	One Way Worker Trips	One-way Vendor Truck Trips	One-way Haul Truck Trips	Equipment[a]	Quantity	Hours/Day
Warehouse						
Rough Grading and Utility Installation	10	0	27,500	Rubber-Tired Dozers	2	8
				Tractors/Loaders/Backhoes	2	8
Pad/Site-Specific Grading Activities	18	0	0	Rubber-Tired Dozers	2	8
				Scrapers	3	8
				Tractors/Loaders/Backhoes	2	8
Building Construction	583	227	0	Cranes	1	7
				Forklifts	2	8
				Tractors/Loaders/Backhoes	2	7
				Welders	2	8
Paving	15	0	0	Pavers	2	8
				Paving Equipment	2	8
				Rollers	2	8
Architectural Coating	117	0	0	Air Compressors	2	6
Cactus Channel						
Phase 1 Site Preparation	10	0	7,500	Excavators	2	8
				Rubber-Tired Loaders	2	8
Phase 2 Site Preparation	3	0	0	Crane	1	8

Notes: See Appendix C for complete assumptions.

[a] Construction equipment list and usage are Project-specific estimates. California Emissions Estimator Model (CalEEMod) defaults were used for off-road construction equipment horsepower and load factors.

Implementation of the Project would generate construction-related air pollutant emissions from entrained dust, equipment and vehicle exhaust emissions, architectural coatings, and pavement off-gassing. Entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM_{10} and $PM_{2.5}$ emissions. To account for dust control measures to comply with SCAQMD Rule 403 in the calculations, it was assumed that the active sites would be watered at least twice daily, resulting in a 55% reduction in fugitive dust as implemented by CalEEMod. Exhaust from internal combustion engines used by construction equipment, hauling trucks, vendor trucks, and worker vehicles would result in emissions of NO_x, VOCs, CO, PM_{10}, and $PM_{2.5}$. Asphalt paving associated with the parking lot land use construction would generate VOC off-gassing emissions. The application of architectural coatings, such as exterior/interior paint and other finishes, would also produce VOC emissions; however, the contractor would be required to procure architectural coatings from a supplier in compliance with the requirements of SCAQMD's Rule 1113 (Architectural Coatings). Unmitigated emissions for coating categories were calculated based on default VOC content data from CalEEMod, which was provided by the air districts, including SCAQMD where the Project would be located. The

CalEEMod default VOC content for SCAQMD is based on the 2013 version of Rule 1113. Mitigated emissions reflect the use of Super Compliant coatings with a VOC content less than 10 grams per liter VOC (SCAQMD 2018).

Operational Emissions

Operation of the Project would result in criteria air pollutant emissions through energy use, area sources, and motor vehicle trips to the Project. CalEEMod was used to estimate emissions from motor vehicles, which was adjusted to include information (including trip rates, trip length for haul trucks, and fleet mix) derived from the Traffic Impact Analysis prepared by Urban Crossroads (Appendix R). According to the Traffic Impact Analysis, the Project would generate 5,873 average daily trips. Default CalEEMod trip lengths were used for all trips types and land uses with the exception of commercial-nonwork (C-NW) trips for haul trucks, which were assumed to have a trip length of 60-miles based on an anticipated haul truck usage similar to recent distribution centers in the region (Appendix C). The default commercial-work (C-W) trip length of 16.6-miles were used. These trip lengths are summarized in Table 9 of the *Air Quality Technical Report* in Appendix C. For the fleet mix detailed in Appendix C, default CalEEMod assumptions were used for the unrefrigerated warehouse based on the vehicle trip rates provided in Appendix R. The 2016.3.2 version of CalEEMod incorporates EMFAC2014 to calculate mobile source emissions. EMFAC2014 has been superseded by EMFAC2017. In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod methodology along with Project specific values where available.

Operational emissions were modeled in CalEEMod under the assumption that Project buildout would occur in 2020. Assuming the earliest start date for Project buildout represents the worst-case scenario for criteria air pollutant emissions because vehicle emission factors for later years would be slightly less due to more stringent standards, as well as fleet turnover replacing older vehicles in later years, the model is considered to be conservative. Default CalEEMod assumptions were used to estimate emissions from the Project area sources, which include gasoline-powered landscape maintenance equipment, consumer products, and architectural coatings for the maintenance of buildings. Emissions from energy sources, which include natural gas appliances and space and water heating, were estimated using CalEEMod and reflect compliance with the 2016 Title 24 standards for nonresidential construction.

Localized Criteria Air Pollutant Emissions

As indicated in the discussion of the thresholds of significance, the SCAQMD also recommends the evaluation of localized NO_2, CO, PM_{10}, and $PM_{2.5}$ impacts as a result of construction and

operational activities to sensitive receptors in the immediate vicinity of the Project site. On-site construction and operational emissions were calculated using CalEEMod and compared to the SCAQMD LST thresholds (see Appendix C). The impacts were analyzed using methods consistent with those in the SCAQMD's *Final Localized Significance Threshold Methodology* (SCAQMD 2008). LSTs were chosen assuming a Project site area of 5 acres and based on a receptor distance of 25 meters. Notably, both the construction and operational LST analyses are based on the combination of maximum emissions that may occur with the worst-case meteorological conditions, which equates to conservatively high estimates that may never occur.

Carbon Monoxide Hotspots

Mobile source impacts occur on two scales of motion. Regionally, Project-related travel would add to regional trip generation and increase the vehicle miles traveled within the local airshed and the SCAB. Locally, Project traffic would be added to the County of Riverside, City of Riverside, and City of Moreno Valley roadway system near the Project site. If such traffic occurs during periods of poor atmospheric ventilation, is composed of a large number of vehicles "cold-started" and operating at pollution-inefficient speeds, and is operating on roadways already crowded with non-Project traffic, there is a potential for the formation of microscale CO "hotspots" in the area immediately around points of congested traffic. With the turnover of older vehicles and introduction of cleaner fuels, CO concentrations in the SCAB have steadily declined.

Based on the comparative analysis presented in Appendix C, a quantitative CO hotspots analysis was not needed to determine whether the change in the level of service (LOS) of an intersection by the Project would have the potential to result in exceedances of the CAAQS or NAAQS. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan). In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: Long Beach Blvd. and Imperial Highway (Lynwood); Wilshire Blvd. and Veteran Ave. (Westwood); Sunset Blvd. and Highland Ave. (Hollywood); and La Cienega Blvd. and Century Blvd. (Inglewood). These analyses did not predict a violation of CO standards. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which had a daily traffic volume of approximately 100,000 vehicles per day. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm.[3] The most recent three years (2014 through 2016) of background 1-hour CO concentrations in the Project vicinity range from 1.7 to 2.5 ppm (SCAQMD n.d.a). This indicates that the most stringent 1-hour CO standard (20.0 ppm) would likely not be exceeded until the daily traffic at the intersection exceeded more than 380,000 vehicles per day.[4] The Los Angeles County Metropolitan

[3] It is conservatively assumed that 4.6 ppm does not account for background CO concentration.

[4] Based on the ratio of the CO standard (20.0 ppm) minus background (2.5 ppm) and the modelled value (4.6 ppm).

Transportation Authority evaluated the LOS in the vicinity of the Wilshire Boulevard/Veteran Avenue intersection[5] and found it to be Level E at peak morning traffic and Level F at peak afternoon traffic (Metropolitan Transportation Authority 2004).

At buildout of the Project, the highest average daily trips at an intersection would be approximately 228,500 at the Trautwein Road/Alessandro Boulevard intersection, which is below the daily traffic volumes that would be expected to generate CO exceedances as evaluated in the 2003 AQMP. This daily trip estimate is based on the average daily traffic rate conditions of the intersection. There is no reason unique to SCAB meteorology to conclude that the CO concentrations at the Trautwein Road/Alessandro Boulevard intersection would exceed the 1-hour CO standard if modeled in detail, based on the studies undertaken for the 2003 AQMP.

Health Risk Assessment

An HRA was prepared to evaluate the potential mobile source health risk impacts to sensitive receptors as a result of exposure to DPM as a result of heavy-duty diesel trucks accessing the site. The HRA is based on the methodologies prescribed in the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines – Guidance Manual for Preparation of Health Risk Assessments (OEHHA 2015). To implement the 2015 OEHHA Guidelines based on Project information, the estimated annual average ambient DPM concentrations at the nearest sensitive receptor were determined using American Meteorological Society/EPA Regulatory Model Improvement Committee Model; 5 years of local meteorological data obtained from the SCAQMD; and the estimated DPM emissions associated with on-site heavy duty truck idling, on-site circulation of heavy duty trucks, and heavy-duty trucks traveling on local roads up to the freeways. For a detailed description of emissions calculations and methodologies, the HRA report is included in Appendix D.

Cancer risk is defined as the increase in probability (chance) of an individual developing cancer due to exposure to a carcinogenic compound, typically expressed as the increased chances in one million. The cancer risk from exposure to a TAC is estimated by calculating the inhalation (and if applicable, ingestion or dermal) dose in units of milligrams/kilogram body weight per day based on a ambient concentration in units of micrograms per cubic meter ($\mu g/m^3$), age sensitivity factors, breathing rates, exposure period, fraction of time spent at home, and multiplying the dose by the inhalation cancer potency factor, expressed as (milligrams/kilogram body weight per day)-1. The SCAQMD *CEQA Air Quality Handbook* (1993) states that emissions of TACs are considered significant if an HRA shows an increased risk of greater than 10 in one million. Based on guidance from the SCAQMD in the document *Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel*

[5] The Metropolitan Transportation Authority measured traffic volumes and calculated the LOS for the intersection Wilshire Boulevard/Sepulveda Avenue, which is a block west along Wilshire Blvd., still east of Highway 405.

Idling Emissions for CEQA Air Quality Analysis (SCAQMD 2003), for purposes of this analysis, 10 in 1 million is used as the cancer risk threshold for the proposed Project.

The SCAQMD has also established non-carcinogenic risk parameters for use in HRAs. Non-carcinogenic risks are quantified by calculating a "hazard index" (HI), expressed as the ratio between the ambient pollutant concentration and its toxicity or reference exposure level. A reference exposure level is a concentration at or below which health effects are not likely to occur. A HI less than one (1.0) means that adverse health effects are not expected. Within this analysis, non-carcinogenic exposures of less than 1.0 are considered less than significant.

4.2.5 Impacts Analysis

Threshold AQ-1. Would the Project conflict with or obstruct implementation of the applicable air quality plan?

As discussed previously, the Project site is located within the SCAB under the jurisdiction of the SCAQMD, which is the local agency responsible for administration and enforcement of air quality regulations for the area. Construction and operation of the development proposed as part of the Project may result in the emission of additional short- and long-term criteria air pollutants in conflict with the SCAQMD AQMPs.

The SCAQMD has established criteria for determining consistency with the AQMP in Chapter 12, Sections 12.2 and 12.3 of the SCAQMD *CEQA Air Quality Handbook* (SCAQMD 1993). The criteria are:

- **Consistency Criterion No. 1**: The proposed project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay the timely attainment of air quality standards of the interim emissions reductions specified in the AQMP.
- **Consistency Criterion No. 2**: The proposed project will not exceed the assumptions in the AQMP or increments based on the year of project build-out phase.

Consistency Criterion No. 1

As discussed under Threshold AQ-2 below, the Project would result in a significant and unavoidable impact associated with the violation of an air quality standard. Because the Project could result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, the Project would conflict with Consistency Criterion No. 1 of the SCAQMD *CEQA Air Quality Handbook*. Construction of the Project would result in a **potentially significant** impact to air quality related to NOx and VOC only.

Consistency Criterion No. 2

While striving to achieve the NAAQS for O_3 and $PM_{2.5}$ through a variety of air quality control measures, the 2016 AQMP also accommodates planned growth in the SCAB. Projects are considered consistent with, and would not conflict with or obstruct implementation of, the AQMP if the growth in socioeconomic factors (e.g., population, employment) is consistent with the underlying regional plans used to develop the AQMP (per Consistency Criterion No. 2 of the SCAQMD *CEQA Air Quality Handbook)*. The future emissions forecasts are primarily based on demographic and economic growth projections provided by SCAG. Thus, demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2016 RTP/SCS were used to estimate future emissions in the 2016 AQMP (SCAQMD 2017).

The 2016 RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The 2016 RTP/SCS charts a course for closely integrating land use and transportation so that the region can grow smartly and sustainably. The 2016 RTP/SCS was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, nonprofit organizations, businesses, and local stakeholders within the Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. In June 2016, SCAG received its conformity determination from the Federal Highway Administration and the Federal Transit Administration indicating that all air quality conformity requirements for the 2016 RTP/SCS and associated 2015 Federal Transportation Improvement Program Consistency Amendment through Amendment 15-12 have been met (SCAG 2016). Consistency with the RTP/SCS would demonstrate consistency with SCAQMD's 2016 AQMP.

The Project lies entirely within Traffic Analysis Zone 43268200. The 2016 RTP/SCS projects that within Traffic Analysis Zone 43268200, there will be a total of 8,755 jobs by 2020 and 22,196 by 2045.[6] As of 2016, there are 4,531 jobs in the March JPA jurisdiction. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Adding jobs consistent with 2016 RTP/SCS projections supports SCAG's achievement of March Air Reserve Base emissions reductions targets.

The SCS also indicates that this is a jobs poor area so providing more jobs will actually reduce greenhouse gas emissions and reduce VMT as it will provide local jobs to achieve a more favorable

[6] Jobs data provided by March JPA.

jobs housing balance. The March JPA General Plan (March JPA 1999) discusses the need to create more jobs, including the following examples:

- March JPA has a stated goal of providing 38,000 jobs, through development of its Planning Area, to the western Riverside County area thereby creating a much-needed job center. The creation of a job center is important to reduce the existing jobs/housing imbalance that exists in this region such that it can help reduce traffic congestion, pollution, fossil fuel dependence and improve the overall quality of life for the residents of western Riverside County. (p. 1-11)
- March JPA has a mission to replace regional economic benefit that was lost with the realignment of the active duty March Air Force Base into a Reserve Base in April 1996. The quantified benefits are the creation of at least 38,000 jobs, and more that $500 million annual economic contribution to the Riverside County region. (p. 5-4)

The Project is expected to generate 1,132 jobs. This is approximately one-fourth of the projected job growth in Traffic Analysis Zone 43268300 in 2020 as compared to 2016, and approximately 6.4% of projected job growth in 2045 as compared to 2016. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Since the jobs created by the Project are within the job growth projections in the 2016 RTP/SCS, the Project would not conflict with the 2016 AQMP and, as such, would not jeopardize attainment of CAAQS and NAAQS in the area under the jurisdiction of the SCAQMD. Therefore, the Project is consistent with Consistency Criterion No. 2.Overall, since the Project would conflict with Consistency Criterion No. 1, impacts are considered **potentially significant** for Threshold AQ-1.

Threshold AQ-2. Would the Project result in a cumulatively considerable new increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?

In considering cumulative impacts from a project, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SCAB is designated as nonattainment for the CAAQS and NAAQS. If a project's emissions would exceed the SCAQMD significance thresholds, it would be considered to have a cumulatively considerable contribution to nonattainment status in the SCAB. If a project does not exceed thresholds and is determined to have less-than-significant project-specific impacts, it may still contribute to a significant cumulative impact on air quality. A project would be considered to have a significant cumulative impact, however, if the project's contribution accounts for a significant proportion of the cumulative total emissions (i.e., it represents a "cumulatively considerable contribution" to the cumulative air quality impact).

Construction and operation of the Project may result in emission of criteria air pollutants from mobile, area, and energy sources, which may cause exceedances of federal and state ambient air quality standards or contribute to existing nonattainment of ambient air quality standards. The

following discussion identifies potential short- and long-term construction impacts that would result from implementation of the Project. Feasible mitigation measures to reduce potential significant impacts, as appropriate, are proposed.

Construction Emissions

Construction of the Project would result in the addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials.

Table 4.2-7 presents the estimated maximum unmitigated and mitigated daily construction emissions generated during construction of the Project in each year. The values shown are the maximum summer or winter daily emissions (i.e., worst-case) results from CalEEMod. Details of the emission calculations are provided in Appendix C.

Table 4.2-7
Estimated Maximum Daily Construction Emissions (pounds/day)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Unmitigated Emissions[a]						
Year 2019	7.7	125.8	55.9	0.2	11.8	6.8
Year 2020	527.4	44.7	42.5	0.1	9.2	3.3
Maximum daily emissions	**527.4**	**125.8**	**55.9**	**0.2**	**11.8**	**6.8**
Pollutant threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold exceeded?	**Yes**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions[a,b]						
Year 2019	5.2	94.4	60.2	0.2	10.0	4.7
Year 2020	53.3	35.6	43.8	0.1	8.7	2.8
Maximum daily emissions	**53.3**	**94.4**	**60.2**	**0.2**	**10.0**	**4.7**
Pollutant threshold	*75*	*100*	*550*	*150*	*150*	*55*
Threshold exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Notes: VOC = volatile organic compounds; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns. See Appendix C for complete results.

[a] Emissions are based on Project-specific construction schedule, equipment list, and amount of hauling material. California Emissions Estimator Model (CalEEMod) defaults were used for off-road construction equipment horsepower and load factors and on-road construction emissions. The off-road emissions calculations assume that fugitive dust is controlled by watering two times daily, as required by South Coast Air Quality Management District (SCAQMD) Rule 403. The emissions analysis conservatively assumed a start year of 2019; therefore, emissions presented here reflect years 2019 and 2020.

[b] Mitigated emissions include implementation of MM-AQ-1, which requires all off-road diesel-powered construction equipment above 50 horsepower to meet the Tier 3 emission standards for non-road diesel engines promulgated by the U.S. Environmental Protection Agency (EPA) at a minimum, as well as requires 50% of all construction equipment to meet the EPA Tier 4 Final standards. Additionally, MM-AQ-2 requires Super Compliant architectural coatings with a VOC content less than 10 grams per liter VOC.

As shown in Table 4.2-7, in the unmitigated scenario, daily construction emissions would not exceed the SCAQMD significance thresholds for CO, SO_x, PM_{10}, or $PM_{2.5}$ during construction. Furthermore, construction-generated emissions would be temporary and would not represent a long-term source of criteria air pollutant emissions. In addition, the Project would be required to comply with SCAQMD Rule 403 to control dust emissions generated during grading activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering the active sites approximately two times daily, depending on weather conditions. As shown in Table 4.2-7, maximum unmitigated construction-generated VOC and NO_x emissions would exceed the SCAQMD's respective quantitative significance thresholds.

Operational Emissions

Following the completion of construction activities, the Project would generate VOC, NO_x, CO, SO_x, PM_{10}, and $PM_{2.5}$ emissions from mobile sources including vehicular traffic generated by delivery trucks and employee vehicles, stationary sources including area sources (consumer products, architectural coatings for maintenance, landscaping equipment), and energy sources (natural gas appliances, space, and water heating).

Table 4.2-8 presents the maximum daily area source emissions, energy source emissions, and vehicle source emissions for the Project operations.[7] The values shown are the maximum summer or winter daily emissions (i.e., worst-case) results from CalEEMod. Details of the emission calculations are provided in Appendix C.

Table 4.2-8
Estimated Maximum Daily Operational Emissions (pounds/day unmitigated)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Unmitigated Emissions[a]						
Area source emissions	16.3	<0.1	0.1	<0.1	<0.1	<0.1
Energy source emissions	<0.1	0.4	0.3	<0.1	<0.1	<0.1
Mobile source emissions[b]	26.3	252	237	1.3	100	30.3
Combined total emissions	**42.7**	**253**	**238**	**1.4**	**100**	**30.3**
Pollutant threshold	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded?	**No**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions[a,c]						
Area source emissions	14.7	<0.1	0.1	<0.1	<0.1	<0.1
Energy source emissions	<0.1	0.4	0.3	<0.1	<0.1	<0.1
Mobile source emissions[b]	26.3	252	237	1.3	100	30.3

[7] The CalEEMod analysis assumed operation in year 2020, which is a conservative assumption for the operational emissions analysis since the CalEEMod model has decreasing emission factors for later years.

Table 4.2-8
Estimated Maximum Daily Operational Emissions (pounds/day unmitigated)

	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Combined total emissions	**41.0**	**253**	**238**	**1.4**	**100**	**30.3**
Pollutant threshold	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded?	**No**	**Yes**	**No**	**No**	**No**	**No**

Note: VOC = volatile organic compound; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns.
See Appendix C for detailed results.

[a] Emissions were estimated using methodology consistent with California Emissions Estimator Model (CalEEMod) 2016.3.2.

[b] on-road vehicle emissions were estimated using EMFAC2017 for calendar year 2020. Vehicle trip rates for each land use type were obtained from the Project-specific Traffic Impact Analysis. Additionally, a Project-specific fleet mix was calculated for the unrefrigerated warehouse land use types based on the Traffic Impact Analysis.

[c] Mitigated architectural coating emissions include the utilization of Super Compliant coatings with a VOC content less than 10 grams per liter VOC.

As shown in Table 4.2-8, in the unmitigated scenario, the combined daily area, energy, and vehicular source emissions would not exceed the SCAQMD operational thresholds for VOC, CO, SO_x, PM_{10}, or $PM_{2.5}$. However, Project emissions would exceed the SCAQMD operational thresholds for NO_x which is attributed to the vehicular source emissions from trucks traveling to and from the Project site.

The SCAB has been designated as federal nonattainment area for O_3 and $PM_{2.5}$ and a state nonattainment area for O_3, PM_{10} and $PM_{2.5}$ emissions. The nonattainment status is the result of cumulative emissions from all sources of these air pollutants and their precursors within the SCAB. As discussed above, the NO_x and VOC emissions during Project construction would be above the significance threshold without mitigation.

Cumulative localized impacts would potentially occur if a construction project were to occur concurrently with another off-site project. Construction schedules for potential future projects within 1,000 feet of the Project site are currently unknown; therefore, potential construction impacts associated with two or more simultaneous projects would be considered speculative. However, future projects would be subject to CEQA and would require air quality analysis and, where necessary, mitigation if the project would exceed SCAQMD thresholds. The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145). This analysis is nonetheless provided in an effort to show good faith analysis and comply with CEQA's information disclosure requirements.

The construction of the Project would generate VOC and NO_x emissions (which are precursors to O_3) that would exceed SCAQMD's emission-based significance threshold. Thus, the Project would have a cumulatively considerable increase in emissions due to construction prior to mitigation. Therefore, construction of the Project would contribute to the SCAB's O_3 nonattainment designation, and impacts would be **potentially significant**.

As detailed in Impact AQ-2, operational emissions generated by the Project would not result in a significant impact regarding VOC, CO, SO_x, PM_{10}, or $PM_{2.5}$; however, Project emissions would exceed the SCAQMD operational threshold for NO_x (precursors to O_3). As described above, if a Project's emissions exceed the SCAQMD significance thresholds for a pollutant or a precursor to a pollutant the SCAB is in nonattainment of under the CAAQS and/or NAAQS, it would have a cumulatively considerable contribution to the SCAB's nonattainment status of that pollutant. Therefore, operation of the Project would contribute to the SCAB's O_3 nonattainment designation, and impacts would be **potentially significant**.

Threshold AQ-3. Would the Project expose sensitive receptors to substantial pollutant concentrations?

Localized Significance Thresholds Analysis

Sensitive receptors are those more susceptible to the effects of air pollution than are the population at large. People most likely to be affected by air pollution include children, the elderly, and people with cardiovascular and chronic respiratory diseases. According to the SCAQMD, sensitive receptors include residences, schools, playgrounds, childcare centers, long-term healthcare facilities, rehabilitation centers, convalescent centers, and retirement homes (SCAQMD 1993). The closest off-site sensitive receptors to the Project site is March Air Reserve Base located approximately 30 meters south from the Project boundary, as shown in Figure 4.2-1, Location of Sensitive Receptors, and as depicted in Appendix C.

Table 4.2-9 presents the estimated maximum on-site unmitigated and mitigated daily construction emissions generated during construction of the Project in each year and compares the emissions to the applicable LSTs. The construction emissions are based on conservative assumptions to represent the maximum level of construction activity that may occur on the Project site on a given day. Details of the emission calculations are provided in Appendix C.

Table 4.2-9
Comparison of Project On-Site Construction Emissions to Localized Significance Thresholds (pounds/day)

	NO_x	CO	PM_{10}	$PM_{2.5}$
Unmitigated On-Site Emissions[a]				
Year 2019	82.6	47.2	10.5	6.4
Year 2020	19.5	14.7	1.0	0.9
Mitigated On-Site Emissions[a,b]				
Year 2019	27.7	50.1	8.0	4.3
Year 2020	10.4	17.3	0.5	0.5

Table 4.2-9
Comparison of Project On-Site Construction Emissions to Localized Significance Thresholds (pounds/day)

	NO_x	CO	PM_{10}	$PM_{2.5}$
Comparison to SCAQMD LSTs[c]				
Allowable Emissions	*270*	*1,577*	*13*	*8*
Threshold exceeded?	**No**	**No**	**No**	**No**
Comparison to 1-hour NO_2 NAAQS[d]				
Allowable Emissions	*150*	—	—	—
Threshold exceeded?	**No**	—	—	—

Notes: NO_x = oxides of nitrogen; CO = carbon monoxide; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold; NO_2 = nitrogen dioxide; NAAQS = National Ambient Air Quality Standards; — = no threshold available.
See Appendix C for complete results.

[a] Emissions estimated using methodology consistent with California Emissions Estimator Model (CalEEMod) 2016.3.2. Only on-site emissions are compared with the LST mass rate table. The off-road emissions calculations assume that fugitive dust is controlled by watering two times daily, as required by SCAQMD Rule 403. The emissions analysis conservatively assumed a start year of 2019; therefore emissions presented here reflect years 2019 and 2020.

[b] Mitigated emissions include implementation of MM-AQ-1, which requires all off-road diesel-powered construction equipment above 50 horsepower to meet the Tier 3 emission standards for non-road diesel engines promulgated by the U.S. Environmental Protection Agency (EPA) at a minimum, as well as requires 50% of all construction equipment to meet the EPA Tier 4 Final standards. Mitigated emissions also include implementation of MM-AQ-2, which requires the utilization of Super Compliant coatings with a volatile organic compound (VOC) content less than 10 grams per liter.

[c] Using the SCAQMD LSTs, 'Allowable Emissions' are the maximum emissions that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. Metropolitan Riverside County LSTs shown are for a 5-acre site at a 25 meter distance, and are assumed to be conservative thresholds for larger project sites.

[d] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD significance threshold has not been updated to reflect this standard. Calculated by scaling the Metropolitan Riverside County NO_2 LST for a 5-acre site at a 25-meter distance by the ratio of the 1-hour NO_2 standards (federal/state).

As shown in Table 4.2-9, construction of the Project is not anticipated to result in an exceedance of the interpolated SCAQMD LSTs or of the approximated LST for the 1-hour NO_2 NAAQS. Localized ambient air quality impacts would be **less than significant**. Since the analysis shows that on-site construction emissions are below the mass-rate LSTs, further air dispersion modeling was not required.

Table 4.2-10 presents the estimated maximum Project on-site operational emissions and compares the emissions to the applicable interpolated LSTs. This analysis conservatively estimated on-site mobile emissions assuming a 0.6-mile one-way trip length. Details of the emission calculations are provided in Appendix C.

Table 4.2-10
Comparison of Project On-Site Operational Emissions to Localized Significance Thresholds (pounds/day)

	NO_x	CO	PM_{10}	$PM_{2.5}$
Maximum On-Site Operational Emissions[a]				
Year 2020	9	13	2.8	0.8
Comparison to SCAQMD LSTs[b]				
Allowable Emissions	*270*	*1,577*	*4*	*2*
Threshold exceeded?	**No**	**No**	**No**	**No**
Comparison to 1-hour NO_2 NAAQS[c]				
Allowable Emissions	*150*	—	—	—
Threshold exceeded?	**No**	—	—	—

Notes: NO_x = oxides of nitrogen; CO = carbon monoxide; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; SCAQMD = South Coast Air Quality Management District; LST = localized significance threshold; NO_2 = nitrogen dioxide; NAAQS = National Ambient Air Quality Standards; — = no threshold available.
See Appendix C for complete results.

[a] Project emissions include on-site area, energy, and mobile source emissions for calendar year 2020. Area source and energy emissions were estimated using California Emissions Estimator Model (CalEEMod) 2016.3.2. Mobile source emissions were calculated using EMFAC2017. On-site mobile emissions were estimated using a one-way trip length of 0.6 miles. The operational schedule shown here is one year later than that analyzed in the CalEEMod analysis. This is a conservative assumption for the operational emissions analysis since the CalEEMod model has decreasing emission factors for later years.

[b] Using the SCAQMD LSTs, 'Allowable Emissions' are the maximum emissions that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. Metropolitan Riverside County LSTs shown are for a 5-acre site at a 25-meter distance, and are assumed to be conservative thresholds for larger project sites.

[c] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD significance threshold has not been updated to reflect this standard. Calculated by scaling the Metropolitan Riverside County NO_2 LST for a 5-acre site at a 25-meter distance, by the ratio of the 1-hour NO_2 standards (federal/state).

As shown in Table 4.2-10, operation of the Project is not anticipated to result in an exceedance of the interpolated SCAQMD LSTs or of the approximated LST for the 1-hour NO_2 NAAQS. Localized ambient air quality impacts would be **less than significant**. Since the screening analysis shows that on-site operational emissions are below the mass-rate LSTs, further air dispersion modeling was not required.

Carbon Monoxide Hotspots

Based on the comparative analysis presented in Appendix C and summarized below, a quantitative CO hotspots analysis was not needed to determine whether the change in the LOS of an intersection by the Project would have the potential to result in exceedances of the CAAQS or NAAQS. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 AQMP and the 1992 CO Plan. As discussed in Appendix C, peak CO concentrations in the SCAB are due to unusual meteorological and topographical considerations, and not due to the impact of particular intersections. Considering the region's unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of the 1992 CO Plan and subsequent plan updates and AQMPs.

Appendix C includes a comparison of CO hotspot analysis included in the 1992 CO Plan, which assessed CO concentrations for four busy intersections in Los Angeles at the peak morning and afternoon time periods, to intersections affected by Project traffic volumes. The busiest intersection evaluated in the 1992 CO Plan was Wilshire Boulevard/Veteran Avenue, which had a daily traffic volume of about 100,000 vehicles per day and did not result in a CO standard violation. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm, which indicates that the most stringent 1-hour CO standard (20.0 ppm) would likely not be exceeded until the daily traffic at the intersection exceeded more than 400,000 vehicles per day, based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm). At buildout of the Project, the highest average daily trips at an intersection would be approximately 228,500 at the Trautwein Road/Alessandro Boulevard intersection, which is below the daily traffic volumes that would be expected to generate CO exceedances as evaluated in the 2003 AQMP. This daily trip estimate is based on the average daily traffic rate conditions of the intersection. Even at this level of traffic and including the SCAQMD projected background concentrations of CO in 2020 at the Rubidoux monitoring station (5.1 ppm), the standard would not be exceeded. There is no reason unique to SCAB meteorology to conclude that the CO concentrations at the Trautwein Road/Alessandro Boulevard intersection would exceed the 1-hour CO standard if modeled in detail, based on the studies undertaken for the 2003 AQMP. Based on the above considerations, localized CO impacts would be **less than significant**.

Health Risk Assessment

According to CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB 2005b), living close to distribution centers or warehouse facilities may lead to adverse health effects beyond those associated with regional air pollution in urban areas. The activities associated with delivering, storing, and loading freight produces DPM emissions. In addition to on-site emissions, truck exhaust from travel in and out of distribution centers contributes to the local pollution impact. DPM has been identified as a TAC and represents 70% of the known potential cancer risk from air toxics in California. DPM is an important contributor to particulate matter air pollution. CARB and SCAQMD analyses indicate that providing a separation of 1,000 feet would substantially reduce DPM concentrations and public exposure downwind of a distribution center. Therefore, CARB recommends a separation of 1,000 feet based on the combination of risk analysis done for Transportation Refrigeration Units and the decrease in exposure predicted within SCAQMD modeling (CARB 2005b).

In order to evaluate health impacts to off-site receptors, the geographic scope of this assessment was extended to a one-quarter mile radius or 1,320 feet from the modeled Project sources. The HRA is consistent with OEHHA guidance (OEHHA 2015), where risks were estimated at the location of the maximally exposed individual resident (MEIR) and included evaluation of the maximally exposed individual sensitive receptor (MEISR). The MEIR and MEISR are defined as the off-site

receptor locations where residents and other sensitive individuals may reside or be present, respectively, with the potential highest cancer risk or chronic HI. Additionally, the 2015 OEHHA guidance includes an exposure duration of 30 years for the residences, as well as applicable age sensitivity factors and daily breathing rates. A detailed description of the 2015 OEHHA guideline assumptions is included in Appendix C.

In summary, the incremental increase in lifetime cancer risk and chronic HI for a resident at the off-site location due to operational emissions would be 1.3 in a million and 0.004, respectively, which would not exceed the applicable SCAQMD cancer and non-cancer risk thresholds. For this analysis, the MEIR was identified as a sensitive receptor and thus determined to be the MEISR.[8] Health risk impacts associated with long-term operations of the Project would be **less than significant**. While DPM emissions will also be emitted during Project construction, the short-term duration of the Project construction and the lower level of on-site construction DPM emissions compared to operational emissions suggests that it is unlikely for construction emissions to substantially change the findings and results reported for the operational emissions.

Threshold AQ-4. Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source, the wind speeds and direction, and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public, and generate citizen complaints. Odor impacts associated with Project construction and operations are discussed below.

Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the Project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people. Therefore, impacts associated with odors during construction would be considered **less than significant**.

According to the SCAQMD, land uses and industrial operations typically associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The Project does not include any uses identified by the SCAQMD as commonly associated with odors. Therefore, Project operations would result in an odor impact that would be **less than significant**.

[8] The MEIR may also be considered the MEISR if the health risk values at the MEIR are the maximum of off-site receptors.

4.2.6 Mitigation Measures

CEQA Guidelines Section 15126.4 requires EIRs to describe feasible measures that can minimize significant adverse impacts. The following mitigation measures have been evaluated for feasibility and are incorporated in order to reduce potentially significant impacts related to criteria air pollutant emissions. These mitigation measures were quantified: **MM-AQ-1** and **MM-AQ-2**. All others were conservatively not quantified.

MM-AQ-1 **Construction Equipment Emissions Standards.** During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the U.S. Environmental Protection Agency (EPA). In addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment.

MM-AQ-2 **Low-VOC Architectural Coatings.** The construction contractor shall be required to utilize Super-Compliant volatile organic compound (VOC) interior and exterior paints, which are defined by the South Coast Air Quality Management District (SCAQMD) as meeting the "super-compliant" VOC standard of 10 grams per liter, during construction and long-term operations (SCAQMD n.d.b).

MM-AQ-3 **Construction Relations Officer.** The Project will provide a construction relations officer to act as a community liaison to oversee on-site construction activity and all emissions and congestion related matters. A phone number and email contact information for the construction relations officer shall be posted on signage at construction site entrance points.

MM-AQ-4 **Improved Energy Efficiency and Water Reduction.** The Project applicant shall incorporate the following measures into the Project design:

- The Project will install approximately 4.5 megawatts of solar photovoltaic electricity generation.
- The Project will install Energy Star certified light bulb and lighting fixtures.
- The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation as required by 2016 Title 24 and consistent with the Riverside County Climate Action Plan criteria.
- Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof,

defined as Cool Roof Rating Council (CRRC) Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of heating, ventilation, and air conditioning equipment with a Seasonal Energy Efficiency Ratio (SEER) of 14 or higher; Installation of water heaters with an energy factor of 0.92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project.

- The Project will provide electrical outlets at building exterior areas.
- The Project landscape non-potable water system will meet "purple" pipe standards.
- The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers.
- The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle charging stations and fifty-four off-site electric vehicle charging stations.

MM-AQ-5 **Commute Trip Reduction .** The Project applicant shall incorporate the following measures in order to encourage alternative modes of transportation and reduce commute trips.

- Five percent (5%) of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools.
- Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet of office space may pursue video conferencing as feasible.
- The Project will provide short- and long-term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces).
- The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).
- Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Each

tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will consider the provision of an ATM as feasible.

MM-AQ-6 **Truck Requirements.** In order to minimize on-road mobile source criteria air pollutant emissions, March Joint Powers Authority (JPA) shall require the following measures for the Project.

- For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks. The March JPA will require evidence of compliance prior to issuance of a certificate of occupancy for any warehouse use.

4.2.7 Level of Significance After Mitigation

With implementation of Mitigation measures **MM-AQ-1** and **MM-AQ-2** during Project construction, NO_x and VOC emissions would be reduced to a level that is **less than significant**. Project emissions would exceed the SCAQMD operational thresholds for NO_x which is attributed to the vehicular source emissions from trucks traveling to and from the Project site. **MM-AQ-4** would apply to energy and water use reductions, which are primarily sources of greenhouse gases and minimal sources of criteria air pollutants and, therefore, not quantified herein. **MM-AQ-5**[9] and **MM-AQ-6**[10] would be required to reduce mobile source emissions; however, due to the lack of clarity on the quantity of reductions associated with these mitigation measures these measures are conservatively not quantified for this analysis (Appendix C). While CAPCOA guidance provides some guidance to estimate reductions for commute trips, the information is in the form of a range of potential reductions, and it is reasonable to conservatively not include a specific reduction relative to MM-AQ-5. Therefore, impacts would be considered **significant and unavoidable** for Project operational emissions. The Project operations would conflict with Consistency Criterion No. 1 of the SCAQMD *CEQA Air Quality Handbook*, therefore the impact remains **significant and unavoidable** impact. Also, since the SCAQMD considers an impact cumulatively considerable contribution to nonattainment status in the SCAB if a project's emissions would exceed the SCAQMD significance thresholds, the Project would also have a cumulatively considerable **significant and unavoidable** impact to air quality after mitigation.

[9] While CAPCOA guidance provides some guidance to estimate reductions for commute trips, the information is in the form of a range of potential reductions, and it is reasonable to conservatively not include a specific reduction relative to MM-AQ-5.

[10] MM-AQ-6 will allow and encourage SmartWay trucks to use the K4 warehouse. SmartWay trucks have improved efficiency over non-SmartWay trucks. However, it is reasonable to conservatively not quantify the benefit of MM-AQ-6 due to minimal information available to estimate emission reductions if such trucks are incorporated into the fleet.

Project Health Impacts

While EIRs have long evaluated the health impacts of air toxic pollutants, such as diesel particulate matter, EIRs have not historically evaluated the specific health impacts of the increase in criteria pollutants[11] other than to note the general effect of criteria air pollutants on health without tying those general impacts to the project. This analysis estimates the health impacts of criteria pollutants, specifically those that are evaluated by the USEPA in rulemaking: NO_X, VOC, O_3, $PM_{2.5}$, and SO_X. However, the Project only exceeded the SCAQMD significance thresholds for NO_X emissions during operation.

In order to estimate the health impacts of criteria pollutants from the Project, a photochemical grid model (PGM), Comprehensive Air-quality Model with extensions (CAMx),[12] was utilized to estimate the small increases in concentrations of O_3 and $PM_{2.5}$ in the region as a result of the emissions of criteria pollutants from the Project. The Benefits Mapping and Analysis Program (BenMAP) (EPA 2018b) was then applied to estimate the resulting health impacts from the small increases in concentration.

The first step in the process is to run the PGM with appropriate information to assess the small increases in ambient air concentrations that the Project may cause. PGMs require a database of information including the spatial allocation of emissions in the area to be modeled. This includes both baseline emissions and Project mitigated emissions. The latest publicly available PGM database for Southern California, which contains baseline emissions, was developed by the SCAQMD in support of the 2016 AQMP (SCAQMD 2017) and was adapted for this analysis. This PGM database is tailored for Southern California using California-specific input tools (e.g., the EMFAC (CARB 2018) mobile source emissions model) and uses a high-resolution 4-km horizontal grid to better simulate meteorology and air quality in the complex terrain and coastal environment of California.

EPA's air quality modeling guidelines (Appendix W of 40 CFR) and O_3 and $PM_{2.5}$ modeling guidance (EPA 2018c) recommends using a PGM to estimate O_3 and secondary $PM_{2.5}$ concentrations. EPA's modeling guidance does not recommend specific PGMs but provides procedures for determining an appropriate PGM on a case-by-case basis. EPA's air quality modeling guidelines and guidance notes that both the CAMx and the Community Multiscale Air Quality (CMAQ) PGMs have been used extensively in the past and would be acceptable PGMs.

[11] Criteria pollutants are those pollutants with an air pollution standard or pollutants which are precursors to those with a standard. Pollutants with an air pollution standard include nitrogen dioxide, sulfur dioxide, ozone, carbon monoxide, particulate matter smaller than 2.5 microns and 10 microns and ozone. Precursor pollutants to criteria pollutants include oxides of nitrogen, oxides of sulfur, and volatile organic chemicals.

[12] Comprehensive Air Quality Model with Extensions.

EPA has prepared a Memorandum documenting the suitability for using CAMx and CMAQ for O_3 and secondary $PM_{2.5}$ modeling of single-sources or group of sources (EPA 2017).

To estimate the potential air quality health impacts, the Project's emissions were added to the CAMx 4-km annual PGM modeling database. Operational emissions from the Project were estimated as described in the Section 4.2.5, Impacts Analysis, and Appendix C. For use in PGMs, each Project emissions source must be spatially distributed across the modeling grid cells so that they can be incorporated into the gridded emission inventory. The total mitigated emission inventory for the Project was used in the analysis. This includes area, energy and mobile source emissions. The energy and area source emissions are located on site and were therefore allocated to the grid cell representing the Project. The mobile source category includes both passenger vehicles and trucks, with the majority of the emissions resulting from truck traffic serving the site. The mobile sources are spatially distributed in the site's grid cell and other grid cells representing travel routes consistent with the Traffic Impact Analysis. Annual emission estimates were spatially gridded, temporally allocated, and chemically speciated to be used for photochemical grid modelling using the Sparse Matrix Operating Kernel Emissions (SMOKE) emissions modelling system supported by the USEPA.

The SCAQMD 2016 AQMP modeling database for Southern California was used for this Project. The Southern California 4-km CAMx modeling databases is based on a 2012 base meteorological year and includes future year emission scenarios. The 2023 future year projections were used for this analysis. The Project's emissions were tagged for treatment by the source apportionment tools in CAMx to obtain the incremental O_3 and $PM_{2.5}$ concentration impacts due to the Project's emissions.

EPA's BenMAP (EPA 2018b) program was used to estimate the health impacts of the Project's contribution to O_3 and $PM_{2.5}$ concentration produced by the CAMx source apportionment modeling. BenMAP uses the concentration estimates along with population and health effect concentration-response (C-R) functions to estimate various health effects of the concentration increases. BenMAP has a wide history of applications by EPA and others, including for local-scale analysis (EPA n.d.) as needed for assessing the health impacts of a Project's emissions. The health effects that we used for $PM_{2.5}$ include mortality (all causes), hospital admissions (respiratory, asthma, cardiovascular), emergency room visits (asthma), and acute myocardial infarction (non-fatal). For O_3, the endpoints are mortality, emergency room visits (respiratory) and hospital admissions (respiratory).

$PM_{2.5}$-related health outcomes included less than one additional incidence of asthma-related emergency room visits, asthma-related hospital admissions, all cardiovascular-related hospital admissions (not including myocardial infarctions), all respiratory-related hospital admissions, mortality, and nonfatal acute myocardial infarction. O_3-related health outcomes included less than one additional incidence of all respiratory-related hospital admissions, mortality, and asthma-

related emergency room visits for any age range. For all these health endpoints, the number of estimated incidences is less than 0.0042% of the baseline number of incidences. The "baseline incidence" is the actual incidence of health effects as measured in the local population in the absence of additional emissions from the Project.

There is a degree of uncertainty in these results from a combination of the uncertainty of the increase in concentration resulting from the PGM and the uncertainty of the application of the C-R increase. All simulations of physical processes, whether ambient air concentrations, or health impacts from air pollution, have a level of uncertainty associated with them, due to simplifying assumptions. The overall uncertainty is a combination of the uncertainty associated with each piece of the modeling study, in this case, the PGM, and BenMAP. While these results reflect a level of uncertainty, regulatory agencies, including the USEPA have judged that, even with the uncertainty in the results, the results provide sufficient information to the public to allow them to understand the health effects of increases or decreases in air pollution. In addition, the health impacts estimation using this method presumes that impacts seen at large concentration differences can be linearly scaled down to small increases in concentration. This methodology of linearly scaling impacts is broadly accepted for use in regulatory evaluations and is considered as being health protective (EPA 2010). These health impacts are conservatively estimated, and the actual impacts may be zero.

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4.3 BIOLOGICAL RESOURCES

This section provides an analysis of the potential impacts to biological resources from the implementation of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). The following discussion and analysis is based on information presented in the biological technical report, *K4 Warehouse and Cactus Channel Improvements Project Biological Resources Report* (Appendix E), and the jurisdictional delineation, *K4 Warehouse and Cactus Channel Improvements Project Jurisdictional Delineation Report* (Appendix F), prepared by Rocks Biological Consulting for the proposed Project. This section analyzes the potential adverse impacts to special-status biological resources defined as follows: (1) species that have been given special recognition by federal, state, or local resource agencies and environmental organizations due to limited, declining, or threatened population sizes; (2) species and habitat types recognized by local and regional resource agencies as special-status; (3) habitat areas or vegetation communities that are unique, are of relatively limited distribution, or are of particular value to wildlife; (4) wildlife corridors and habitat linkages; and (5) U.S. Army Corps of Engineers (ACOE) jurisdictional waters of the United States (including wetlands), California Department of Fish Wildlife (CDFW) jurisdictional streams, and waters of the state subject to the permitting authority of the Los Angeles Regional Water Quality Control Board (RWQCB). Regulated biological resources may or may not be considered special-status, but are regulated under local, state, and/or federal laws.

As discussed in Chapter 2, Project Description, of the Environmental Impact Report (EIR), Meridian Park K4 LLC is proposing the development of an approximately 718,000-square-foot industrial warehouse with 289 automobile parking stalls and 317 truck trailer parking stalls on the K4 Parcel and the conversion of the existing Cactus Avenue Drainage Channel (Cactus Channel)) from an open-air earthen channel into an underground concrete culvert for approximately 7,900 linear feet between Elsworth Street on the west and Heacock Street and Heacock Channel on the east on the Cactus Channel improvements site. The K4 Parcel is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a current land use designation of Business Park within the existing March Joint Powers Authority (JPA) General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.

- **Plot Plan:** A Plot Plan approval is requested to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailed parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into one 35.4-acre K4 Parcel.

4.3.1 Existing Conditions

Project Description

The approximately 42.4-acre Project site includes the 35.4-acre K4 Parcel and 7.0-acre Cactus Channel improvements site; thus, the term "Project site" in this section includes both the "K4 Parcel" and "Cactus Channel improvements site" defined further below.

K4 Parcel

The proposed Project includes development of a 718,000-square-foot building equipped with 105 loading docks, 289 automobile parking stalls, 317 truck trailer parking stalls, and new driveways on the approximate 35.4-acre K4 Parcel. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. These new access driveways are proposed to cross Cactus Channel and are necessary to provide ingress/egress to the proposed K4 Warehouse site; thus, is included in the K4 Parcel.

Cactus Channel Improvements

The Project also includes converting an existing open-air drainage channel (Cactus Channel) on the south side of Cactus Avenue into a box culvert and would include implementing regional improvements to the Cactus Channel drainage ditch. This portion of the Project is referred to as the "Cactus Channel Improvements Site" in this section.

Project Location

The approximately 35.4-acre K4 Parcel is located north of March Air Reserve Base (ARB), south of Cactus Avenue, and extends east-to-west from the Veterans Way and Cactus Avenue intersection to Chanute Avenue. The approximately 7.0-acre Cactus Channel improvements site runs along the south side of Cactus Avenue (north of the 35.4-acre K4 Parcel), east of Elsworth Street and west of Heacock Street and Heacock Channel. Interstate (I) 215 is located approximately 0.8 miles west of the Project site. The Project site is located within the March JPA jurisdiction in unincorporated Riverside County, California and is comprised of five parcels designated as Assessor's Parcel Numbers 2971-500-068, 2971-500-079, 2971-500-387, 2971-600-058, and 2972-000-040 (Figure 2-1, Project Location).

Access to the Project is from Cactus Avenue to the north, where the new access driveways are proposed to be constructed across Cactus Channel.

Physical Setting and Land Uses

The site is a relatively flat parcel that supports several upland vegetation communities, primarily dominated by goldenbush scrub/non-native grassland and developed/disturbed land. Surrounding land uses include industrial and commercial development, residential development, and military development. The Project site is within the jurisdiction of March JPA, but outside of (adjacent to) the Meridian Specific Plan area. Therefore, the Project requires separate land use approvals. Reuse of the March ARB, including the Project site, was planned under the March JPA General Plan (March JPA 1999a). The March JPA General Plan and Master EIR were prepared and adopted/certified in 1999 for the JPA Planning area (March JPA 1999b; SCH No. 97071095). Additionally, the Project occurs within the 'Northeast Planning Subarea' area identified for future development within the "Disposal and Reuse of March Air Force Base" Project (U.S. Air Force 1996).

The proposed improvements to the Cactus Channel are being proposed by and for the District as part of the District's Master Plan; and thus, is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the District and it would either be constructed contemporaneously with the Project or built separately depending on permitting and timing. The Cactus Channel would function as part of the District's Master Plan, and these agencies are party to the Western Riverside County (WRC) Multiple Species Habitat Conservation Plan (MSHCP). Thus, improvements to the Cactus Channel may require compliance with the MSHCP. Currently it is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale.

Background

The Project was part of the larger 'Disposal and Reuse of March Air Force Base' and occurs within the 'Northeast Planning Subarea' area identified for future development under that process. Reuse of the entire base was planned under the *March AFB Master Reuse Plan*, and that document served as the basis for the *March Joint Powers Authority (JPA) General Plan* (March JPA 1999a). Environmental review of the general plan was performed in 1999 under the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA 1999b; SCH No. 97071095).

As part of that process, a Section 7 Consultation with the U.S. Fish and Wildlife Service (USFWS) was pursued for Stephens' kangaroo rat (SKR) (*Dipodomys stephensi*), least Bell's vireo (*Vireo bellii pusillus*), mountain plover (*Charadrius montanus*), coastal California gnatcatcher (*Polioptila californica californica*), Quino checkerspot butterfly (*Euphydryas editha quino*), southwestern willow flycatcher (*Empidonax traillii extimus*), and Riverside fairy shrimp (*Streptocephalus woottoni*).

Through formal Section 7 Consultation (Biological Opinion (BO) 1-6-99-F-13), USFWS concurred that the proposed action was not likely to adversely affect coastal California gnatcatcher, Quino checkerspot butterfly, southwestern willow flycatcher, Riverside fairy shrimp, and mountain plover, and any future effects to these species would need to be addressed through separate Section 7 Consultation. Additionally, the Section 7 BO 1-6-99-F-13 addressed effects on SKR and least Bell's vireo within occupied areas located west of I-215 within the West March Planning subarea. No occupied SKR habitat or occupied least Bell's vireo habitat was identified east of I-215 (USFWS 1999; March JPA 1999b).

The Long-Term SKR Habitat Conservation Plan (HCP), adopted in 1996, designated portions of the March Air Force Base as the Sycamore Canyon-March Air Force Base Core Reserve, which is located outside of the Project site (west of I-215). Core Reserves were designated to be managed for the conservancy and recovery of SKR. However, in accordance with Section 5(C)(1)(e) of the Long-Term SKR HCP, SKR Management Areas and open space areas are allowed to be sold or traded to secure other habitat that support similar biological function and value as the core reserve areas designated in the SKR HCP. Thus, BO 1-6-99-F-13 outlined conservation measures to minimize effects to SKR, including the consideration of suitable trade criteria for the proposed development areas that would affect the function and value of the Sycamore Canyon-March Air Force Base Core Reserve area. As such, the USFWS supported the release of 1,178 acres of SKR Management Area/March Air Force Base West Campus for development as long as suitable replacement habitat with similar biological value compared with the area to be traded was exchanged. Additionally, the California Department of Fish and Game[1] (CDFG) issued a consistency determination to BO 1-6-99-F-13 on January 12, 2000, pursuant to the California Endangered Species Act (CESA).

Both the USFWS and CDFG authorized the acquisition and conservation of the Potrero site in exchange for the former 1,178-acre March Air Force Base (now March ARB) SKR Management Area. The Potrero site was determined to better address the "overall conservation needs of the SKR," and would meet the completion needs of the SKR Core Reserves expansion as required by the SKR HCP. Thus, USFWS and CDFG authorized the release of the 1,178-acre SKR Management Area of the former March Air Force Base for development. This was provided in a series of three letters written by USFWS and cosigned by CDFG (also referred to as a joint wildlife agency letter) dated December 29, 2003 (FWS-WRIV-883.2), October 29, 2004, and May 22, 2006 (FWS/CDFG-WRIV-3259.5).

As a result of the release of the 1,178-acre SKR Management Area for development, the Center for Biological Diversity and the San Bernardino Valley Audubon Society jointly filed a lawsuit

[1] As of January 2013, the CDFG changed its name to the California Department of Fish and Wildlife (CDFW). Where referring to documents/guidance published before the official name change, CDFG is used in this document; for all references after 2012, CDFW is used.

against the USFWS and the Secretary of the Interior in 2009 for failure to prepare a new BO under the federal Endangered Species Act (FESA), failure to conduct environmental analysis under National Environmental Policy Act, and a failure to properly amend the SKR HCP. Ultimately these parties, March JPA and LNR Riverside LLC through a Cy Pres motion, entered into a Settlement Agreement (*Center for Biological Diversity v. Jim Bartel, et al.* 2012), dated September 12, 2012. Pursuant to the Settlement Agreement, specific areas in the March SKR Management Area/March Air Force Base West Campus were set aside as permanent open space and other areas were identified as developable areas. As such, 649 acres of the former March SKR Management Area lands were re-instated as SKR management area (i.e., lands to the west and south of the Project site) and SKR restriction were removed from the 'West Campus' Project site lands. Additionally, 15 acres of the former March SKR Management Area lands resulted in the establishment of Water Quality Open Space Area for least Bell's vireo conservation. The BO (1-6-99-F-13) and subsequent Settlement Agreement have been incorporated into this EIR, where applicable, as many of the habitats that were set aside as permanent open space provide suitable habitat with higher function and value compared with similar habitats within the Project site.

The Project also occurs within the WRC MSHCP plan area. The WRC MSHCP is a comprehensive, multijurisdictional HCP focusing on conservation of species and their associated habitats in WRC. The MSHCP is one of several large, multijurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The goal of such regional biological planning efforts is to preserve sufficient contiguous blocks of native habitats, such that special-status species are also conserved. The March JPA is the lead agency for the Project and is not a signatory to the MSHCP. As such, the Project is not subject to MSHCP regulations nor does it receive take authority granted under the MSHCP. However, if proposed Project implementation is anticipated to impact (would have a take) Covered Species addressed within the MSHCP, the March JPA may choose to participate in the MSHCP. Additionally, the Cactus Channel improvements are being permitted by the Riverside County Flood Control District and Water Conservation District (District) and would function as part of the District's Master Plan. Since the District is party to the MSHCP, improvements to the Cactus Channel may require compliance with the MSHCP. In either case, the Project mitigation will be pursued in a manner consistent with the MSHCP, further offsetting potential minor impacts on special-status species that could occur with Project implementation.

Biological Resources Surveys

RBC biologists conducted vegetation mapping, a habitat assessment, general biological surveys, a preliminary jurisdictional wetland/waters delineation, and summer special-status plant surveys at the Project site on July 17 and 25, 2018 (Appendices E and F). Protocol-level presence/absence surveys for SKR were conducted between October 21 and October 26, 2018. Additionally, large branchiopod surveys are currently underway and survey results will be shared with the USFWS pursuant to survey

protocol. General biological surveys, vegetation mapping, and wildlife surveys were conducted within the 42.4-acre Project site (i.e., the 35.4-acre K4 Parcel and 7.0-acre Cactus Channel improvements site) and within 50 feet of the Project site (collectively referred to as the Biological Survey Area (BSA)). However, only the Project site information is included in report calculations and tables, while the 50-foot buffer is illustrated within the figures of the biological report for informational purposes and edge effects analysis (Appendix E). Site visits confirmed the Project site primarily consists of upland vegetation communities dominated by goldenbush/non-native grassland and developed/disturbed land. The Cactus Channel occurs within the Project's boundary, and supports sparse riparian vegetation along the border of the site to the north at Cactus Avenue.

Topography and Soils

The Project site is relatively flat with elevations ranging from approximately 1,540 feet above mean sea level (amsl) to 1,550 feet amsl. Soils mapped on site are primarily Greenfield sandy loams, ranging from moderately coarse to coarse sandy loam to coarse textured alluvium (Appendices E and F).

4.3.1.1 Vegetation Communities

The Project site supports seven vegetation communities and land covers, as classified in accordance with *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Vegetation within the Project site is predominantly comprised of goldenbush scrub/non-native grassland, developed/disturbed land covers (i.e., roads and industrial areas), and non-native grassland (Figure 4.3-1, Biological Resources; Appendix E). Additionally, primarily small patches of riparian plants were observed within the Cactus Channel. Vegetation communities were then crosswalked with *The Manual of California Vegetation* (MCV2) (Sawyer et al. 2009), which is adopted as the standard for vegetation classification and description recognized by state and federal agencies. Table 4.3-1 provides a summary of vegetation acreages for the Project site, which is crosswalked from Holland (1986) to MCV2 (Sawyer et al. 2009) and separated by Project area (K4 Parcel and Cactus Channel Improvements Project Site). Vegetation descriptions throughout this section refer to MCV2 (Sawyer et al. 2009) as crosswalked from Holland (1986).

Table 4.3-1
Summary of Vegetation within the K4 Parcel and Cactus Channel Improvements Project

Vegetation (Holland)[1]	Vegetation[2]	Global/State Rank	K4 Parcel (acres)	Cactus Channel Improvements (acres)	Total
Upland Vegetation Communities					
Goldenbush Scrub/Non-Native Grassland	Disturbed Palmer's Goldenbush Scrub[3]	G3S3	22.16	—	22.16

Table 4.3-1
Summary of Vegetation within the K4 Parcel and Cactus Channel Improvements Project

Vegetation (Holland)[1]	Vegetation[2]	Global/State Rank	K4 Parcel (acres)	Cactus Channel Improvements (acres)	Total
Non-Native Grassland	Mediterranean California naturalized annual and perennial grassland	No Rank	0.26	8.40	8.66
		Subtotal	*22.42*	*8.40*	*30.82*
Riparian Vegetation Communities					
Freshwater Marsh[3]	Cattail Marshes[3]	G5S5	0.04	0.37	0.41
Southern Willow Scrub[3]	Sandbar Willow Thickets[3]	G5S4.2	0.02	0.02	0.04
Fremont Cottonwood Individuals[3]	Fremont Cottonwood Individuals[3]	G4S3.2	—	0.02	0.0255
Subtotal			*0.06*	*0.41*	*0.47*
Land Covers					
Developed/Disturbed	Developed/Disturbed	No Rank	10.16	0.85	11.01
Ornamental	Ornamental	No Rank	—	0.05	0.05
Subtotal			*10.16*	*0.90*	*11.06*
Total[4]			**32.64**	**9.71**	**42.35**

Source: Appendix E.

Notes: — = no data available.

1 Vegetation communities recognized by Holland (1986; Appendix E).

2 Vegetation communities from Holland (1986) crosswalked to *The Manual of California Vegetation* (Sawyer et al. 2009).

3 Considered special-status by Holland (1986), California Department of Fish and Wildlife (CDFW 2018a), and/or are riparian vegetation communities within the jurisdictional limits of California Department of Fish and Wildlife, Regional Water Quality Control Board, and/or U.S. Army Corps of Engineers.

4 Acreage may not total due to rounding.

Three of the seven vegetation communities and land covers identified within the Project site (i.e., the K4 Parcel and Cactus Channel improvements site) are riparian vegetation communities (i.e., cattail marshes, sandbar willow, Fremont cottonwood individuals), which are considered sensitive for the purposes of this analysis because they are likely within the jurisdictional limits of CDFW, ACOE, and/or RWQCB. Additionally, Fremont cottonwood alliance is considered a sensitive vegetation community by CDFW (2018a). One upland vegetation community (disturbed Palmer's goldenbush scrub) observed on site is recognized as a sensitive vegetation community by CDFW (2018a). The disturbed Palmer's goldenbush scrub vegetation community present on site is sparse and heavily intermixed with non-native grassland. It is not comprised of the rare goldenbush species for which this community is likely considered sensitive. The goldenbush on site is thick-bracted goldenbush (*Ericameria palmeri* var. *pachylepis*; no California Rare Plan Rank (CRPR) or other listing), whereas the Palmer's goldenbush (*Ericameria palmeri* var. *palmeri*) that is rare and is a CRPR 1B.1 species. As such, this vegetation community provides low quality function and value, particularly compared with similar undisturbed vegetation communities west of the

Project site. As per the base realignment, USFWS consultation, and subsequent negotiations, 664 acres of native habitat west of the Project site were set aside for conservation in consideration of development within the base re-use area. These conservation areas include upland habitats similar to those that occur on site. As such, impacts on upland habitats are considered adequately mitigated under previous agency consultation and are considered less than significant.

Upland Vegetation Communities

Disturbed Palmer's Goldenbush Scrub Alliance

The Palmer's goldenbush scrub alliance (*Ericameria palmeri* provisional shrubland alliance) includes Palmer's goldenbush as the dominant shrub in the shrub canopy. Palmer's goldenbush scrub alliance has an open canopy less than 1.5 meters (4.9 feet) in height (Sawyer et al. 2009).

Species associated with Palmer's goldenbush scrub alliance includes California buckwheat (*Eriogonum fasciculatum*), California matchweed (*Gutierrezia californica*), and sawtooth goldenbush (*Hazardia squarrosa*). The herbaceous layer within this alliance is typically is continuous (Sawyer et al. 2009). Disturbed Palmer's goldenbush scrub, which has at least 50% cover of non-native species such as red brome (*Bromus madritensis* ssp. *rubens*), poverty brome (*Bromus sterilis*), and Bermuda grass (*Cynodon dactylon*), occurs within the western two-thirds of the Project site.

The disturbed Palmer's goldenbush scrub alliance on site occurs within the western two-thirds of the K4 Parcel and is also referred to as goldenbush scrub/non-native grassland habitat within the biological report prepared for the Project (Appendix E). Disturbed Palmer's goldenbush scrub within the K4 Parcel totals approximately 22.16 acres and supports scattered stands of goldenbush (*Ericameria palmeri* var. *pachylepis*) amongst primarily non-native grasses (*Bromus madritensis* ssp. r*ubens*, *Bromus sterilis*, *Cynodon dactylon*, etc.). The K4 Parcel is frequently disked, which keeps non-native grasses fairly low to the ground. No disturbed Palmer's goldenbush scrub occurs within the Cactus Channel Improvement Site.

The Palmer's goldenbush scrub alliance has a CRPR rank of G3 and a provisional rank of S3 meaning it is considered vulnerable and at modern risk (also considered rare and of high priority) globally and provisionally within California. Although this vegetation community is a sensitive plant community based on the above rankings, the Palmer's goldenbush scrub mapped within the Project site is highly disturbed by non-native species and frequent mechanical perturbation (i.e., disking); thus, provides low quality habitat.

Mediterranean California Naturalized Annual and Perennial Grassland (Non-Native Grassland)

The Mediterranean California naturalized annual and perennial grassland (herein referred to as non-native grasslands) includes a sparse to dense cover of annual grasses that is typically 0.2 meters (0.7 feet) to 0.5 meters (1.6 feet) tall and can be up to 1 meter (3 feet) tall. Grasses that occur in non-native grassland include wild oats (*Avena* spp.), bromes (*Bromus* spp.), fescue (*Vulpia* spp.), and Italian ryegrass (*Festuca perennis*). Forbs that occur with these grasses include California poppy (*Eschscholzia californica*), stork's bill (*Erodium* ssp.), goldfields (*Lasthenia* spp.), phacelias (*Phacelia* ssp.), gilias (*Gilia* spp.), and baby blue eyes (*Nemophila menziesii*) (Holland 1986). Non-native grassland also includes land that is used as pasture for grazing purposes. Grasses such as barley (*Hordeum* spp.) and wild oats may grow in these areas. This land has very few native species.

Non-native grassland (totaling approximately 8.66 acres within the Project site) occurs predominantly within the Cactus Channel on the Project site. Approximately 0.26 acres of non-native grassland habitat occurs within the K4 Parcel and 8.40 acres occurs within the Cactus Channel improvements site. Non-native grassland generally occurs on fine-textured loam or clay soils that are moist during the winter rainy season and very dry during the summer and fall (Holland 1986). Non-native grassland within the BSA is largely dominated by common brome (*Bromus madritensis* ssp. *rubens*). Areas mapped as non-native grassland within the Cactus Channel also support Dallis grass (*Paspalum dilatatum*) and Bermuda grass (*Cynodon dactylon*). This habitat includes portions of the Cactus Channel that either did not qualify as freshwater marsh or were too small to map separately. All jurisdictional resources were delineated and mapped as part of the Project. Details regarding aquatic resources are provided in the jurisdictional delineation report prepared for the Project (Appendix F).

Mediterranean California naturalized annual and perennial grassland (non-native grassland) were mapped to the general habitat type because the CDFW does not consider any of the semi-natural stands[2] as special-status biological resources under California Environmental Quality Act (CEQA) (CDFW 2018a).

Native Riparian Vegetation Communities

Cattail Marshes Alliance

The cattail marshes alliance (*Typha* (*angustifolia, domingensis, latifolia*) alliance) includes cattails as the dominant or co-dominant herb in the herbaceous layer. Cattail marshes alliance has a continuous to intermittent canopy less than 1.5 meters (4.9 feet) in height (Sawyer et al. 2009).

[2] Semi-natural stands are invasive naturalized plant groups where "plants are sufficiently dominant to have replaced most of the natives, and, in many situations, the associates are themselves non-native species" (Sawyer et al. 2009).

Species associated with the cattail marshes alliance includes creeping bentgrass (*Agrostis stolonifera*), flatsedge (*Cyperus* spp.), salt grass (*Distichlis spicata*), barnyardgrass (*Echinochloa crus-galli*), pale spike rush (*Eleocharis macrostachya*), (*Juncus* spp.), perennial pepper weed *(Lepidium latifolium*), water-parsley (*Oenanthe sarmentosa*), smartweed (*Persicaria lapathifolia),* dotted smartweed *(Persicaria punctata*), common reed (*Phragmites australis*), American bulrush (*Schoenoplectus americanus*), California bulrush (*Schoenoplectus californicus*), and cocklebur (*Xanthium strumarium*). Emergent trees may be present at low cover, including willows (*Salix* spp.) (Sawyer et al. 2009).

Cattail marshes within the Project site supports hydrophytic species including broadleaf cattail (*Typha latifolia*), pondweed (*Potamogeton* sp.), and tall flat sedge (*Cyperus eragrostis*) and is also referred to as freshwater marsh within the biological report prepared for the Project (Appendix E). Cattail marshes vegetation occurs within inundated portions of the Cactus Channel and this vegetation community occurs in patches along the northwestern portion of the Cactus Channel. Approximately 0.41 acres of cattail marshes vegetation community occurs within the Project site, including 0.04 acres within the K4 Parcel and 0.37 acres within the Cactus Channel improvements site.

The cattail marshes alliance has a rank of G5S5 in CDFW (2018a) meaning it is globally secure and secure in the state. Therefore, cattail marshes are not considered special-status under CDFW (2018a); however, this is a riparian community and Section IV, Appendix G (Environmental Checklist Form) of the CEQA Guidelines (14 CCR 15000 et seq.) requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or the USFWS; therefore, this community is considered special-status under CEQA.

Sandbar Willow Thickets Alliance

The sandbar willow thickets (*Salix exigua*) alliance includes sandbar willow as the dominant or co-dominant shrub in the tree canopy. The sandbar willow thickets alliance has an intermittent to continuous shrub canopy less than 7 meters (23 feet) in height with a variable ground cover layer and low cover of emergent trees (Sawyer et al. 2009).

Species associated within the sandbar willow thickets alliance include baccharis species (*Baccharis* ssp.), California brickellbush (*Brickellia californica*), California rose (*Rosa californica*), Himalayan black berry (*Rubus armeniacus*), California blackberry (*R. ursinus*), and arroyo willow (*Salix lasiolepis*) (Sawyer et al. 2009).

Sandbar willow thickets alliance (also referred to as southern willow scrub within the biological report prepared for the Project; Appendix E) occurs within small patches throughout the Cactus Channel, and totals approximately 0.04 acres within the Project site. Approximately 0.02 acres of sandbar willow thickets vegetation community occurs within the K4 Parcel and 0.04 acres occurs within the Cactus

Channel improvements site. Sandbar willow thickets alliance is characteristically dominated by dense stands of willows (*Salix* spp.). The on-site sandbar willow thickets contain limited stands of Gooding's black willow (*Salix gooddingii*; four individuals) and sandbar willow (*Salix exigua* var. *exigua*; 60 small individuals).

Sandbar willow thickets alliance is ranked by CDFW (2018a) as a G5S4 alliance meaning it is meaning it is globally secure and considered apparently secure in the state. Sandbar willow thickets are therefore not considered special-status under CDFW; however, this is a riparian community and Section IV, Appendix G (Environmental Checklist Form) of the CEQA Guidelines (14 CCR 15000 et seq.) requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or the USFWS; therefore, this community is considered special-status under CEQA.

Fremont Cottonwood Individuals

The Fremont cottonwood forest alliance (*Populus fremontii* alliance) includes Fremont cottonwood as the dominant or co-dominant tree in the canopy. Fremont cottonwood forest has a continuous to open canopy less than 25 meters (82 feet) in height with a variable ground layer (Sawyer et al. 2009).

Species associated with the Fremont cottonwood forest alliance include box elder, Oregon ash (*Fraxinus latifolia*), California sycamores, coast live oak, sandbar willow, black willow (*Salix gooddingii*), red willow (*Salix laevigata*), arroyo willow, and yellow willow (*Salix lutea*) (Sawyer et al. 2009). A small population of young Fremont cottonwood (11 individuals) are located within the eastern portion of the Cactus Channel.

A small population of young Fremont cottonwood (*Populus fremontii*) occurs within the Cactus Channel. Within the Project site, a total of 0.02 acres of Fremont cottonwood individuals occur within the Cactus Channel improvements site. Fremont cottonwood individuals do not occur within the K4 Parcel on site. Fremont cottonwood is a riparian tree species, which grows near streams, rivers, and wetlands in the southwestern United States. Fremont cottonwood are typically associated with riparian forests, however the on-site population of this species is limited to 11 individuals.

The Fremont cottonwood forest alliance is ranked by CDFW (2018a) as a G3S3 alliance. This ranking indicates that globally and within California the alliance is considered vulnerable and at modern risk, and is also considered rare and of high priority; therefore, is considered special-status under CEQA. Although this vegetation community is a sensitive plant community based on the above rankings, the Fremont cottonwood forest mapped within the Project site is highly disturbed, small (totaling 0.02 acres), and isolated; thus, providing low quality habitat.

Land Covers

Developed/Disturbed

Developed/disturbed areas within the Project site totals approximately 11.01 acres, including 10.16 acres within the K4 Parcel and 0.85 acres within the Cactus Channel improvements site. Developed/disturbed land support little to no native vegetation and are comprised of human-made disturbances (agriculture, construction, or other land-clearing activities) or structures such as buildings and roads. The high level of soil disturbance allows only sparse ruderal (weedy) plant species to occur. Major developed areas within the Project boundary are concentrated on the eastern third of the site and include a soil stockpile area and areas disturbed by grading and former concrete pads on the site. Areas mapped as developed/disturbed on the Project site are overwhelmingly comprised of disturbed areas within only a few small developed areas in the form of concrete bridges and paved roads.

Developed/disturbed land is not recognized by CDFW (2018a); therefore, it is not considered special-status under CEQA.

Ornamental

Ornamental vegetation within the Project site totals approximately 0.05 acres, which occurs within the Cactus Channel improvements site. Ornamental vegetation does not occur within the K4 Parcel. Ornamental vegetation supports non-native tree and grass species including tree of heaven (*Ailanthus altissima*) and Bermuda grass. Ornamental vegetation within the Project area is located along the Cactus Channel and at the far west end of the Cactus Channel.

Ornamental vegetation is not recognized by CDFW (2018a); therefore, it is not considered special-status under CEQA.

4.3.1.2 Special-Status Plants and Wildlife

Endangered, rare, or threatened species, as defined in CEQA Guideline 15380(b) (14 CCR 15000 et seq.), are referred to as "special-status species" in this analysis and include (1) endangered or threatened species recognized in the context of CESA and FESA; (2) plant species with a CRPR 1 or 2 (CDFW 2016; CNPS 2016); (3) CDFW Species of Special Concern and Watch List (WL) species, as designated by the CDFW (2016); (4) mammals and birds that are Fully Protected species, as described in Fish and Game Code, Sections 4700 and 3511; and (5) Birds of Conservation Concern, as designated by the USFWS (2008). Species of CRPR 3 or 4 may, but generally do not, qualify for protection under this provision. Species of CRPR 3 and 4 are those that require more information to determine status and plants of limited distribution; and thus, are also discussed.

Plants

The California Natural Diversity Database (CDFW 2018b; Figure 4.3-2, CDFW and USFWS Occurrences) was queried for a radius of 3 miles around the Project site (i.e., K4 Parcel and Cactus Channel improvements site). Additionally, a California Native Plant Society Inventory of Rare, Threatened, and Endangered Plants of California (CDFW 2018b) search was conducted for the U.S. Geological Survey 7.5-minute Riverside East and Sunnymead quadrangles and the surrounding topographic quadrangles (i.e., Steele Peak and Perris) with an elevation range of 1,500 to 1,600 feet amsl. Potential for special-status species occurrence was refined by considering the habitat affinities for each species, the results of field habitat assessments, vegetation mapping, and knowledge of local biological resources. The potential for the Project area to support special-status plant species was assessed during the site visits and vegetation mapping; analysis of California Natural Diversity Database (Figure 4.3-2) and California Native Plant Society data; and knowledge of the habitat affinities and biogeography of special-status plants in Southern California. Special-status plant species with potential to occur on the Project site are provided in Table 4.3-2.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Abronia villosa var. *aurita*	Chaparral sand-verbena	None/None/ 1B.1	Annual herb. Blooms January–September. Sandy chaparral, coastal scrub and desert dunes. Elevation 245–5,250 feet	Very low potential to occur. Suitable sandy habitat not present.
Allium munzii	Munz's onion	FE/ST/1B.1	Perennial bulbiferous herb. Blooms March–May. Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland, Valley and foothill grassland. Elevation 970–3,510 feet	Very low potential to occur. No undisturbed native vegetation communities on site. No clay soils mapped prior to site disturbance (mapped soil is a sandy loam) and no clay soil observed during site visit.
Asplenium vespertinum	western spleenwort	None/None/ 4.2	Perennial rhizomatous herb. Blooms February–June. Chaparral, Cismontane woodland, Coastal scrub. Elevation 590–3,280 feet	Low potential to occur. No undisturbed native vegetation communities on site. Additionally, visible year-round and not observed during site visit.
Atriplex coronata var. *notatior*	San Jacinto Valley crownscale	FE/None/ 1B.1	Annual herb. Blooms April–August. Playas, mesic valley/foothill grasslands, and vernal pools within alkaline habitat. Elevation 456–1,640 feet	Very low potential to occur. No suitable alkaline habitat present.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Atriplex parishii	Parish's brittlescale	None/None/ 1B.1	Annual herb. Blooms June–October. Chenopod scrub, playas, and vernal pools within alkaline habitat. Elevation 82–6,233 feet	Very low potential to occur. No suitable alkaline habitat present.
Berberis nevinii	Nevin's barberry	FE/SE/1B.1	Perennial evergreen shrub. Blooms February–June. Chaparral, cismontane woodland, coastal scrub, and riparian scrub. Elevation 230–2,705 feet	No potential to occur. Species is visible year-round and was not detected during summer plant surveys.
Brodiaea filifolia	thread-leaved brodiaea	FT/SE/1B.1	Perennial bulbiferous herb. Blooms March–June. Chaparral, cismontane woodlands, coastal scrub, playas, valley/foothill grasslands, vernal pools. Elevation 82–3,675 feet	Low potential to occur. Not known from region and no suitable habitat present.
Calochortus plummerae	Plummer's mariposa lily	None/None/ 4.2	Perennial bulbiferous herb. Blooms May–July. Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland. Elevation 330–5,580 feet	Very low potential to occur. No suitable habitats present on site. Species not observed during summer plant surveys, and no dried Calochortus fruit observed on site.
Caulanthus simulans	Payson's jewelflower	None/None/ 4.2	Annual herb. Blooms February–June. Chaparral and coastal scrub. Elevation 295–7,218 feet	Very low potential to occur. No suitable habitat on site.
Centromadia pungens ssp. laevis	smooth tarplant	None/None/ 1B.1	Annual herb. Blooms April–September. Chenopod scrub, meadows and seeps, playa, riparian woodland, valley and foothill grassland. Elevation 0–2,100 feet	Present. This species is common on the K4 warehouse site with a population of 525-550 individuals occupying 0.15 acre.
Chorizanthe leptotheca	Peninsular spineflower	None/None/ 4.2	Annual herb. Blooms May–August. Chaparral, coastal scrub, lower montane coniferous forest. Elevation 984–6,233 feet	Low potential to occur. Limited suitable habitat present and not detected during summer plant survey.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Chorizanthe parryi var. *parryi*	Parry's spineflower	None/None/ 1B.1	Annual herb. Blooms April–June. Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Elevation 900–4,000 feet	Low potential to occur. Limited suitable habitat present and not detected during plant survey.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower	None/None/ 1B.2	Annual herb. Blooms April–July. Chaparral, coastal scrub, meadows and seeps, valley/foothill grassland, and vernal pools. Elevation 98–5,020 feet	Low potential to occur. Limited suitable habitat present and not detected during summer plant survey.
Convolvulus simulans	small-flowered morning-glory	None/None/ 4.2	Annual herb. Blooms March–July. Chaparral, coastal scrub, valley and foothill grasslands. Elevation 98–2,296 feet	Low potential to occur. Limited suitable habitat present.
Deinandra paniculata	paniculate tarplant	None/None/ 4.2	Annual herb. Blooms April–November. Coastal scrub, valley/foothill grassland, vernal pools. Elevation 82–3,084 feet	Low potential to occur. Although there is suitable habitat for this species and this species is known to occur in the general area, this species was not observed during the summer rare plant survey conducted in July 2018 during the blooming period for this species.
Dodecahema leptoceras	slender-horned spineflower	FE/SE/1B.1	Annual herb. Blooms April–June. Chaparral, cismontane woodland, alluvial fan coastal scrub. Elevation 655–2,490 feet	Very low potential to occur. No suitable habitat present.
Dudleya multicaulis	many-stemmed dudleya	None/None/ 1B.2	Perennial herb. Blooms April–July. Chaparral, coastal scrub, and valley/foothill grasslands. Elevation 50–2,590 feet	Very low potential to occur. No suitable habitat present.
Eriastrum densifolium ssp. *sanctorum*	Santa Ana River woollystar	FE/SE/1B.1	Perennial herb. Blooms April–September. Chaparral and coastal alluvial fan scrub. Elevation 298–2,000 feet	Very low potential to occur. No chaparral or coastal alluvial fan scrub present.
Harpagonella palmeri	Palmer's grapplinghook	None/None/ 4.2	Annual herb. Blooms March–May. Chaparral, coastal scrub, and valley/foothill grasslands. Elevation 65–3,133 feet	Very low potential to occur. No clay soils or suitable habitats present on site.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Hordeum intercedens	vernal barley	None/None/ 3.2	Annual herb. Blooms March–June. Coastal dunes, coastal scrub, valley/foothill grassland saline flats and depressions, and vernal pools. Elevation 16–3,280 feet	Very low potential to occur. Not known from the vicinity; not observed during summer plant survey. On-site disturbance and lack of saline habitat would likely preclude species.
Horkelia cuneata var. *puberula*	mesa horkelia	None/None/ 1B.1	Perennial herb. Blooms February–September. Maritime chaparral, cismontane woodland, and coastal scrub. Elevation 230–2,657 feet	Very low potential to occur. No suitable habitat present.
Imperata brevifolia	California satintail	None/None/ 2B.1	Perennial rhizomatous herb. Blooms September–May. Chaparral, coastal scrub, Mojavean desert scrub, alkali meadows and seeps, and riparian scrub. Elevation 0–3,986 feet	Very low potential to occur. No suitable habitat present; not observed during summer plant surveys.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None/ 1B.1	Annual herb. Blooms February–June. Coastal salt marshes and swamps, playas, vernal pools. Elevation 3–4,002 feet	Very low potential to occur. No suitable coastal salt marsh, swamp, or playa habitat present on site.
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	None/None/ 4.3	Annual herb. Blooms January–July. Chaparral and coastal sage scrub. Elevation 3–2,905 feet	Very low potential to occur. No suitable habitat on site.
Microseris douglasii ssp. *platycarpha*	small-flowered microseris	None/None/ 4.2	Annual herb. Blooms March–May. Cismontane woodlands, coastal scrub, valley/foothill grasslands, and vernal pools. Elevation 50–3,510 feet	Low potential to occur. No undisturbed native vegetation communities on site. This species can be found in non-native grassland but high site disturbance likely precludes it.
Myosurus minimus ssp. *apus*	little mousetail	None/None/ 3.1	Annual herb. Blooms March–June. Valley/foothill grasslands and alkaline vernal pools. Elevation 65–2,100 feet	Low potential to occur. Areas that may pond are highly disturbed and unlikely to support native vernal pool species.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Navarretia fossalis	spreading navarretia	FT/None/ 1B.1	Annual herb. Blooms April–June. Chenopod scrub, shallow freshwater marshes and swamps, playas, and vernal pools. Elevation 98–2,150 feet	Low potential to occur. Not reported from area and not observed during surveys; potentially ponded areas on site are highly disturbed and unlikely to support native species.
Pseudognaphaliu m leucocephalum	white rabbit-tobacco	None/None/ 2B.2	Perennial herb. Blooms (July) August–November (December). Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. Elevation 0–6,890 feet	Very low potential to occur. No suitable habitat on site; not observed during summer rare plant survey.
Romneya coulteri	Coulter's matilija poppy	None/None/ 4.2	Perennial rhizomatous herb. Blooms March–July. Chaparral and coastal scrubs. Elevation 65–3,937 feet	Low potential to occur. Not observed during summer plant surveys.
Senecio aphanactis	chaparral ragwort	None/None/ 2B.2	Annual herb. Blooms January–April. Chaparral, cismontane woodland, and coastal scrub. Elevation 50–2,625 feet	Very low potential to occur. No chaparral, cismontane woodland, or coastal scrub habitat present on site.
Sidalcea neomexicana	salt spring checkerbloom	None/None/ 2B.2	Perennial herb. Blooms March–June. Chaparral, coastal scrub, lower montane coniferous forests, Mojavean desert scrub, and playas. Elevation 50–5,020 feet	Very low potential to occur. No suitable alkaline habitat present.
Sphenopholis obtusata	prairie wedge grass	None/None/ 2B.2	Perennial herb. Blooms April–July. Cismontane woodland, meadows and seeps. Elevation 984–6,561 feet	Very low potential to occur. No woodlands, meadows, or seeps present.
Symphyotrichum defoliatum	San Bernardino aster	None/None/ 1B.2	Perennial rhizomatous herb. Blooms July–November. Cismontane woodlands, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and vernally mesic valley/foothill grasslands. Elevation 7–6,690 feet	Very low potential to occur. No associated habitats present on site. No suitable mesic habitat present on site.

Table 4.3-2
Special-Status Plants with Potential to Occur within the Project Site

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Habitat Description	Potential to Occur
Texosporium sancti-jacobi	woven-spored lichen	None/None/ 3	Crustose lichen. Appears on soil, small mammal pellets, dead twigs, and on Selaginella spp., as well as chaparral openings. Elevation 950–2,165 feet	Very low potential to occur. Continuous site disturbance would disrupt the establishment of this species.

Notes: CRPR = California Rare Plant Rank.
Status Legend:
FE: Federally listed as endangered
FT: Federally listed as threatened
SE: State listed as endangered
ST: State listed as threatened
CRPR 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
CRPR 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere
CRPR 2A: Plants Presumed Extirpated in California, But More Common Elsewhere
CRPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
CRPR 3: Plants About Which More Information is Needed - A Review List
CRPR 4: Plants of Limited Distribution - A Watch List
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20%–80% occurrences threatened / moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

No federally or state listed plants were observed during the general field surveys or summer rare plant surveys, and none have a moderate or high potential to occur on the site based on the disturbed nature of the site and lack of suitable habitats (Table 4.3-2, which is based on Table 4 in Appendix E). The only special-status plant species identified on site during the focused summer rare plant surveys conducted in July 2018 was smooth tarplant (*Centromadia pungens* ssp. l*aevis*); a California Native Plant Society CRPR 1B.1 and State Rank S2. The CRPR rank of 1B.1 listing means it's a plant of rare, threatened, or endangered in California and elsewhere, and seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat); its state rank S2 means that it is "imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province (CNPS 2018; Appendix E). Smooth tarplant is an annual herb in the sunflower family (*Asteraceae*) that blooms from April to September. Smooth tarplant is found in a wide range of habitats ranging from open, poorly drained flats, grassland, and disturbed sites to riparian woodland, meadows and seeps. Smooth tarplant was observed in the eastern third of the K4 Parcel in disturbed/developed communities, and in the central portion of the Cactus Avenue Channel within non-native grassland vegetation communities. The total on-site population is approximately 525–550 individuals covering an area of 0.15 acres (Figure 4.3-1).

No federally or state threatened or endangered plants were observed during the general field survey or focused special-status plant survey. The majority of the Project site is continually disturbed. Additionally, the Project site lacks suitable soils (i.e., clay and alkaline soils) to support listed plant species known from the Project vicinity. Soils on site are primarily Greenfield sandy loams, ranging from moderately coarse to coarse sandy loam to coarse textured alluvium (Appendix E). Thus, state and/or federally listed plants are not likely to occur on site or within the BSA.

Wildlife

Special-status wildlife species are defined as species that meet one or more of the following criteria:

- Species designated as either rare, threatened, or endangered by CDFW or the USFWS and are protected under either the CESA (California Fish and Game Code (CFGC), section 2050 et seq.) or FESA (16 U.S.C. 1531 et seq.), or meet the CEQA definition for endangered, rare, or threatened (14 CCR 15380(b) and (d)).
- Candidate species being considered or proposed for listing under these same acts.
- Species fully protected by the CFGC sections 3511, 4700, 5050, or 5515.
- Species of expressed concern to resource/regulatory agencies or local jurisdictions. This includes wildlife that are considered a state SSC, CDFW WL species, USFWS Birds of Conservation Concern, and CDFW Special Animal species.

A California Natural Diversity Database (CDFW 2018b; Figure 4.3-2) query was conducted for a radius of 3 miles around the Project site. Potential for special-status species occurrence was refined by considering the habitat affinities for each species, the results of field habitat assessments, vegetation mapping, and knowledge of local biological resources. Additionally, the base re-alignment BO and supporting information was reviewed as part of this assessment (Appendix E). Special-status wildlife species with potential to occur on the Project site are provided in Table 4.3-3.

Table 4.3-3
Special-Status Wildlife with Potential to Occur within the Project Site

Species Name	Common Name	Status (Federal/ State)	Habitat Description	Potential to Occur
Invertebrates				
Branchinecta lynchi	vernal pool fairy shrimp	FT/None	Natural vernal pools or other seasonal pools.	Low to moderate potential to occur. Potential ponding features observed on site may be suitable for this species, which is typically found in deep, naturally occurring vernal pools. This species also has a minor potential to occur in the Cactus Channel as it supports temporarily ponded areas.
Streptocephalus woottoni	Riverside fairy shrimp	FE/None	Vernal pools or other seasonal pools with a depth greater than 30 centimeters.	Moderate potential to occur. Limited ponding features observed during Project surveys that appear to be deep enough for this species, which typically occurs in pools greater than 30 centimeters depth; moderate potential to occur in the Cactus Channel as it supports temporarily ponded areas that may be deep enough for this species.
Amphibians				
Spea hammondii	western spadefoot	None/SSC	Temporary ponds, vernal pools, and backwaters of flowing creeks. Also adjacent upland habitats such as grasslands and coastal sage scrub for burrowing.	Moderate potential to occur. Though the site is fairly disturbed, low areas occur on the site that would be suitable for this species if they hold water. Additionally, the Cactus Channel has suitable habitat to support this species.
Reptiles				
Aspidoscelis hyperythra	orange-throated whiptail	None/WL	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands. Found on sandy or friable soils with open scrub.	Moderate potential to occur. Suitable habitat is present, but this species not observed during field surveys.
Aspidoscelis tigris stejnegeri	San Diegan tiger whiptail	None/SSC	A variety of rocky, sandy, dry habitats including sage scrub, chaparral, woodlands on friable loose soil.	Low potential to occur. Suitable habitat is present; this species is more common near the coast.

Table 4.3-3
Special-Status Wildlife with Potential to Occur within the Project Site

Species Name	Common Name	Status (Federal/ State)	Habitat Description	Potential to Occur
Crotalus ruber	red diamondback rattlesnake	None/SSC	Chaparral, coastal sage scrub, along creek banks, and in rock outcrops or piles of debris. Often associated with dense vegetation in rocky areas.	Low potential to occur. Suitable rocky habitat is not present.
Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands. Found on sandy or friable soils with open scrub. Requires open areas, bushes, and fine loose soil.	Low potential to occur. Suitable habitat is present; however, species is more common near the coast.
			Birds	
Accipiter cooperii (nesting)	Cooper's hawk	None/WL	Usually in oak woodlands but occasionally in willow or eucalyptus woodlands.	Low potential to occur. Although not observed during Project surveys, this species is known to occur in the area. Limited nesting habitat present on site. No large willows, oaks, or eucalyptus trees present on site.
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	BCC/SSC	Found in grasslands and open scrub from the coast to foothills. Strongly associated with California ground squirrel (*Otospermophilus beecheyi*) and other fossorial mammal burrows.	Moderate to high potential to occur. Suitable but unoccupied burrows observed on site. Burrowing owls known to occur within 1.25 miles of site.
Charadrius montanus (nesting)	mountain plover	BCC/SSC	Inhabits annual grasslands and agricultural fields.	Low potential to occur. Suitable foraging habitat not present.
Eremophila alpestris actia	California horned lark	None/WL	Found from coastal deserts and grasslands to alpine dwarf-shrub habitat above treeline. Also seen in coniferous or chaparral habitats.	Low to moderate potential to occur. Suitable habitat not present; however, species known to occasionally occupy disturbed grasslands. Nearest documented occurrence approximately 3.5 miles southwest.
Lanius ludovicianus (nesting)	loggerhead shrike	BCC/SSC	Found within grassland, chaparral, desert, and desert edge scrub, particularly near dense vegetation used for nesting.	Low potential to occur. Suitable foraging habitat is present, but dense nesting habitat is not present.

Table 4.3-3
Special-Status Wildlife with Potential to Occur within the Project Site

Species Name	Common Name	Status (Federal/ State)	Habitat Description	Potential to Occur
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Riparian woodland with understory of dense young willows or mulefat and willow canopy. Nests often placed along internal or external edges of riparian thickets.	Low potential to occur. Suitable riparian habitat is not present.
			Mammals	
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None/SSC	Inhabits coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities.	Low to moderate potential to occur. Suitable habitat on site and burrows observed that are consistent with pocket mouse size; however, repeated disturbance of the site would likely preclude this species.
Dipodomys stephensi	Stephens' kangaroo rat	FE/ST	Habitats include annual grassland and coastal sage scrub with sparse shrub cover. Commonly in association with *Eriogonum fasciculatum*, *Artemisia californica*, and *Erodium cicutarium*, in areas with loose, friable, well-drained soil, and flat or gently rolling terrain.	None. No individuals or sign observed during focused Stephens' kangaroo rat surveys.
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, live oaks, and arid, rocky regions. Requires downward opening crevices.	Low potential to occur. Suitable roosting crevices not present.
Lasiurus xanthinus	western yellow bat	None/SSC	Occupies a range of habitats in arid and dry areas. Inhabits secluded woodlands, agricultural lands, and sometimes even residential areas.	Low potential to occur. Suitable roosting habitat not present.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None/SSC	Habitats include early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush. Uses open land but requires some shrubs for cover.	Present. Although the site is fairly disturbed, suitable foraging habitat is present for this species.
Nyctinomops femorosaccus	pocketed free-tailed bat	None/SSC	Rugged cliffs, rocky outcrops, and slopes in desert shrub and pine oak forests.	Low potential to occur. Rocky outcrops not present.

Table 4.3-3
Special-Status Wildlife with Potential to Occur within the Project Site

Species Name	Common Name	Status (Federal/ State)	Habitat Description	Potential to Occur
Onychomys torridus ramona	southern grasshopper mouse	None/SSC	Low open and semi-open scrub habitats including sparse coastal scrub, mixed chaparral, low sagebrush, riparian scrub, and annual grassland with scattered shrubs.	Low potential to occur. Suitable desert habitat with friable soils lacking on site. Repeated disturbance of the site would likely preclude this species.
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None/SSC	Found in low elevation grassland, alluvial sage scrub, and coastal sage scrub.	Low to moderate potential to occur. Alluvial sage scrub and coastal sage scrub not present, however grassland present. Repeated disturbance of the site would likely preclude this species.

Notes:
FT: Federally listed as threatened
FE: Federally listed as endangered
SSC: Species of Special Concern
WL: Watch List
BCC: Birds of Conservation Concern
SE: State listed as endangered
ST: State listed as threatened

No federally and/or state listed species were observed within or adjacent to the Project site during the field surveys conducted in July 2018. Two federally listed species have a low to moderate or moderate potential to occur within or adjacent to the Project site (i.e., the K4 Parcel and Cactus Channel improvements site) (protocol-level presence/absence surveys for large branchiopods are currently underway for the 2018 wet season; however, no fairy shrimp have been observed to date):

- Riverside fairy shrimp (*Streptocephalus woottoni*; federally endangered (FE)); and
- Vernal pool fairy shrimp (*Branchinecta lynchi*; federally threatened (FT)).

Based on negative results of protocol-level presence/absence surveys conducted for SKR in 2018, potential for this federally and state listed species to occur on site was modified from a moderate to no potential to occur; and is discussed below:

- Stephens' kangaroo rat (*Dipodomys stephensi*; FE/state threatened (ST)).

Seven non-listed special-status wildlife species were observed or have a low to moderate or moderate to high potential to occur within and/or immediately adjacent to the BSA:

- Burrowing owl (*Athene cunicularia*; CDFW Species of Special Concern (SSC));

- California horned lark (*Eremophila alpestris actia*; CDFW WL);
- Los Angeles pocket mouse (*Perognathus longimembris brevinasus*; SSC)
- northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*; SSC);
- orange-throated whiptail (*Aspidoscelis hyperythra*; WL);
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*; SSC); and
- western spadefoot (*Spea hammondii*; SSC).

Federally and State Listed Species

Riverside Fairy Shrimp (*Streptocephalus woottoni*)

The Riverside fairy shrimp (FE) is considered to have one of the most limited distributions among west coast-endemic fairy shrimps. The species is found in Ventura, Orange, Riverside, and San Diego Counties in California, and is also known to occur in Baja California, Mexico. The extent of the Riverside fairy shrimp range in California spans 163 miles north-south and all populations, with the exception of the Riverside population, occur within 15 miles of the coast (USFWS 2011). This species is the biotic foundation of the food web for a diverse range of aquatic and terrestrial predators. Riverside fairy shrimp have adapted and evolved to endure dry seasons, when vernal pools are not inundated with water by lying dormant in cysts (dormant eggs) until environmental conditions are optimal for the Riverside fairy shrimp life cycle. Hatching and observation periods are variable based on annual and seasonal precipitation levels. Riverside fairy shrimp hatch and mature within 48 to 56 days, dependent on environmental variables such as water temperature. Since the Riverside fairy shrimp matures slowly (as compared to seven to 14 days for San Diego fairy shrimp), it is generally restricted to the cooler water temperatures of deep (greater than 12 inches or 30 centimeters) vernal pools (USFWS 2011). The closest documentation of this species is approximately 0.5 and 1.5 miles south of the Project site; however, these occurrence are extirpated or possibly extirpated (CDFW 2018b). The closest extant occurrence for this species is located approximately 16 miles southeast of the Project site (CDFW 2018b).

Suitable habitat for Riverside fairy shrimp has been documented within the Project site (i.e., K4 Parcel and Cactus Channel improvements site). Riverside fairy shrimp has a moderate potential to occur within the low areas that may pond within the K4 Parcel during rain events. Additionally, Riverside fairy shrimp has a moderate potential to occur within portions of the Cactus Channel that support features likely to remain inundated for periods greater than 120 days in the Cactus Channel improvements site (Appendix E). Thus, federally listed branchiopod (i.e., fairy shrimp) protocol-level presence/absence surveys are currently underway. The results of these surveys will be submitted to the USFWS in accordance with species protocol, and the exact acreage of potentially suitable habitat would need to be verified based on inundation during the first significant rain event.

*Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)*

The vernal pool fairy shrimp (FT) is known to occur from Jackson County near Medford, Oregon, throughout the Central Valley in California, and west to the central Coast Ranges. Isolated southern populations occur on the Santa Rosa Plateau and near Rancho California in Riverside County (Eng et al. 1990). This species is more typical of natural vernal pools, not riverine or other systems. Within its southernmost range (e.g., Riverside County) this species tends to occur in pools that pond for long periods of time (USFWS 2007). Since this species requires a long ponding period it generally occurs in deeper pools, such as Santa Rosa Plateau, which has pools up to 16 inches deep (Chester 2007). The closest documented occurrence for this species is approximately 17 miles southwest of the Project site (CDFW 2018b).

Vernal pool fairy shrimp has a low to moderate potential to occur within the low areas that may pond within the parcel area during rain events, as well within portions of the Cactus Channel that support features likely to remain inundated for periods greater than 120 days (Appendix E). Although this species has not been recorded in the immediate Project area, suitable habitat occurs within the on-site ponding features (CDFW 2018b). Thus, federally listed branchiopod (i.e., fairy shrimp) protocol-level presence/absence surveys are currently underway. The results of these surveys will be submitted to the USFWS in accordance with species protocol, and the exact acreage of potentially suitable habitat would need to be verified based on inundation during the first significant rain event.

*Stephens' Kangaroo Rat (*Dipodomys stephensi*)*

SKR (FE/ST) populations occur within three distinct regions within Riverside and San Diego Counties: WRC, western San Diego County, and central San Diego County. Habitat for SKR includes open grasslands, fallow agricultural fields, and sparse coastal sage scrub vegetation types in areas with penetrable soils and flat to fairly steep sloping topography, with elevations ranging from 180 to 4,100 feet amsl (USFWS 1997). Suitable habitat for SKR varies in composition and density based on location and season; however, areas with dense grass cover are typically not suitable for this species. This species is known to occur approximately 1 mile west of the Project site and I-215, and 1.5 miles south of the Project site (i.e., the K4 Parcel and Cactus Channel improvements site) (CDFW 2018b).

Although suitable habitat to support SKR (i.e., grassland, limited coastal scrub, and disturbed habitat) was identified within the Project site (i.e., K4 Parcel and Cactus Channel improvements site), protocol-level presence/absence surveys were conducted between October 21 and 26, 2018 for this species with negative findings. No SKR were trapped during the protocol-level survey effort and no SKR sign (i.e., tracks, scats, tail-drags, seed caches) were observed within the study area. The complete survey results are provided in Appendix E. These findings are consistent with the Master Environmental Impact Analysis for the March JPA General Plan, which states that all occupied acreage of SKR occur west of I-215 and no occupied SKR habitat was documented east of I-215 (March JPA 1999b). Thus, SKR

are not expected to occur within the Project site. Additionally, the Project does not occur within a SKR Core Area as recognized by the SKR HCP Plan Area and/or MSHCP Plan Area (RCHCA 1996; County of Riverside 2003). While SKR is widespread throughout the MSHCP Plan Area, the largest and key populations of occupied SKR are known, concentrated in several Core Areas requiring conservation. The closest SKR Core Area is Sycamore Canyon Core Reserve located approximately 1.7 miles northwest of the Project site; thus, impacts to Core Areas for SKR would not occur.

Other Special-Status Species

Burrowing Owl (*Athene cunicularia*)

Burrowing owl (SSC) inhabit open areas such as grasslands, pastures, coastal dunes, desert scrub, and the edges of agriculture fields (Unitt 1984). This species may also occur in agricultural areas, ruderal grassy fields, vacant lots, and pastures containing suitable vegetation structure and useable burrows with foraging in proximity (Gervais et al. 2008). In California, suitable habitat for burrowing owl is generally characterized by short, sparse vegetation with few shrubs, level to gentle topography, and well-drained soils (Haug et al. 1993). Burrowing owl populations in California usually use burrows created by California ground squirrel (*Spermophilus (Otospermophilus) beecheyi*) or other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and/or foxes. Burrowing owl also frequently use natural rock cavities, debris piles, culverts, and pipes for nesting and roosting (Rosenberg et al. 1998) and have been documented using artificial burrows for nesting and cover (Smith and Belthoff 2001).

Suitable foraging and nesting habitat occurs within the Project site (i.e., the K4 Parcel and the Cactus Channel improvements site), as well as areas adjacent to the Project site. Although focused burrowing owl surveys have not been conducted for the Project, suitable burrowing owl habitat occurs within the Project site. Burrowing owls or sign (i.e., active burrow, white-wash, pellets, etc.) were not observed during the July 2018 field surveys; however, a wintering burrowing owl was documented by RBC approximately 1.5 miles west of the Project site (west of I-215), near the Meridian West Campus site on December 23, 2015 (Appendix E). This species has a moderate to high potential to occur within the non-native grassland habitat, goldenbush scrub/non-native grassland, and disturbed land (totaling approximately 41.83 acres) throughout the Project site, including approximately 32.58 acres within the K4 Parcel and 9.25 acres within the Cactus Channel improvements site.

California Horned Lark (*Eremophila alpestris actia*)

California horned lark (SSC) is found from coastal deserts and grasslands to alpine dwarf-shrub habitat above tree line and in coniferous or chaparral habitats. It is a common to abundant resident in a variety of habitats where trees and large shrubs are absent. Within Southern California, California horned lark nest on the ground in open fields, grasslands, and rangelands. In California, this species breeds from March through July, with a peak in activity in May. California horned

larks forage in areas with low-growing vegetation and feed primarily on grains and other seeds, relying on mostly insects during the summer months. This species has a low to moderate potential to occur within the non-native grassland and goldenbush scrub/non-native grassland habitats (totaling approximately 30.82 acres) throughout the Project site, including approximately 22.42 acres within the K4 Parcel and 8.40 acres within the Cactus Channel improvements site.

Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus*)

Los Angeles pocket mouse (California Species of Special Concern) occurs in coastal basins of Southern California, from Los Angeles east to Cabazon, south to Temecula (Bolster 1998). This species is uncommon to rare throughout its range and inhabits low elevation (550 to 2,650 feet) grasslands, alluvial sage scrub, and coastal sage scrub. This species hibernates from October through February and primarily feeds on seeds and forbs, and infrequently arthropods and larva (Bolster 1998).

The closest documented occurrence for this species is approximately 0.5 miles south of the Project site (CDFW 2018b). This species was not observed on site; however, there are approximately 30.82 acres of suitable foraging habitat (i.e., non-native grassland and goldenbush scrub/non-native grassland habitats) for Los Angeles pocket mouse within the Project site, including approximately 22.42 acres within the K4 Parcel and 8.40 acres within the Cactus Channel improvements site. Thus, there is a low to moderate potential for this species to occur within the Project site.

Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*)

Northwestern San Diego Pocket Mouse (SSC) occurs in coastal sage scrub, sage scrub/grassland ecotomes, and chaparral communities generally associated with rocky and gravelly substrates. In San Diego County, northwestern San Diego pocket mouse is typically associated with shrub cover greater than 50% (Bolger et al. 1997). This species is one of six subspecies of San Diego pocket mouse (Williams et al. 1993) and is primarily a granivore (seed-eater). Northwestern San Diego pocket mouse are nocturnal and spend their days in burrows. A study by Bolger et al. (1997) suggests that isolated habitat patches must be at least 62 to 198 acres to sustain native rodent populations. The repeated disturbance evident on site would likely preclude this species; however, based on the presence of suitable habitat and burrows consistent with pocket mouse size observed within the general biological surveys there is a low to moderate probability for northwestern San Diego pocket mouse to occur on the Project site. The closest documented occurrence for this species is approximately 1.3 miles west of the Project site, west of I-215. There are approximately 30.82 acres of suitable habitat (i.e., non-native grassland, goldenbush scrub/non-native grassland) for northwestern San Diego pocket mouse within the Project site, including 22.42 acres within the K4 Parcel and 8.40 acres within the Cactus Channel improvements site.

*Orange-Throated Whiptail (*Aspidoscelis hyperythra*)*

Orange-throated whiptail (WL) is known to occur within chaparral, non-native grassland, coastal sage scrub, juniper woodland, and oak woodland in southwestern California and Baja California from sea level to 3,400 feet amsl. Its diet consists primarily of termites (*Reticulitermes hesperus*); thus, it is primarily associated with perennial vegetation (Bostic 1966), including California buckwheat (McGurty 1981). Orange-throated whiptail are diurnal, but spend the hottest part of the day in the shade (Pianka 1986). Although this species was not observed during field surveys conducted in July 2018, the Project site provides suitable habitat (i.e., non-native grassland and goldenbush scrub/non-native grassland habitat) to support this species. Thus, there is a moderate potential for this species to occur within the Project site and the closest documented occurrence for this species is approximately 2.3 miles southwest of the Project site, west of I-215 (CDFW 2018b). There are approximately 30.82 acres of suitable habitat (i.e., non-native grassland and goldenbush scrub/non-native grasslands) for orange-throated whiptail within the Project site, including 22.42 acres within the K4 Parcel and 8.40 acres within the Cactus Channel improvements site.

*San Diego Black-Tailed Jackrabbit (*Lepus californicus*)*

San Diego black-tailed jackrabbit (SSC) inhabits open land, but require some shrubs for cover, and primarily occurs in early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush. This species is currently considered vulnerable due to a restricted range and small number of populations. San Diego black-tailed jackrabbit occur from the coast to the western slope of the coastal mountains at elevations below 6,000 feet. Suitable habitat to support San Diego black-tailed jackrabbit occurs throughout the Project site and adjacent areas. One individual was observed within the Project site during surveys conducted in July 2018; thus, this species occurs on site. There are approximately 42.35 acres of suitable habitat (all habitats excluding developed land) for San Diego black-tailed jackrabbit within the Project site, including 32.64 acres within the K4 Parcel and 9.71 acres within the Cactus Channel improvements site.

*Western Spadefoot (*Spea hammondii*)*

Western spadefoot (SSC) is an amphibian species that is almost completely terrestrial, requiring upland areas for foraging and overwintering, and adjacent wetland areas for breeding and reproduction (USFWS 2005). Spadefoot toads are known to construct and occupy burrows that may be up to one meter in depth during the dry periods (Stebbins 1972). Adults emerge with the onset of rainfall events to breed (Stebbins 1972). This species requires temporary rain pools or water sources (lacking predators) with at least three weeks of inundation. The potential vernal pools within the K4 Parcel, as well as the Cactus Channel on the south side of Cactus Avenue have the potential to support this species during breeding. Additionally, the Project site provides suitable upland habitat (i.e., non-native grassland and goldenbush scrub/non-native grassland habitat) to

support this species. The closest documented occurrence for this species is approximately 0.6 miles west of the Project site, west of I-215, and 0.9 miles northwest of the Project site (CDFW 2018b); thus, there is a moderate potential for this species to occur within the Project site. Additionally, a SKR management report notes the observation of this species within a ponded area at the north end of the Meridian West Campus Project site in 2011, approximately 1.55 miles northwest of the Project site. There are approximately 30.82 acres of suitable upland habitat (i.e., non-native grassland and goldenbush scrub/non-native grasslands) for western spadefoot within the Project site, including 22.42 acres within the K4 Parcel and 8.40 acres within the Cactus Channel improvements site. Additionally, there are approximately 0.47 acres of suitable breeding habitat (i.e., freshwater marsh, southern willow scrub, and Fremont's cottonwood), including 0.06 acres within the K4 Parcel and 0.41 acres within the Cactus Channel improvements site.

4.3.1.3 Critical Habitat

No USFWS-designated critical habitat or proposed critical habitat occurs within 5 miles of the proposed Project site; thus, no impacts to critical habitat are expected to occur during implementation of the proposed Project (Figure 4.3-2).

4.3.1.4 Wildlife Corridors

Wildlife corridors are linear features that connect larger patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by assuming continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires). Habitat linkages are small patches of habitat that join larger blocks of habitat and help reduce adverse effects of habitat fragmentation. Habitat linkages are also important in maintaining gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as stepping stones for dispersal.

The Project site occurs in Riverside County, within the boundaries of the WRC MSHCP (Figure 4.3-3, MSHCP Overview). The MSHCP Conservation Area is comprised of a variety of existing and proposed cores and linkages, including Cores, Extensions of Existing Cores, Linkages, Constrained Linkage, and Non-contiguous Habitat Blocks (County of Riverside 2003). The Project site does not occur within any existing or proposed cores and/or linkage areas recognized within the MSHCP Conservation Area (County of Riverside 2003; Figure 4.3-3). Additionally, the Project site does not occur within any MSHCP designed Criteria Cells, Public/Quasi Public Conserved Land areas, existing conserved Additional Reserve Land, or land described for conservation (County of Riverside 2003; Figure 4.3-3). The closest designated core and/or linkage area to the Project site is existing Core D, which is located approximately 1.1 miles west of the Project site

(west of I-215), followed by Non-contiguous Habitat Block A, which is located approximately 2.6 miles north of the Project site (north of State Route (SR) 60). The closest designated linkage area is proposed Constrained Linkage 7, which connects the northern habitat block of Core D (immediately north of Sycamore Canyon Wilderness Park) with Box Springs Mountain Reserve (Non-contiguous Habitat Block A) north of Sycamore Canyon Wilderness Park, located over 4 miles northwest of the Project site.

While the Project site is primarily undeveloped, it is dominated by routinely disturbed non-native grasses and disturbed land that provide lower quality habitat and minimal cover to support most wildlife movement through the area. Additionally, the areas surrounding the site are substantially developed, and do not support direct linkage to better quality habitat. Furthermore, the Project site is located approximately 0.50 miles east of I-215 and approximately 2.1 miles south of SR-60, which likely provides a barrier to wildlife traveling east–west and north–south. As a result, the Project site does not serve as a wildlife corridor.

4.3.1.5 Preliminary Jurisdictional Areas

The Project supports an west–east, earthen-lined and vegetated drainage ditch, which is referred to as the Cactus Channel (Figure 4.3-4, Preliminary Jurisdictional Determination; Appendix F). The Cactus Channel runs parallel to Cactus Avenue from just east of Elsworth Street to Hancock Street, within the northern portion of the Project site, and receives flows from several culverts along Cactus Avenue. This is the only aquatic resource observed within the study area. This feature originates within the Project survey area from a culvert along Cactus Avenue, east of the intersection of Elsworth Street, and flows east approximately 1.5-miles until being diverted south into a drainage ditch along Heacock Street. The channel supports both wetland and non-wetland features.

A majority of the Cactus Channel within the survey area met all three parameters per the Arid West Supplement and would therefore be considered potentially jurisdictional wetlands per the ACOE, RWQCB, and CDFW. These wetland areas were disturbed by regular mowing of the channel; thus, the presence or absence of wetland boundaries was largely defined by observation of hydric soil indicators (i.e., presence and prominence/abundance of redox features). Wetland areas also occur within the bed and banks of potentially jurisdictional CDFW streambed.

Non-wetland waters (determined by the presence of an ordinary high water mark (OHWM) and bed and bank) were present within the Cactus Channel from just west of Riverside Drive to Heacock Street. These waters are considered potential non-wetland, ephemeral waters of the United States/state and are likely to be jurisdictional under the ACOE, RWQCB, and ephemeral streambed jurisdictional by the CDFW. Some areas of the Cactus Channel supported small patches of riparian vegetation (i.e., sandbar willow, Fremont's cottonwood, and Goodding's black willow), which is also likely to be considered potentially jurisdictional CDFW riparian areas; however,

these riparian areas did not meet the federal wetland parameters; thus, unlikely to be jurisdictional by the ACOE and RWQCB. The trapezoidal nature of the channel and associated wide banks account for the increase in CDFW estimated jurisdiction, which extends beyond the delineated ACOE/RWQCB/CDFW wetland and non-wetland areas in most areas throughout the channel.

No vernal pools were observed during the 2018 Project biological surveys; however, depressions with cracked soils were observed on site during the July 2018 general biological surveys. As such, these areas may pond during the rainy season and protocol listed branchiopod surveys are currently being undertaken to determine presence/absence on site.

Tables 4.3-4 and 4.3-5 provide the approximate acreages of potential jurisdictional resources, per regulatory agency, delineated within the Project survey area and related information. Table 4.3-6 provides vegetation community acreages with the Project site (Figure 4.3-4; Appendix F).

Table 4.3-4
The Project Site (K4 Parcel and Cactus Channel Improvements site)

ACOE and RWQCB Jurisdictional Waters	Acreage	Linear Feet	Presence of OHWM	Wetland Presence	Dominant Vegetation	Location (lat/long)
Cactus Channel Wetland	1.39	4,790	No	Yes	Freshwater Marsh	33.90994442, -117.2615647
Cactus Channel Non-Wetland Waters of the United States/State	0.42	2,876	Yes	No	Unvegetated; Non-Native Grassland	33.909960615, -117.2509659
Total	**1.81**	**7,666**	—	—	—	—

Source: Appendix F.
Notes: ACOE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board; OHWM = ordinary high water mark.

Table 4.3-5
California Department of Fish and Wildlife Potential Jurisdictional Waters within the Project Site (including the K4 Parcel and Cactus Channel Improvements Site)

CDFW Jurisdictional Waters	Acreage	Linear Feet	Presence of OHWM	Wetland Presence	Dominant Vegetation
Cactus Channel Wetland	1.39	4,790	No	Yes	Freshwater Marsh
Cactus Channel Non-Wetland Streambed	1.60	2,876	Yes	No	Unvegetated; Non-Native Grassland
Total	**2.99**	**7,666**	—	—	—

Source: Appendix F.
Notes: CDFW = California Department of Fish and Wildlife; OHWM = ordinary high water mark.

Table 4.3-6 outlines the total acreage of CDFW jurisdictional resources (i.e., riparian vegetation communities, non-native grassland, and unvegetated streambed) within the Project site.

Table 4.3-6
California Department of Fish and Wildlife Jurisdictional Vegetation Communities within the Project Site (including the K4 Parcel and Cactus Channel Improvements Site)

CDFW Riparian Vegetation Communities	K4 Parcel (acres)	Cactus Channel Improvements (acres)	Total Project Site (acres)
Fremont Cottonwood	--	0.02	0.02
Freshwater Marsh	0.04	0.37	0.41
Non-Native Grassland	0.02	2.50	2.52
Southern Willow Scrub	0.02	0.02	0.04
Total	**0.08**	**2.91**	**2.99**

Source: Appendices E and F.
Notes: CDFW = California Department of Fish and Wildlife.

4.3.2 Relevant Plans, Policies, and Ordinances

Federal

Federal Endangered Species Act

FESA of 1973 (16 U.S.C. 1531 et seq.), as amended provides for listing of endangered and threatened species of plants and animals and designation of critical habitat for listed animal species. FESA regulates the "taking" of any endangered fish or wildlife species, per Section 9 of the Act. As development is proposed, the responsible agency or individual landowner is required to consult with the USFWS to assess potential impacts to listed species (including plants) or its critical habitat, pursuant to Sections 7 and 10 of the act. USFWS is required to make a determination as to the extent of impact to a particular species a project would have. If it is determined that potential impacts to a species would likely occur, measures to avoid or reduce such impacts must be identified. USFWS may issue an incidental take statement, following consultation and the issuance of a BO. This allows for take of the species that is incidental to another authorized activity, provided that the action will not adversely affect the existence of the species. Section 10 of the FESA provides for issuance of incidental take permits to non-federal parties with the development of a HCP; Section 7 of the act provides for permitting of federal projects.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703 et seq.) was originally passed in 1918 as four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The MBTA is a federal statute that implements treaties with several countries on the conservation and protection of migratory birds. The number of bird species covered by the MBTA is extensive and is listed at 50 CFR 10.13. The MBTA is enforced by USFWS and prohibits "by any means or in

any manner, to pursue, hunt, take, capture, [or] kill" any migratory bird, or attempt such actions, except as permitted by regulation.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act of 1899 prohibit discharge of any material into navigable waters, or tributaries thereof, of the United States without a permit. The act also makes it a misdemeanor to excavate, fill, or alter the course, condition, or capacity of any port, harbor, or channel; or to dam navigable streams without a permit.

Many activities originally covered by the Rivers and Harbors Act are now regulated under the Clean Water Act (CWA) of 1972, discussed below. However, the 1899 Act retains relevance and created the structure under which the ACOE oversees CWA 404 permitting.

Clean Water Act

Pursuant to Section 404 of the CWA, the ACOE is authorized to regulate any activity that would result in the discharge of dredged or fill material into waters of the U.S. The term "wetlands" (a subset of waters) is defined in 33 Code of Federal Regulations 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." In the absence of wetlands, the limits of ACOE jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM, as defined in 33 Code of Federal Regulations 328.3(e). The ACOE, with oversight from the U.S. Environmental Protection Agency, has the principal authority to issue CWA Section 404 Permits. The ACOE would require a Standard Individual Permit for more than minimal impacts to waters of the U.S. as determined by the ACOE. Projects with minimal individual and cumulative adverse effects on the environment may meet the conditions of an existing Nationwide Permit. Pursuant to Section 10 of the Rivers and Harbors Act of 1899, ACOE regulates any potential obstruction or alteration of any navigable water of the United States.

A water quality certification or waiver pursuant to Section 401 of the CWA is required for all Section 404 permitted actions. The RWQCB, a division of the State Water Resources Control Board, provides oversight of the 401 permit process in California. The RWQCB is required to provide "certification that there is reasonable assurance that an activity that may result in the discharge to waters of the United States will not violate water quality standards." Water Quality Certification must be based on the finding that proposed discharge will comply with applicable water quality standards.

The NPDES is the permitting program for discharge of pollutants into surface waters of the U.S. under Section 402 of the CWA. Substantial impacts to wetlands may require an Individual Permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits.

Clean Water Rule

Issued in 2015, the Clean Water Rule (also referred to as the Waters of the U.S. Rule or WOTUS Rule) was published by the U.S. Environmental Protection Agency and the ACOE under a provision of the CWA to clarify water resource management in the United States. The regulation defined the scope of federal water protection in a more consistent manner, particularly as regulations oversee streams and wetlands that have a significant hydrologic and ecological connection to traditional navigable waters, interstate waters, and territorial seas. The Clean Water Rule clarifies the scope of coverage of the CWA in an effort to save time and avoid costs and confusion in future implementation of the act. More than 100 parties have filed lawsuits since the Clean Water Rule was issued which were consolidated in the Sixth Circuit and halted the implementation of the Clean Water Rule for the duration of the litigation. However, in January 2018, the Supreme Court ruled that the Sixth Circuit did not have jurisdiction over the case, and in February 2018, the Sixth Circuit dismissed the case and dissolved the stay. On February 6, 2018, the U.S. Environmental Protection Agency and ACOE published a final rule titled "Definition of 'Waters of the United States'—Addition of an Applicability Date to 2015 Clean Water Rule," in which the agencies delayed implementation of the 2015 Clean Water Rule until 2020. Nine environmental groups challenged the rule in the United States District Court and the District Court called the final rule the "Suspension Rule" since it suspended the implementation of the 2015 Clean Water Rule until 2020. The Suspension Rule is one of a series of steps intended to repeal and replace the rule.

The 2015 Clean Water Rule is in effect in 22 states, the District of Columbia, and the U.S. territories. With this final rule, the Environmental Protection Agency and the Department of the Army intend to provide greater certainty about the jurisdictional extent of the Clean Water Act and to maintain the legal status quo by adding an applicability date to the 2015 Clean Water Rule while they continue to work to consider possible revisions to the 2015 rule.

State

California Environmental Quality Act

The CEQA was established in 1970 as California's counterpart to the National Environmental Policy Act. It is a statute that requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, where feasible.

CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a project. A project is an activity undertaken by a public agency or a private activity, which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency that may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

California Endangered Species Act and Natural Community Conservation Planning Act

The CESA (CFGC, Section 2050 et seq.) provides protection and prohibits the take of plant, fish, and wildlife species listed by the State of California. Unlike FESA, state-listed plants have the same degree of protection as wildlife, but insects and other invertebrates may not be listed. Take is defined similarly to FESA and is prohibited for both listed and candidate species. Take authorization may be obtained by the project applicant from the CDFW under the CESA Section 2081, which allows take of a listed species for educational, scientific, or management purposes. In this case, private developers consult with CDFW to develop a set of measures and standards for managing the listed species, including full mitigation for impacts, funding of implementation, and monitoring of mitigation measures.

CESA of 1984, in combination with the California Native Plant Protection Act of 1977, regulates the listing and take of plant and animal species designated as endangered, threatened, or rare within the state. California also lists SSC based on limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. The CDFW is responsible for assessing development projects for their potential to impact listed species and their habits. State-listed special-status species are addressed through the issuance of a 2081 permit (Memorandum of Understanding).

In 1991, the California Natural Community Conservation Plan (NCCP) Act was approved and the NCCP Coastal Sage Scrub program was initiated in Southern California. California law (Section 2800 et seq. of the CFGC) established the NCCP program "to provide for regional protection and perpetuation of natural wildlife diversity while allowing compatible land use and appropriate development and growth." The NCCP Act encourages preparation of subarea plans that address habitat conservation and management on an ecosystem basis rather than one species or habitat at a time.

California Fish and Game Code Sections 1600-1602

Pursuant to Division 2, Chapter 6, Section 1602 of the CFGC, CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake that supports fish or wildlife. A Lake or Streambed Alteration Agreement Application must be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW has jurisdiction over riparian habitats associated with watercourses. Jurisdictional waters are

delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. CDFW jurisdiction does not include tidal areas or isolated resources. CDFW reviews the proposed actions and, if necessary, submits (to the applicant) a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is the Lake or Streambed Alteration Agreement.

California Fish and Game Code Sections 3503, 3511, 3513, 3801, 4700, 5050, and 5515

Within California, fish, wildlife, and native plant resources are protected and managed by CDFW. The California Fish and Game and Commission and/or CDFW are responsible for issuing permit for the take or possession of protected species. The following sections of the CFGC address protected species: Section 3511 (birds), Section 4700 (mammals), Section 5050 (reptiles and amphibians), and Section 5515 (fish). In addition, the protection of birds of prey is provided for in Sections 3503, 3513, and 3800 of the CFGC.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) provides for statewide coordination of water quality regulations. The state Water Resources Control Board was established as the statewide authority and nine separate RWQCBs were developed to oversee water quality on a day-to-day basis.

The RWQCB is the primary agency responsible for protecting water quality in California. As discussed above, the RWQCB regulates discharges to surface waters under the federal CWA. In addition, the RWQCB is responsible for administering the California Porter-Cologne Water Quality Control Act.

Pursuant to the Porter-Cologne Water Quality Control Act, the state is given authority to regulate waters of the state, which are defined as any surface water or groundwater, including saline waters. As such, any persons proposing to discharge waste into a water body that could affect its water quality must first file a Report of Water Discharge if Section 404 is not required for the activity. "Waste" is partially defined as any waste substance associated with human habitation, including fill material discharged into water bodies.

Regional and Local Plans

Stephens' Kangaroo Rat Habitat Conservation Plan

The March JPA Planning Area is located within the SKR HCP area for the endangered SKR, which was implemented by the Riverside County Habitat Conservation Agency and allows for incidental take of SKR for qualifying projects located within the HCP area. The SKR HCP mitigates impacts to SKR from development by establishing a network of Core Reserves for conservation of SKR

and the ecosystems upon which it depends. The SKR HCP also established a system for managing and monitoring these Core Reserves. The SKR HCP designated the Sycamore Canyon Park and the March Air Force Base SKR Management Area as a Core Reserve in 1996. No portion of the Project site is located within this designated SKR Management Area. The original March Air Force Base SKR Management Area consisting of 1,178 acres of grassland, located in the northern and western portions of the West March Planning Subarea (west of the Project site and I-215) was exchanged for acquisition of the Potrero site, which was determined to better address the overall conservation needs of SKR. The Potrero site provides a larger, contiguous block of occupied SKR habitat, is adjacent to federal lands, and provides connection to core population reserves for this species; thus, better complies with the objectives and requirements of the Long-term SKR HCP. The acquisition and conservation of the Potrero site allowed for other developable areas identified within the SKR Management Area of the former March Air Force Base (west of I-215) to be released for development. As such, the 1,178 acres of grassland within the West March Planning Subarea was released as a Core Reserve and is no longer part of the Riverside County Habitat Conservation Agency. However, the proposed Project is located outside of (east of) the West March Planning Subarea.

Under the SKR HCP development within the Plan boundaries, but outside the Core Reserves, is deemed to have fully mitigated for any impacts to SKR through compliance with the HCP and the payment of a fee. March JPA is not a Permittee to the SKR HCP. However, if the proposed Project is anticipated to impact (would have a take) SKR, the March JPA may choose to participate in the SKR HCP. The SKR HCP establishes suitable habitat areas where incidental take is permitted through a fee process and core reserve areas in occupied habitat where development projects are required to obtain individual permits. The Project site (i.e., K4 Parcel and Cactus Channel improvements site) is located within the SKR HCP fee area; thus, if impacts to SKR are anticipated, the March JPA may choose to pay a per-acre fee to participate in the SKR HCP to allow for take. Alternatively, March JPA may choose to acquire an individual Stephens kangaroo rat incidental take permit from the USFWS through Section 7 of the FESA.

Western Riverside County MSHCP

The Project occurs within the boundaries of the WRC MSHCP, a comprehensive, multijurisdictional HCP focusing on conservation of species and their associated habitats in WRC. The MSHCP is one of several large, multijurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The MSHCP allows Riverside County and its Cities to better control local land-use decisions and maintain a strong economic climate in the region, while addressing the requirements of CESA and FESA. The MSHCP serves as a HCP pursuant to Section 10(a)(1)(b) of FESA of 1973, as well as a NCCP under the NCCP Act of 2001; and allows the participating jurisdictions to authorize "take" of plant and wildlife species identified within the plan area.

Projects where the lead agency is a signatory to the MSHCP are covered under the MSHCP. However, the March JPA is the lead agency for the Project and is not a signatory to the MSHCP. As such, the Project is not subject to MSHCP regulations nor does it receive take authority granted under the MSHCP. However, if proposed Project implementation is anticipated to impact (would have a take) Covered Species addressed within the MSHCP, the March JPA may choose to participate in the MSHCP instead of acquiring a separate federal take permit from the USFWS under Section 7 of the FESA for covered special-status species. Pursuant to the MSHCP, the WRC Regional Conservation Authority was created to oversee the goals of the MSHCP. The Regional Conservation Authority may grant permission to public agencies and regional service providers who were not part of the original agreement to construct projects within the area covered by the MSHCP. As such, the March JPA could apply for status as a Participating Special Entity (which includes payment of a fee), and the Project can use the "take" permits granted under the MSHCP instead of having to obtain their own separate permits or negotiate with the federal and state wildlife agencies. Participation in the MSHCP is a voluntary action typically taken only when incidental take permit is required from USFWS. However, all projects are required to be consistent with the terms and conditions of the MSHCP.

March JPA General Plan

The March JPA General Plan serves as the primary document for the regulation of the physical development of the planning area. The Resource Management Element of the March JPA General Plan includes policies related to biological resources. The following policies are from the March JPA General Plan that applies to the Project. Consistency with these policies are discussed in Section 4.9, Land Use and Planning.

Policy 5.1: Where practical, conserve important plant communities and habitats such as riparian areas, wetlands, significant tree stands, and species by using buffers, creative site planning, revegetation and open space easements/dedications.

Policy 5.2: Encourage the planting of native species of trees and other drought tolerant vegetation.

Policy 5.4: In areas that may contain important plant and animal communities, require development to prepare biological assessments identifying species types and locations and develop measures to preserve recognized sensitive species, as appropriate.

Policy 5.5: Where practical, allow development to remove only the minimum natural vegetation and encourage the revegetation of graded areas with native plant species.

Policy 5.6: Work with state, federal and local agencies in the preservation and/or mitigation of recognized sensitive vegetation and wildlife in March JPA Planning Area.

Policy 9.1: Encourage a "link" system of open space land to intermix with development providing both visual buffers and relief, as well as preservation and connectivity of the natural environment.

Policy 9.6: Establish an open space conservation program that identifies areas of open space retention based upon capital costs, operations and maintenance costs, accessibility, needs, resource preservation, ability to complete or enhance the existing open space linkage system and natural environment.

Riverside County Ordinance Nos. 499-559 (Tree Removal)

Chapter 12.08 of the Riverside County Code of Ordinances provides regulations regarding roadside tree removal and trimming activities (County of Riverside 2016). In accordance with Unincorporated Riverside County Ordinance No. 499 (as amended through 499.11), a permit must be obtained from the County Transportation Director prior to removing trees or trimming any tree planted in the right of way of a County highway. If such tree removals are proposed, conditions may be imposed by the County Transportation Director such as requirements for use of a qualified tree surgeon or trimmer, and for bond, insurance, or security to protect from damage, as well as relocation and/or replacement by one or more trees.

Chapter 12.24 of the Riverside County Code of Ordinances also includes regulations related to the tree removal (County of Riverside 2016). According to the Unincorporated Riverside County Ordinance No. 559 (as amended through 559.7), the removal of living native trees on parcels or property greater than 0.5 acre in size, located in the unincorporated Riverside County, and above 5,000 feet in elevation requires a permit.

Riverside County Oak Tree Management Guidelines address oak woodlands in areas where zoning and/or general plan density restrictions will allow the effective use of clustering (County of Riverside 1999). A biological study is required for properties that support oak tree son a lot size of 2.5 acres or greater. Protected oaks include any individual tree larger than 2 inches in diameter at breast height or the sum of the diameters of multiple trunks at diameter at breast height. Protected species include *Quercus agrifolia*, *Q. chrysolepis*, *Q. Engelmann*, *Q. kelloggii*, *Q. morehus*, and *Q. wislizenii* (County of Riverside 1999).

4.3.3 Thresholds of Significance

March JPA uses the CEQA Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the Initial Study prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted CEQA

Guidelines Appendix G (December 2018), the Project could have a significant impact related to biological resources if the Project would:

- **BIO-1:** Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- **BIO-2:** Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.
- **BIO-3:** Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.
- **BIO-4:** Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.
- **BIO-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
- **BIO-6:** Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.3.4 Impacts Analysis

Threshold BIO-1. ***Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?***

The *Biological Technical Report* outlines the special-status species that could be potentially affected by the Project (Appendix E). The entire approximate 42.4-acre Project site (including the 35.4-acre K4 Parcel and 7.0-acre Cactus Channel improvements site) is proposed to be impacted by the proposed Project (Figure 4.3-5, Proposed K4 Project Impacts).

Special-Status Plants

The Project site does not provide suitable habitat for federally or state threatened or endangered plants based on the disturbed nature of the site, lack of suitable soils to support listed plant species

in the vicinity, and results of focused summer special-status plant surveys conducted in July 2018 (Appendix E). Smooth tarplant (*Centromadia pungens* ssp. *laevis*; CRPR 1B.1 and State Rank S2) was the only plant species observed on site during the focused rare plant survey conducted in July 2018 (Appendix E; Figure 4.3-5). No other special-status plant species has a moderate or high potential to occur within the Project site (Table 4.3-2; Appendix E).

All plants constituting CRPR 1B meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act), or Section 2062 and 2067 (CESA) of the CFGC and are eligible for state listing. Thus, it is mandatory that impacts to these species or their habitat be analyzed during preparation of environmental documents pertaining to CEQA. Approximately 525 to 550 smooth tarplant individuals were observed and mapped within 0.15 acres of predominantly disturbed land and minimal grassland habitat throughout the Project site during the focused special-status plant surveys conducted in July of 2018, and individuals would be directly impacted by the Project (i.e., grading, clearing, grubbing, trampling, etc.) (Figure 4.3-5). The entire 42.4 acre Project site (i.e., K4 Parcel and Cactus Channel improvements site) is proposed to be permanently impacted during the proposed Project activities. Potential short-term indirect impacts to smooth tarplant would primarily result from the generation of fugitive dust, increased human activity, and the introduction of chemical pollutants during vegetation removal and grading/filling activities associated with Project construction. Potential long-term indirect impacts to smooth tarplant populations in the Project area would primarily result from potential altered hydrology, non-native invasive species, chemical pollutants, increased human presence, and alteration of the natural fire regime. Project impacts to special-status plants are discussed below for each Project area (i.e., the K4 Parcel and Cactus Channel improvements site).

K4 Parcel

Approximately 532 smooth tarplant individuals were observed and mapped within 0.15 acres of disturbed land in the southeastern portion of the K4 Parcel during the focused special-status plant surveys conducted in July of 2018, and these individuals would be permanently impacted by the Project (i.e., grading, clearing, grubbing, trampling, etc.) (Figure 4.3-5). Direct temporary impacts to smooth tarplant could occur from removal or trampling of vegetation outside of the designated work zones. Construction would result in direct permanent impacts to smooth tarplant, which would be potentially significant absent mitigation. MM-BIO-1 would be implemented requiring focused surveys be conducted during the appropriate season prior to construction, demarcation of construction limits adjacent to occupied smooth tarplant habitat outside of the construction areas, preparation of a Smooth Tarplant Mitigation Plan including measures to salvage seedbanks from occupied habitat, when feasible, timing of planting or seeding activities, success criteria requirements, and compensatory mitigation requirements for impacts (minimum replacement value of 1:1 for permanent impacts) to occupied smooth plant habitat.

In accordance with the March Air Force Base closure process, 664 acres of native habitat (i.e., non-native grassland habitat) was placed into conservation easement to offset species and habitat losses associated with base redevelopment, including development of the Project site. Planned conservation areas occur approximately 1 mile west of the Project site (west of I-215), and provides similar habitats to those that will be impacted by the Project (March JPA 1999b; Appendix E). At least one population of 50 smooth tarplant individuals was observed during a brief survey of the conservation areas conducted in 2018. Given the habitats present within the conserved areas, it is also likely that there are additional populations of smooth tarplant within the conserved areas. As such, many habitat and species loses have already been addressed through conservation of the site, including smooth tarplant and other CRPR species. As a result, it is likely that this habitat could be counted toward the overall compensatory mitigation requirements addressed in **MM-BIO-1**, as applicable.

Short-term and long-term indirect impacts to smooth tarplant could be significant, and would be reduced through implementation of **MM-BIO-1**, requiring focused surveys be conducted during the appropriate season prior to construction, preparation of a Smooth Tarplant Mitigation Plan should impacts to the species be unavoidable, demarcation of construction limits adjacent to occupied smooth tarplant habitat outside of the construction areas for avoidance, and weekly monitoring to assure avoidance. Additionally, implementation of **MM-BIO-2** requiring an environmental awareness training be conducted, clearly marking work limits, routine monitoring to ensure implementation of best management practices (BMPs), requiring vehicle speeds under 15 mph on unpaved roads to control dust, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to smooth tarplant. Implementation of **MM-BIO-1** and **MM-BIO-2** would reduce direct and/or indirect impacts to special-status plants to **less than significant**.

Cactus Channel Improvements

Approximately 11 smooth tarplant individuals were observed and mapped in non-native grassland habitat within the Cactus Channel improvements site during the focused special-status plant surveys conducted in July of 2018 (Figure 4.3-5). All of these individuals would be directly impacted by the Project (i.e., grading, clearing, grubbing, trampling, etc.). Direct temporary impacts to smooth tarplant could occur from removal or trampling of vegetation outside of the designated work zones. Direct impacts to smooth tarplant would be potentially significant absent mitigation. **MM-BIO-1** would be implemented requiring focused surveys be conducted during the appropriate season prior to construction, demarcation of construction limits adjacent to occupied smooth tarplant habitat outside of the construction areas, preparation of a Smooth Tarplant Mitigation Plan including measures to salvage seedbanks from occupied habitat, when feasible, timing of planting or seeding activities, success criteria requirements, and compensatory mitigation requirements for impacts (minimum replacement value of 1:1 for permanent impacts) to occupied smooth plant habitat.

In accordance with the March Air Force Base closure process, 664 acres of native habitat (i.e., non-native grassland habitat) was placed into conservation easement to offset species and habitat losses associated with base redevelopment, including development of the Project site. Planned conservation areas occur approximately 1 mile west of the Project site (west of I-215), and provides similar habitats to those that will be impacted by the Project (March JPA 1999b; Appendix E). At least one population of 50 smooth tarplant individuals was observed during a brief survey of the conservation areas conducted in 2018. Given the habitats present within the conserved areas, it is also likely that there are additional populations of smooth tarplant within the conserved areas. As such, many habitat and species loses have already been addressed through conservation of the site, including smooth tarplant and other CRPR species. As a result, it is likely this habitat could be counted toward the overall compensatory mitigation requirements addressed in **MM-BIO-1**, as applicable.

Short-term and long-term indirect impacts to smooth tarplant could be significant, and would be reduced through implementation of **MM-BIO-1**, requiring focused surveys be conducted during the appropriate season prior to construction, preparation of a Smooth Tarplant Mitigation Plan should impacts to the species be unavoidable, demarcation of construction limits adjacent to occupied smooth tarplant habitat outside of the construction areas for avoidance, and weekly monitoring to assure avoidance. Additionally, implementation of **MM-BIO-2** requiring an environmental awareness training be conducted, clearly marking work limits, routine monitoring to ensure implementation of BMPs, requiring vehicle speeds under 15 mph on unpaved roads to control dust, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to smooth tarplant. Implementation of **MM-BIO-1** and **MM-BIO-2** would reduce direct and/or indirect impacts to special-status plants to **less than significant**.

Special-Status Wildlife

Federally and State-Listed Wildlife Species

Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

Riverside fairy shrimp is federally listed as endangered and vernal pool fairy shrimp is federally listed as threatened. Riverside fairy shrimp and vernal pool fairy shrimp have a low to moderate and moderate potential to occur (respectively) within the Project site based on the presence of potentially suitable habitat for these species. Protocol-level branchiopod presence/absence surveys are currently underway and results of these surveys will be submitted to the USFWS in accordance with species protocol. Impacts to Riverside fairy shrimp and vernal pool fairy shrimp could occur should the results of the ongoing focused surveys be positive. However, if the results of the listed branchiopod focused surveys are negative, no direct and/or indirect impacts would occur to these species and mitigation would not be required.

If present, direct impacts to federally listed fairy shrimp could result from ground-disturbing activities (i.e., clearing, grubbing, grading, etc.), and would be considered significant absent mitigation. Indirect short-term impacts to fairy shrimp include vibration, changes to hydrology, chemical pollution, fugitive dust, and increased human presence, and substantial long-term impacts include hydrology alterations, chemical pollution, and increased human presence. Indirect short-term and long-term impacts to federally listed vernal pool branchiopods would also be considered significant absent mitigation. Project impacts to federally listed fairy shrimp are further discussed below for each Project area (i.e., K4 Parcel and Cactus Channel improvements site).

K4 Parcel

The low areas within the K4 Parcel may pond during rain events, and may support features likely to remain inundated for periods greater than 120 days. As discussed above, direct impacts to federally listed fairy shrimp could result from ground-disturbing activities (i.e., clearing, grubbing, grading, etc.). Additionally, short-term and long-term indirect impacts to federally listed fairy shrimp could result from impacts due to vibration, changes to hydrology, chemical pollution, fugitive dust, and increased human presence. Indirect long-term impacts include changes to hydrology, chemical pollution, and increased human presence. Direct and/or indirect impacts would be considered significant absent mitigation.

Direct and/or indirect impacts to occupied listed vernal pool branchiopod habitat would be reduced by implementation of **MM-BIO-3**, which requires focused surveys be conducted prior to construction, demarcation of construction limits adjacent to occupied vernal pool branchiopod habitat outside of the construction areas, monitoring for avoidance within 500 feet of occupied or assumed occupied vernal pool habitat, avoidance of fueling, vehicle maintenance, and staging areas within 100 feet of vernal pool or aquatic habitat, as well as mitigation (i.e., minimum replacement value of 1:1 for temporary impacts and 2:1 for permanent impacts), preparation and implementation of a mitigation, monitoring, and management plan, and creation, restoration, and/or enhancement of suitable vernal pool habitat or compensation to a USFWS-approved mitigation bank for listed branchiopods if impacts to occupied vernal pool branchiopod habitat cannot be avoided. Additionally, implementation of **MM-BIO-2** requiring attendance of an environmental awareness training, clearly marking work limits, routine monitoring to ensure implementation of BMPs, requiring vehicle speeds under 15 mph on unpaved roads to control dust, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to listed vernal pool branchiopod species. Implementation of **MM-BIO-2 and MM-BIO-3** would reduce direct and/or indirect impacts to listed vernal pool branchiopods to **less than significant**, and no additional mitigation is required.

Cactus Channel Improvements Site

The Cactus Channel supports features that likely remain inundated for long periods, and therefore may be suitable for Riverside fairy shrimp and vernal pool fairy shrimp. As discussed above, direct impacts to federally listed fairy shrimp could result from ground-disturbing activities (i.e., clearing, grubbing, grading, etc.). Additionally, short-term and long-term indirect impacts to federally listed fairy shrimp could result from impacts due to vibration, changes to hydrology, chemical pollution, fugitive dust, and increased human presence. Indirect long-term impacts include changes to hydrology, chemical pollution, and increased human presence. Direct and/or indirect impacts would be considered significant absent mitigation.

Direct and/or indirect impacts to occupied listed vernal pool branchiopod habitat would be reduced by implementation of **MM-BIO-3**, which requires focused surveys be conducted prior to construction, demarcation of construction limits adjacent to occupied vernal pool branchiopod habitat outside of the construction areas, monitoring for avoidance within 500 feet of occupied or assumed occupied vernal pool habitat, avoidance of fueling, vehicle maintenance, and staging areas within 100 feet of vernal pool or aquatic habitat, as well as mitigation (i.e., minimum replacement value of 1:1 for temporary impacts and 2:1 for permanent impacts), preparation and implementation of a mitigation, monitoring, and management plan, and creation, restoration, and/or enhancement of suitable vernal pool habitat or compensation to a USFWS-approved mitigation bank for listed branchiopods if impacts to occupied vernal pool branchiopod habitat cannot be avoided. Additionally, implementation of **MM-BIO-2** requiring attendance of an environmental awareness training, clearly marking work limits, routine monitoring to ensure implementation of BMPs, requiring vehicle speeds under 15 mph on unpaved roads to control dust, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to listed vernal pool branchiopod species. Implementation of **MM-BIO-2 and MM-BIO-3** would reduce direct and/or indirect impacts to listed vernal pool branchiopods to **less than significant**, and no additional mitigation is required.

Stephens' Kangaroo Rat

This species of kangaroo rat is federally listed as endangered and state listed as threatened. There are approximately 41.83 acres of potentially suitable habitat (i.e., goldenbush scrub/non-native grassland, non-native grassland, and developed/disturbed land) within the Project site. Protocol-level presence/absence surveys were conducted for SKR within the study area (i.e., the K4 Parcel and Cactus Channel improvements site) in 2018 with negative results. No SKR or SKR sign (i.e., tracks, scat, tail drags, or seed caches) were documented during the protocol survey effort conducted between October 21 and 26, 2018. Additionally, the March JPA Planning Area EIR did not identify SKR records and/or occupied habitat within the Project site (east of I-215) based on previous focused survey efforts conducted for this species in this area (March JPA 1999b).

Therefore, no direct and/or indirect impacts to this species are expected to occur during Project implementation. Nevertheless, direct and/or indirect impacts to this species, if present, would be considered significant. Thus, Project impacts to federally listed SKR are further discussed below for each Project area (i.e., K4 Parcel and Cactus Channel improvements site).

K4 Parcel

Potentially suitable habitat for SKR occurs within the K4 Parcel and this species has documented occurrences within 1 mile of the Project site (CDFW 2018b). Although the species was determined to be absent during protocol-level surveys conducted in 2018, there are approximately 32.58 acres of suitable habitat for this species (i.e., goldenbush scrub/non-native grassland, non-native grassland, and developed/disturbed land) within the K4 Parcel and direct and/or indirect impacts to this species would be significant. Potential impacts include direct impacts to 32.58 acres of occupied habitat (i.e., non-native grassland, goldenbush scrub/non-native grassland, and disturbed lands), potential for mortality, injury, and/or harassment, and indirect impacts due to construction-related noise, vibration, lighting, potential vehicle strike, and increased human presence could occur. As such, construction activities have the potential to result in significant impacts to SKR individuals and/or occupied habitat if present on site and in the immediate vicinity of the Project site.

Direct and/or indirect impacts to occupied SKR habitat would be further reduced by implementation of **MM-BIO-4**, which requires focused surveys be conducted prior to construction, development and implementation of a trapping/relocation program in coordination with the resource agencies, demarcation of construction limits adjacent to occupied SKR burrows outside of the construction areas, monitoring for avoidance within 500 feet of occupied SKR habitat, as well as take authorization requirements and mitigation (i.e., minimum replacement value of 1:1 for impacts). Additionally, implementation of **MM-BIO-2** requiring attendance of an environmental awareness training, clearly marking work limits, routine monitoring to ensure implementation of BMPs, requiring vehicle speeds under 15 mph on unpaved roads to control dust, lighting restrictions, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to SKR individuals and habitat. Implementation of **MM-BIO-2 and MM-BIO-4** would reduce direct and/or indirect impacts to listed SKR to **less than significant**, and no additional mitigation is required.

Cactus Channel Improvements Site

Potentially suitable habitat for SKR occurs within the Cactus Channel improvements site and this species has documented occurrences within 1 mile of the Project site (CDFW 2018b). Although the species was determined to be absent during protocol-level surveys conducted in 2018, there are approximately 9.25 acres of suitable habitat for this species (i.e., non-native grassland, and

developed/disturbed land) within the Cactus Channel Improvements, and any direct and/or indirect impacts to this species would be significant. Potential impacts include direct impacts to 9.25 acres of occupied habitat (i.e., non-native grassland and disturbed lands), potential for mortality, injury, and/or harassment, and indirect impacts due to construction-related noise, vibration, lighting, potential vehicle strike, and increased human presence could occur. As such, construction activities have the potential to result in significant impacts to SKR individuals and/or occupied habitat if present on site and in the immediate vicinity of the Project site.

Direct and/or indirect impacts to occupied SKR habitat would be further reduced by implementation of **MM-BIO-4**, which requires focused surveys be conducted prior to construction, development and implementation of a trapping/relocation program in coordination with the resource agencies, demarcation of construction limits adjacent to occupied SKR burrows outside of the construction areas, monitoring for avoidance within 500 feet of occupied SKR habitat, as well as take authorization requirements and mitigation (i.e., minimum replacement value of 1:1 for impacts). Additionally, implementation of **MM-BIO-2** requiring attendance of an environmental awareness training, clearly marking work limits, routine monitoring to ensure implementation of BMPs, requiring vehicle speeds under 15 mph on unpaved roads to control dust, lighting restrictions, and preparation and implementation of a landscape plan with appropriate provisions to avoid the spread of non-native invasive species would further reduce potential indirect impacts to SKR individuals and habitat. Implementation of **MM-BIO-2** and **MM-BIO-4** would reduce direct and/or indirect impacts to listed SKR to **less than significant**, and no additional mitigation is required.

Other Non-Listed Special-Status Wildlife Species

Birds

Burrowing Owl

Burrowing owl is a CDFW SSC species. Although focused burrowing owl surveys have not been conducted for the Project site, suitable foraging and nesting habitat for this species occurs on site. Burrowing owl individuals and/or sign (i.e., active burrows, whitewash, pellets, etc.) were not identified within the Project site during general biological surveys conducted in July 2018. However, the Project site is within this species range and approximately 41.83 acres of suitable foraging and nesting habitat (i.e., non-native grassland habitat and disturbed lands with burrows of potentially suitable size for burrowing owl) occurs on site. Thus, burrowing owls may occur within or adjacent to the Project site.

Burrowing owl was also identified in the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA 1999b). In accordance with the USFWS consultation of the March ARB realignment, 664 acres of native habitat (i.e., 649 acres of upland habitat) were set aside for conservation to offset species and habitat losses associated with March

ARB redevelopment, including development of the Project site. This planned conservation area occurs approximately 1 mile west of the Project site, and provides similar habitats to those that will be impacted by the Project. As such, many habitat and species losses, including suitable burrowing owl foraging habitat, have already been addressed through the planned conservation of this area and are considered adequately mitigated for under previous agency consultation. Project impacts to suitable foraging habitat would not represent a significant adverse impact to this species, conditional upon satisfaction of previous mitigation requirements within the BO (BO-1-6-99-F-13), subsequent Settlement Agreement (S.D. Cal. No. 09-cv-1854-JAH-POR), and consistency determination (2080-1999-56-6).

Burrowing owl has the potential to occur on site or within the vicinity of the Project during the proposed construction activities. Impacts would include direct impacts to 41.83 acres of suitable foraging and nesting habitat (i.e., non-native grassland habitat and disturbed lands) and indirect impacts due to construction-related noise, vibration, lighting, vehicle strike, and increased human presence could occur. As such, construction activities have the potential to result in significant impacts to burrowing owl individuals present on site and in the immediate vicinity of the Project site. Thus, implementation of **MM-BIO-5**, which would require preconstruction surveys for burrowing owl within 30 days of ground-disturbing activities, avoidance and minimization measures if burrowing owl is found, and potential preparation of a burrowing owl Relocation Plan (i.e., compensatory mitigation requirements), would reduce potential direct impacts to burrowing owl. Conservation areas west of I-215 provide suitable habitat for burrowing owl and could be counted toward the overall compensatory mitigation requirements addressed in **MM-BIO-5**, as applicable. Additionally, potential indirect impacts to burrowing owl would be reduced through the implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, clearly marking work limits, restricts vehicle speed limits to 15 mph or less to minimize the generation of fugitive dust, provides pet restrictions, provides measures to ensure that trash and debris are disposed of properly to minimize short-term impacts of increased human activities; and incorporation of native, non-invasive landscaping be incorporated to minimize the spread of non-native invasive plant and animal species. With implementation of **MM-BIO-5** and **MM-BIO-2**, direct and/or indirect impacts to burrowing owls would be **less than significant** with Project implementation, and no additional mitigation is required.

Amphibians

Western Spadefoot

Western spadefoot is a CDFW SSC species. Although this species has not been recorded within the immediate Project area, suitable breeding (i.e., potential vernal pools and Cactus Channel) and upland habitat (i.e., goldenbush scrub/non-native grassland and non-native

grassland habitat) for this species occurs on site. Thus, western spadefoot has a moderate potential to occur within the Project site.

There are approximately 0.47 acres of suitable breeding habitat (i.e., freshwater marsh, southern willow scrub, and Fremont's cottonwood) and 30.82 acres of suitable upland habitat (i.e., non-native grassland and goldenbush scrub/non-native grasslands) for western spadefoot within the Project site (i.e., K4 Parcel and Cactus Channel improvements site). If western spadefoot are present, Project construction could result in direct impacts to this species and/or suitable habitat to support this species (i.e., the grassland, disturbed coastal scrub, and riparian habitats present on site). Vegetation- and ground-disturbing activities associated with construction have the potential to impact suitable habitat for this species. Western spadefoot are also vulnerable to mortality or injury during vegetation and grading activities because they tend to be cryptic, slow moving, and belowground or under rocks or debris during cooler periods. Project impacts to western spadefoot are further discussed below for each Project area (i.e., K4 Parcel and Cactus Channel improvements site).

K4 Parcel

There are approximately 0.06 acres of suitable breeding habitat (i.e., freshwater marsh and southwestern willow scrub) and 22.42 acres of suitable upland habitat (i.e., non-native grassland and goldenbush/non-native grasslands) within the K4 Parcel. Thus, direct impacts to western spadefoot could occur during proposed K4 Parcel activities. Direct impacts to western spadefoot are considered less than significant with implementation of **MM-BIO-3**, requiring focused surveys for breeding western spadefoot, and if observed, establishing environmentally sensitive areas (ESAs), monitoring avoided occupied pools, BMPs, and development and implementation of a Mitigation, Monitoring, and Management Plan, as well as **MM-BIO-7** requiring development of a relocation plan to identify monitoring and relocation efforts if adult western spadefoots are identified. Potential indirect impacts would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species. Additionally, the conservation of 649-acres of adjacent open space areas, impacts to western spadefoot would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2, MM-BIO-3,** and **MM-BIO-7** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Cactus Channel Improvements Site

There are approximately 0.47 acres of suitable breeding habitat (i.e., freshwater marsh, southwestern willow scrub, and Fremont's cottonwood) and 8.40 acres of suitable upland habitat (i.e., non-native grassland) within the K4 Parcel. Thus, direct impacts are considered less than significant with implementation of **MM-BIO-3**, requiring focused surveys for breeding western spadefoot, and if observed, establishing ESAs, monitoring avoided occupied pools, BMPs, and development and implementation of a Mitigation, Monitoring, and Management Plan, as well as **MM-BIO-7** requiring development of a relocation plan to identify monitoring and relocation efforts if adult western spadefoots are identified. Potential indirect impacts would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species. Additionally, the conservation of 649-acres of adjacent open space areas, impacts to western spadefoot would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2, MM-BIO-3,** and **MM-BIO-7** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Reptiles

Orange-Throated Whiptail

Orange-throated whiptail, a CDFW WL species, was the only special-status reptile with moderate potential to occur within the Project site (i.e., the K4 Parcel and Cactus Channel improvements site). Although not observed during field surveys conducted within Project site in 2018, orange-throated whiptail could occur within the shrub dominated habitats and grassland habitats (i.e., goldenbush scrub/non-native grassland and non-native grassland habitat) on site, totaling approximately 30.77 acres. There are approximately 22.42 acres of suitable habitat (i.e., goldenbush scrub/non-native grassland and non-native grassland habitat) for this species within the K4 Parcel and 8.40 acres of suitable habitat (i.e., non-native grassland habitat) for this species within the Cactus Channel improvements site. Given orange-throated whiptails status as a low-level WL species, due to its abundance on a regional level, as well as the conservation of 649-acres of adjacent open space areas, impacts to orange-throated whiptail would be considered **less than significant** with Project implementation, and no additional mitigation is required. Additionally, **MM-BIO-2** which requires regular biological monitoring, biologists to flush special-status species from the Project site, implementation of speed limits, and covering open trenches would further reduce potential impacts to this species. No additional mitigation is required.

Mammals

San Diego Black-Tailed Jackrabbit

San Diego black-tailed jackrabbit is a CDFW SSC species. One individual San Diego black-tailed jackrabbit was observed within the developed/disturbed habitat on site during general biological surveys conducted in July 2018 (Appendix E). The proposed Project would impact 42.35 acres of goldenbush/non-native grassland, developed/disturbed, non-native grassland, freshwater marsh, ornamental, southern willow scrub, and a small patch Fremont cottonwood habitats. Construction activities have the potential to directly impact a small number of individuals of these species, including mortality and injury of individuals in burrows. Also, any individuals that are flushed from burrows by construction activities would be highly vulnerable to stress and predation. Project impacts to San Diego black-tailed jackrabbit are further discussed below for each Project area (i.e., 32.6-acre K4 Parcel and 9.7-acre Cactus Channel improvements site).

K4 Parcel

There are approximately 32.64 acres of suitable habitat (i.e., all habitats excluding developed lands) for San Diego black-tailed jackrabbit within the K4 Parcel. Direct impacts to San Diego black-tailed jackrabbit are considered less than significant with implementation of **MM-BIO-8**, requiring a pre-construction survey for San Diego black-tailed jackrabbit thirty days prior to construction, flushing of non-breeding jackrabbits prior to construction, flagging and avoiding dens, depressions, nests, or burrows occupied by pups during the pup-rearing season, as well as monitoring and reporting requirements.

Potential indirect short-term and long-term impacts could occur due to generation of fugitive dust, increased noise levels, chemical pollutants, increased human activity, and non-native invasive plant and animal species introduction. Indirect impacts to non-listed special-status wildlife species would be significant, absent mitigation. Potential indirect impacts to San Diego black-tailed jackrabbit would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species.

Additionally, the conservation of 649-acres of adjacent open space areas west of I-215, impacts to San Diego black-tailed jackrabbit would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2** and **MM-BIO-8** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Cactus Channel Improvements Site

There are approximately 9.71 acres of suitable habitat (i.e., all habitats excluding developed lands) for San Diego black-tailed jackrabbit within the Cactus Channel improvements site. Direct impacts to San Diego black-tailed jackrabbit are considered less than significant with implementation of **MM-BIO-8**, requiring a pre-construction survey for San Diego black-tailed jackrabbit thirty days prior to construction, flushing of non-breeding jackrabbits prior to construction, flagging and avoiding dens, depressions, nests, or burrows occupied by pups during the pup-rearing season, as well as monitoring and reporting requirements.

Potential indirect short-term and long-term impacts could occur due to generation of fugitive dust, increased noise levels, chemical pollutants, increased human activity, and non-native invasive plant and animal species introduction. Indirect impacts to non-listed special-status wildlife species would be significant, absent mitigation. Potential indirect impacts to San Diego black-tailed jackrabbit would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species.

Additionally, the conservation of 649-acres of adjacent open space areas west of I-215, impacts to San Diego black-tailed jackrabbit would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2** and **MM-BIO-8** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Northwestern San Diego Pocket Mouse and Los Angeles Pocket Mouse

Northwestern San Diego pocket mouse and Los Angeles pocket mouse are CDFW SSC species. There is a low to moderate potential for northwestern San Diego pocket mouse and Los Angeles pocket mouse to occur within the approximate 30.82 acres of non-native grassland and goldenbush scrub/non-native grassland habitat present throughout the Project site (i.e., the K4 Parcel and Cactus Channel improvements site) based on the presence of suitable habitat and burrows consistent with pocket mouse size observed during field surveys conducted in July 2018.

Construction activities have the potential to directly impact a small number of individuals of these species, including mortality and injury of individuals in burrows. Also, any individuals that are flushed from burrows by construction activities would be highly vulnerable to stress and predation. Potential indirect short-term and long-term impacts could occur due to generation of fugitive dust, increased noise levels, chemical pollutants, increased human activity, and non-native invasive plant and animal species introduction. Indirect impacts to non-listed special-status wildlife species would be significant, absent mitigation. Project impacts to northwestern San

Diego pocket mouse and Los Angeles pocket mouse are further discussed below for each Project area (i.e., 32.6-acre K4 Parcel and 9.7-acre Cactus Channel improvements site).

K4 Parcel

There are approximately 22.42 acres of suitable Northwestern San Diego pocket mouse and Los Angeles pocket mouse habitat (i.e., non-native grassland, goldenbush scrub/non-native grassland) within the K4 Parcel. Direct impacts to these species are considered less than significant with implementation of **MM-BIO-4**, requiring focused special-status small mammal surveys prior to construction, avoidance of active burrows, to the extent feasible, and/or preparation and implementation of an agency approved trapping/relocation program if active burrows are not avoidable (i.e., methods for trapping and relocating to other suitable habitats within the Project vicinity). Potential indirect impacts to Northwestern San Diego pocket mouse and/or Los Angeles pocket mouse would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species.

Additionally, the conservation of 649-acres of adjacent open space areas west of I-215, impacts to northwestern San Diego pocket mouse and Los Angeles pocket mouse would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2** and **MM-BIO-4** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Cactus Channel Improvements Site

There are approximately 8.40 acres of suitable northwestern San Diego pocket mouse and Los Angeles pocket mouse habitat (i.e., non-native grassland habitat) within the Cactus Channel improvements site. Direct impacts to these species are considered less than significant with implementation of **MM-BIO-4**, requiring focused special-status small mammal surveys prior to construction, avoidance of active burrows, to the extent feasible, and/or preparation and implementation of an agency approved trapping/relocation program if active burrows are not avoidable (i.e., methods for trapping and relocating to other suitable habitats within the Project vicinity). Potential indirect impacts to Northwestern San Diego pocket mouse and/or Los Angeles pocket mouse would be considered less than significant with implementation of **MM-BIO-2**, which requires attendance of an environmental awareness training, regular monitoring, flushing special-status species immediately prior to vegetation removal activities, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, covering trenches to prevent trapping wildlife, lighting restrictions, and replanting with native and/or non-invasive species.

Additionally, the conservation of 649-acres of adjacent open space areas west of I-215, impacts to northwestern San Diego pocket mouse and Los Angeles pocket mouse would be further reduced to **less than significant**. Thus, implementation of **MM-BIO-2** and **MM-BIO-4** would reduce potential direct and/or indirect impacts to **less than significant**, and no additional mitigation is required.

Threshold BIO-2. Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Special-Status Riparian Vegetation Communities

Biological resource surveys, vegetation mapping, and a preliminary jurisdictional wetland/waters delineation, including documentation of riparian habitats, were conducted on the Project site (i.e., K4 Parcel and Cactus Channel improvements site) and within 50 feet of the Project site (BSA) in July 2018 (Figure 4.3-4; Appendices E and F). One east–west, earth-lined channel (also referred to as the Cactus Channel) occurs along the northern portion of the Project site, south of Cactus Avenue. The Cactus Channel supports 0.47 acres of riparian vegetation communities, including: freshwater marsh, southern willow scrub, and a small patch of Fremont cottonwood habitat (Tables 4.3-1 and 4.3-6). These riparian vegetation communities are potentially jurisdictional under CDFW CFGC Section 1602; thus, this habitat is considered to be a sensitive habitat community. A Streambed Alteration Agreement or clearance would be required from CDFW to ensure compliance with CDFG Code Section 1602. One CDFW recognized upland sensitive vegetation community occurs within the Project site: disturbed Palmer's goldenbush scrub alliance (G3S3; CDFW 2018b). The disturbed Palmer's goldenbush scrub vegetation community on site totals approximately 22.16 acres within the K4 Parcel and is highly disturbed; thus, providing low quality habitat. Palmer's goldenbush scrub vegetation community does not occur within the Cactus Channel improvements site. Other upland vegetation communities within the Project site include developed/disturbed land, non-native grassland, and ornamental vegetation, none of which are considered sensitive vegetation communities. Project impacts to riparian habitat are further discussed below for each Project area (i.e., K4 Parcel and Cactus Channel improvements site).

K4 Parcel

The K4 Parcel access driveways are proposed to cross over Cactus Channel to provide ingress/egress to the site from Cactus Avenue. These driveway crossings would permanently impact all potentially jurisdictional CDFW riparian vegetation communities' on site (totaling approximately 0.06 acres) including 0.04 acres of freshwater marsh and 0.02 acres of southern willow scrub, which would result in potential significant impacts to riparian habitat. CDFW has jurisdiction over streambeds and/or riparian habitats associated with watercourses; therefore, a

Streambed Alteration Agreement or clearance would be required from CDFW to ensure compliance with CDFG Code Section 1602 prior to impacts. Additionally, if vernal pools are identified within the low areas of the K4 Parcel, the vernal pools are likely to be considered a sensitive vegetation community, and is likely to be significant. Potential indirect short-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, and changes in hydrology/hydraulics. **MM-BIO-9** would be implemented, which requires demarcation of jurisdictional features (i.e., jurisdictional riparian habitats) that will not be impacted by proposed Project activities; implementation of BMPs, including vehicle and equipment restrictions within ponding or flowing water, measures to reduce impacts to water quality (i.e., spoil and debris placement), and fueling and chemical pollutant restriction adjacent to jurisdictional waters (i.e., riparian habitat); consultation with the ACOE, RWQCB, and CDFW to determine appropriate replacement ratios for impacts to sensitive riparian habitat, requiring a minimum of 1:1 replacement ratio for impacts to sensitive riparian vegetation communities. Additionally, implementation of **MM-BIO-2** would reduce potential indirect impacts to sensitive riparian vegetation communities, which requires regular monitoring, attendance of an environmental awareness training, demarcation of construction limits, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, and replanting with native and/or non-invasive species. With implementation of **MM-BIO-2** and **MM-BIO-9**, direct and indirect impacts to sensitive riparian vegetation would be **less than significant**.

Additionally, the K4 Parcel would permanently impact approximately 22.16 acres of disturbed Palmer's goldenbush scrub, which is a sensitive upland vegetation community by CDFW (2018b). The disturbed Palmer's goldenbush scrub vegetation community present on site is sparse and heavily intermixed with non-native grassland; thus, this vegetation community provides low quality function and value, particularly compared with similar undisturbed vegetation communities west of the Project site. As per the base realignment, USFWS consultation, and subsequent negotiations, 664 acres of native habitat west of the Project site were set aside for conservation in consideration of development within the base re-use area. These conservation areas include upland habitats similar to those that occur on site. As such, impacts on upland habitats are considered adequately mitigated under previous agency consultation and are considered less than significant.

Cactus Channel Improvements Site

The proposed Cactus Channel Improvements would permanently impact all potentially jurisdictional CDFW riparian vegetation communities on site (totaling approximately 0.41 acres) including 0.37 acres of freshwater marsh, 0.02 acres of Fremont's cottonwood, and 0.02 acres of southern willow scrub habitat, which would result in potential significant impacts. CDFW has jurisdiction over streambeds and/or riparian habitats associated with watercourses; therefore, a Streambed Alteration Agreement or clearance would be required from CDFW to ensure

compliance with CDFG Code Section 1602 prior to impacts. Potential indirect short-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, and changes in hydrology/hydraulics. **MM-BIO-9** would be implemented to minimize potential direct and/or indirect impacts to less than significant. **MM-BIO-9**, which requires demarcation of jurisdictional features (i.e., jurisdictional riparian habitats) that will not be impacted by proposed Project activities; implementation of BMPs, including vehicle and equipment restrictions within ponding or flowing water, measures to reduce impacts to water quality (i.e., spoil and debris placement), and fueling and chemical pollutant restriction adjacent to jurisdictional waters (i.e., riparian habitat); consultation with the ACOE, RWQCB, and CDFW to determine appropriate replacement ratios for impacts to sensitive riparian habitat, requiring a minimum of 1:1 replacement ratio for impacts to sensitive riparian vegetation communities. Additionally, implementation of **MM-BIO-2** would reduce potential indirect impacts to sensitive riparian vegetation communities, which requires regular monitoring, attendance of an environmental awareness training, demarcation of construction limits, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, and replanting with native and/or non-invasive species. With implementation of **MM-BIO-2** and **MM-BIO-9**, direct and indirect impacts to sensitive riparian vegetation would be **less than significant**.

Threshold BIO-3. ***Would the Project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***

As discussed in Section 4.3.2, Relevant Plans, Policies, and Ordinances, the RWQCB is a division of the State Water Resources Control Board, provides oversight of the 401 permit (required by the CWA) process in California. The 42.4-acre Project area includes a west–east, earthen-lined and vegetated drainage ditch (also known as the Cactus Channel). Thus, a preliminary jurisdictional wetland/waters delineation was conducted for the Project site (i.e., the K4 Parcel and Cactus Channel improvements site) and within areas 50 feet of the Project site (BSA) in July 2018 (Figure 4.3-4; Appendices E and F). As concluded in the jurisdictional delineation, a majority of the Cactus Channel within the survey area met all three parameters per the Arid West Supplement and would therefore be considered potentially jurisdictional wetlands per the ACOE and RWQCB. The drainage and other waters of the US will also require permitting through the RWQCB under the CWA Section 401. As shown in Table 4.3-4 (Appendices E and F; Figures 4.3-4 and 4.3-5), the proposed Project would permanently impact approximately 1.39 acres (4,790 linear feet) of potential ACOE and RWQCB wetland waters of the United States/state (the entire portion of this drainage that occurs within the Project site). The Project would also impact 0.42 acres (2,876 linear feet) of non-wetland, ephemeral ACOE/RWQCB waters of the United States/state (Table 4.3-4). Approximately 2.99 acres (7,666 linear feet) of potentially jurisdictional CDFW streambed (wetland

and non-wetland) and/or associated riparian habitat within the Cactus Channel would be impacted with the proposed Project (Table 4.3-5). Waters under the jurisdiction of RWQCB pursuant to Section 401 of the CWA and Section 13260 of the California Water Code (the Porter-Cologne Water Quality Act) is equal to that of the ACOE and CDFW streambed jurisdiction on the Project site. To ensure compliance with Section 404 of the CWA, a permit or clearance would be required from ACOE. Similarly, a Water Quality Certification or clearance from the RWQCB would be required to ensure compliance with Section 401 of the CWA and the Porter-Cologne Water Quality Act. Finally, as also discussed above, a Streambed Alteration Agreement or clearance would be required from CDFW to ensure compliance with CFGC Section 1602. Thus, impacts to jurisdictional features would be significant and would require consultation with ACOE, RWQCB, and CDFW.

K4 Parcel

The K4 Parcel access driveways are proposed to cross over Cactus Channel to provide ingress/egress to the site from Cactus Avenue. These crossings would permanently impact approximately 0.06 acres (131 linear feet) of potential ACOE and RWQCB wetland waters of the United States/state (Table 4.3-7). No non-wetland, ephemeral ACOE and RWQCB waters of the United States/state would be impacted during development of the K4 Parcel. The CDFW takes jurisdiction over riparian vegetation associated with the streambed; and thus, has a slightly more expansive jurisdiction than the ACOE and/or RWQCB. In total, approximately 0.08 acres (131 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) areas would be impacted during the implementation of the K4 Parcel development (including all ACOE and RWQCB potentially jurisdictional areas and an additional 0.02 acres of CDFW potentially jurisdictional riparian habitat) (Table 4.3-7). K4 Parcel impacts to the jurisdictional areas would potentially require permitting from the ACOE under Section 404 of the CWA, RWQCB pursuant to Section 401 of the CWA and/or Porter Cologne Act, and CDFW Streambed Alteration Agreement pursuant to Fish and Game Code Section 1602. The proposed K4 Parcel impacts to ACOE jurisdiction would be minimal (less than 0.5 acres and below the 300 linear foot limitation); thus, is likely to qualify for Nationwide Permit No. 39.

Table 4.3-7
U.S. Army Corps of Engineers, Regional Water Quality Control Board, and/or California Department of Fish and Wildlife Potentially Jurisdictional Waters within the K4 Parcel

Agency Jurisdiction	Acreage	Linear Feet
Potentially Jurisdictional ACOE and RWQCB Disturbed Wetland Waters of the United States/State	0.06	131
Potentially Jurisdictional CDFW Streambed (Wetland and Non-Wetland)	0.08	131

Source: Appendices E and F.
Notes; ACOE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board; CDFW = California Department of Fish and Wildlife.

Compensatory mitigation would be based upon resource agency direction; however, mitigation to address impacts to these drainages must, at a minimum include the following types of measures: off-site restoration or enhancement through either acquisition or work on another site already conserved, and/or through a local In-Lieu Fee Program or mitigation bank, including replacement of the disturbed jurisdictional features at a minimum of 1:1. The exact mitigation would be decided through consultation with the permitting agencies after completion of the CEQA process. **MM-BIO-9** would ensure that appropriate mitigation to replace state and/or federally jurisdictional waters and/or wetlands proposed to be impacted during Project activities maintains compliance with Sections 404 and 401 of the CWA, and CFGC Section 1602, and has been approved and implemented prior to site disturbance. **MM-BIO-9** also incorporates measures to minimize indirect impacts to jurisdictional waters not proposed to be impacted through the implementation of BMPs, including; vehicle and equipment restrictions adjacent to flowing water, minimization of impacts to water quality, and measures for work areas adjacent to jurisdictional waters, including wetlands and riparian areas, and has been included to ensure impacts are mitigated accordingly and regulatory permits are obtained based on impacts to jurisdictional resources. Therefore, with incorporation of **MM-BIO-9**, the K4 Parcel would have a **less than significant direct impact** related to jurisdictional resources.

Potential indirect short-term and long-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, altered fire regime, and changes in hydrology/hydraulics. Potential indirect impacts to jurisdictional wetlands and/or waters would be reduced with implementation of **MM-BIO-2**, requiring attendance of an environmental awareness training, demarcation of construction limits, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, removal of cut vegetation from drainage channels, and storage/staging area restrictions adjacent to jurisdictional features. Therefore, with incorporation of **MM-BIO-2**, the K4 Parcel would have a **less than significant indirect impact** related to jurisdictional resources.

Cactus Channel Improvements Site

The proposed Cactus Channel Improvements would permanently impact approximately 1.34 acres (4,659 linear feet) of potential ACOE and RWQCB wetland waters of the United States/state and approximately 0.42 acres (2,876 linear feet) of non-wetland, ephemeral ACOE and RWQCB waters of the United States/state during the construction of a box culvert along the Cactus Channel (Table 4.3-8). The proposed Cactus Channel Improvements would impact approximately 2.90 acres (7,535 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) and/or associated riparian habitat within the Cactus Channel (Table 4.3-8). The 2.90 acres of CDFW impacts include 2.5 acres of non-native grassland, 0.37 acres of freshwater marsh, 0.02 acres of Fremont's cottonwood, and 0.02 acres of southern willow scrub habitat. The Cactus Channel Improvements proposed impacts

to the jurisdictional areas would require permitting from the ACOE[3] under Section 404 of the CWA, RWQCB pursuant to Section 401 of the CWA and/or Porter Cologne Act, and CDFW Lake or Streambed Alteration Agreement pursuant to Fish and Game Code Section 1602. Impacts to jurisdictional areas from the Cactus Channel Improvements are likely to be significant and would require consultation with the ACOE, RWQCB, and CDFW. Impacts to ACOE jurisdictional areas are unlikely to qualify for a Nationwide Permit; and thus, is likely to require an individual permit under the ACOE.

Table 4.3-8
U.S. Army Corps of Engineers, Regional Water Quality Control Board, and/or California Department Fish and Wildlife Potentially Jurisdictional Waters within the Cactus Channel Improvements

Agency Jurisdiction	Acreage	Linear Feet
Potentially Jurisdictional ACOE and RWQCB Disturbed Wetland Waters	1.34	4,659
Potentially Jurisdictional ACOE and RWQCB Non-Wetland Waters, Ephemeral Waters of the United States/state	0.42	2,876
Total Potential ACOE/RWQCB Impacts	**1.76**	**7,535**
Potentially Jurisdictional CDFW Streambed (Wetland and Non-Wetland)	2.9	7,535

Source: Appendices E and F.
Notes: ACOE = U.S. Army Corps of Engineers; RWQCB = Regional Water Quality Control Board; CDFW = California Department of Fish and Wildlife. ACOE/RWQCB jurisdictional areas are the same as (within) CDFW jurisdictional areas; acreages do not represent separate lands.

Compensatory mitigation would be based upon resource agency direction; however, mitigation to address impacts to these drainages must, at a minimum include the following types of measures: off-site restoration or enhancement through either acquisition or work on another site already conserved, and/or through a local In-Lieu Fee Program or mitigation bank, including replacement of the disturbed jurisdictional features at a minimum of 1:1. The exact mitigation would be decided through consultation with the permitting agencies after completion of the CEQA process. **MM-BIO-9** would ensure that appropriate mitigation to replace state and/or federally jurisdictional waters and/or wetlands proposed to be impacted during Project activities maintains compliance with Sections 404 and 401 of the CWA, and CFGC Section 1602, and has been approved and implemented prior to site disturbance. **MM-BIO-9** also incorporates measures to minimize indirect impacts to jurisdictional waters not proposed to be impacted through the implementation of BMPs, including; vehicle and equipment restrictions adjacent to flowing water, minimization of impacts to water quality, and measures for work areas adjacent to jurisdictional waters, including wetlands and riparian areas, and has been included to ensure impacts are mitigated accordingly and regulatory permits are obtained based on impacts to jurisdictional resources.

[3] The ACOE may evaluate the Cactus Avenue Channel culvert project under a Standard Individual Permit, which would require an analysis of alternatives pursuant to the Section 404(b)(1) Guidelines. Additionally, the ACOE, RWQCB, and/or CDFQ may require a functional assessment to quantitatively estimate the stream/wetland condition for the evaluation of the proposed project.

Therefore, with incorporation of **MM-BIO-9**, the Cactus Channel Improvements would have a **less than significant direct impact** related to jurisdictional resources.

Potential indirect short-term and long-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, altered fire regime, and changes in hydrology/hydraulics. Potential indirect impacts to jurisdictional wetlands and/or waters would be reduced with implementation of **MM-BIO-2**, requiring attendance of an environmental awareness training, demarcation of construction limits, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, removal of cut vegetation from drainage channels, and storage/staging area restrictions adjacent to jurisdictional features. Therefore, with incorporation of **MM-BIO-2**, the Cactus Channel Improvements would have a **less than significant indirect impact** related to jurisdictional resources.

Threshold BIO-4. Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

The trees and shrubs within the Project site and adjacent area have the potential to support nesting birds protected under the MBTA (16 USC 703–712) and CFGC Sections 3503.5, 3503, and 3513. Thus, Project construction would have the potential to result in significant impacts to birds and raptors, in the event that such species were to be nesting, foraging, or reproducing within the biological resources study area. Implementation of **MM-BIO-6**, which requires pre-construction nesting bird surveys be conducted and impacts to protected nesting birds be avoided, has been included to avoid potential impacts to native nesting birds. With implementation of **MM-BIO-6**, impacts to native nesting birds would be **less than significant**.

The Project site is located on March JPA land within the March JPA Planning Area identified within the March JPA General Plan (March JPA 1999a). The Project site also occurs in Riverside County, within the boundaries of the WRC MSHCP. However, the Project does not occur within any conservation areas identified in the March JPA General Plan or MSHCP existing and proposed cores (i.e., Cores, Extensions of Existing Cores, Linkages, Constrained Linkage, and Non-contiguous Habitat Blocks) (Figure 4.3-3). Additionally, the Project site does not occur within any MSHCP designed Criteria Cells, Public/Quasi Public Conserved Land areas, existing conserved Additional Reserve Land, or land described for conservation (Figure 4.3-3). The closest designated core and/or linkage areas include existing Core D (located approximately 1.1 miles west of the Project site, west of I-215), Non-contiguous Habitat Block A (located approximately 2.6 miles north of the Project site, north of SR-60), and Constrained Linkage 7 (which connects the northern habitat block of Core D, north of Sycamore Canyon Wilderness park with Box Springs Mountain Reserve also known as Non-contiguous Habitat Block A, west of I-215). The Project site is dominated by non-native grassland

habitat and disturbed land and is surrounded by development. I-215 is located 0.5 miles west of the Project site and SR-60 is located approximately 2.1 miles north of the Project site and likely provides a barrier for most wildlife traveling east–west and north–south in the area. As a result, the Project is unlikely to serve as a wildlife corridor or habitat linkage, and **no impact** is anticipated.

Cactus Channel is an ephemeral drainage and the only water source within the Project site. Thus, the Project site and adjacent areas lack habitats that support native migratory fish. The Project site is within an urbanized environment and provides minimal water sources to provide suitable habitat for important nesting, feeding, and resting ground for migratory, resident, and wintering bird species. As a result, the Project provides minimal habitat to support resident and migratory birds and bats. The closest water feature is Perris Reservoir approximately 4.2 miles southeast of the Project site, and would not be impacted during the proposed Project activities. As a result, the Project would not interfere substantially with the moment of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. No direct or indirect impacts to native migratory fish or wildlife species are anticipated, and the proposed Project would not impede on the use of native wildlife nursery sites; thus, **no impact** is anticipated.

Threshold BIO-5. Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The Riverside County Oak Tree Management Guidelines protect native oaks. No oaks protected under the Riverside County Oak Tree Management Guidelines occur within the Project site and/or adjacent areas; therefore, the proposed Project (i.e., K4 Parcel and Cactus Channel improvements site) would not conflict with the County's Oak Tree Management Guidelines.

Pursuant to unincorporated Riverside County Ordinance No. 499 (as amended through 499.11), "No person, firm, corporation, public district, public agency or political subdivision shall remove or severely trim any tree planted in the right of way of any County highway without first obtaining a permit from the County Transportation Director to do so." The only trees that occur near roadways are a few small willows associated with on-site drainages (there are no street tree plantings). Since no street tree plantings occur on the Project site, no impacts to trees protected under Ordinance No. 499.11 would occur with Project implementation.

Chapter 12.24 of the Riverside County Code of Ordinances also includes regulations related to tree removal (County of Riverside 2016). According to the Unincorporated Riverside County Ordinance No. 559 (as amended through 559.7), the removal of living native trees on parcels or property greater than 0.5 acres in size, located in the Unincorporated Riverside County, and above 5,000 feet in elevation requires a permit. The Project site elevation is below 5,000 acres; thus, the proposed Project would not conflict with the Unincorporated Riverside County Ordinance No. 559. The proposed

Project would not conflict with any local policies or ordinance protecting biological resources. **No impact** would occur.

Threshold BIO-6. Would the Project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The 42.4-acre Project site (i.e., K4 Parcel and Cactus Channel improvements site) is located within the boundaries of the WRC MSHCP. The March JPA is not a permittee to the MSHCP, and thus, does not have to comply with the Reserve Assembly goals of the MSHCP or any other MSHCP requirements. The Project site is not located in an area subject to Cell Criteria, Public/Quasi-Public Conserved Land areas, existing conserved Additional Reserve Land, or land described for conservation under the MSHCP, and therefore the Project's development would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented (Figure 4.3-3). Although Riparian/Riverine habitat occurs on site, these areas would be mitigated to a level of less than significant in compliance with the MSHCP through implementation of **MM-BIO-2** (i.e., regular monitoring, attendance of an environmental awareness training, demarcation of construction limits, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, and replanting with native and/or non-invasive species) and **MM-BIO-9** (i.e., demarcation of jurisdictional features, implementation of BMPs, and consultation with the ACOE, RWQCB, and CDFW to determine appropriate replacement ratios for impacts to sensitive riparian habitat with a minimum of 1:1 replacement ratio). Additionally, vernal pool branchiopod surveys are ongoing. If identified, impacts to vernal pool fairy shrimp would be reduced by implementation **MM-BIO-2** (i.e., attendance of an environmental awareness training, clearly marking work limits, routine monitoring to ensure implementation of BMPs, maintaining vehicle speed limits of 15 mph on adjacent dirt roads, preparation and implementation of a landscape plan, and replanting with native and/or non-invasive species) and **MM-BIO-3** (i.e., focused listed branchiopod surveys be conducted prior to construction, demarcation of construction limits adjacent to occupied vernal pool branchiopod habitat outside of construction areas, monitoring for avoidance within 500 feet of occupied or assumed occupied vernal pool habitat, avoidance of fueling, vehicle maintenance, and staging areas within 100 feet of vernal pool or aquatic habitat, as well as mitigation (i.e., minimum replacement value of 1:1 for temporary impacts and 2:1 for permanent impacts), preparation and implementation of a mitigation, monitoring, and management plan, and creation, restoration, and/or enhancement of suitable vernal pool habitat or compensation to a USFWS-approved mitigation bank for listed branchiopods, which would be consistent with the WRC MSHCP.

The Project site is located within an identified burrowing owl survey area within the MSHCP. Although no burrowing owl individuals and/or sign were observed during general biological surveys conducted within the Project site in July 2018, focused burrowing owl surveys were not conducted and suitable burrowing owl habitat occurs on site and in adjacent areas immediately south of the Project site. Thus, additional burrowing owl measures within **MM-BIO-5** including,

but not limited to preconstruction surveys for BUOW within 30 days of ground-disturbing activities, avoidance and minimization measures if found, potential preparation of a burrowing owl Relocation Plan, and potential compensatory mitigation, would ensure consistency with the MSHCP. As such, the development of the Project would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented. Conflicts with the MSHCP would be **less than significant** with Project implementation, and no additional mitigation is required.

Additionally, the Project is consistent with other MSHCP and SKR HCP requirements. Although suitable SKR habitat was identified within the Project site (i.e., K4 Parcel and Cactus Channel improvements site), focused surveys were conducted for SKR in 2018 with negative results. Additionally, the Project site is not located within a SKR Core Area designated by the SKR HCP and MSHCP. The closest SKR Core Area is Sycamore Canyon Core Reserve Area located approximately 1.7 miles northwest of the Project site. Thus, impacts to designated SKR Core Areas would not occur as a result of the proposed Project. Given this species has not been identified within the Project site during previous survey efforts, and the negative findings for this species in 2018 during focused surveys, SKR are not expected to occur within the Project site and impacts to this species are anticipated to be **less than significant**, and further reduced by implementation of **MM-BIO-4** (presence/absence surveys if burrows cannot be avoided, installation of one-way doors, if present, development of a trapping/relocation plan, and mitigation requirements). Federally listed large branchiopod protocol-level surveys are currently underway, and results of these surveys will be provided to USFWS as per the survey requirements. If this species is identified to be present on site, then additional fairy shrimp measures within **MM-BIO-3**, including, but not limited to conducting focused surveys, establishing ESAs within 250 feet of occupied features, biological monitoring, establishment of BMPs, preparation of a Mitigation, Monitoring, and Management Plan, and mitigation requirements (i.e., minimum of 1:1 mitigation for temporary impacts and 2:1 mitigation for permanent impacts). Impacts to state and/or federally jurisdictional waters would be less than significant with implementation of **MM-BIO-9**, which requires that state and/or federal permits be acquired prior to impacts, establishment of BMPs, biological monitoring, and mitigation requirements (i.e., minimum of 1:1 mitigation for temporary impacts and 2:1 mitigation for permanent impacts). Conflicts with the MSHCP would be **less than significant** with Project implementation, and no additional mitigation is required.

4.3.5 Cumulative Impacts

The Project would result in impacts on riparian areas and special-status plant and wildlife species. These impacts are adverse, however, riparian impacts would be fully mitigated through creation and/or preservation of similar habitats in close proximity to the Project area. Special-status plant and wildlife impacts will be fully mitigated in accordance with previous larger planning efforts and in consultation with state and federal wildlife agencies, as well as through implementation of additional avoidance and minimization measures. Project impacts were considered in connection with the larger March AFB re-

use, and this area is included in the regional MSHCP plan. The MSHCP is a regional effort to offset significant cumulative biological impacts, and all development in the region that is permitted through the County of Riverside must comply with the MSHCP. Because of this regional biological planning, cumulative biological impacts are avoided for development in the western Riverside region when developments are pursued in compliance with the plan. Though the JPA is an independent agency and therefore not a participant under the MSHCP, Project mitigation will be pursued in a manner consistent with the MSHCP and all special-status species impacts and jurisdictional resource impacts will be permitted through state and federal agencies. The channel is constructed and any impacts would not contribute to a significant regional loss of such habitats. As such, cumulative impacts are considered **less than significant**.

4.3.6 Mitigation Measures

CEQA Guidelines Section 15126.4 requires EIRs to describe feasible measures that can minimize significant adverse impacts. The following mitigation measures have been evaluated for feasibility and are incorporated in order to reduce potentially significant impacts related to smooth tarplant, listed vernal pool branchiopods (fairy shrimp), burrowing owls, nesting birds, western spadefoot, special-status small mammals, burrowing owl, San Diego black-tailed jackrabbit, and jurisdictional areas.

MM-BIO-1 **Smooth Tarplant Mitigation and Monitoring Plan.** Surveys shall be conducted for smooth tarplant the season prior to each phase of construction. Surveys shall occur within the Project site and include suitable habitat within a 100-foot buffer (access permitting), at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with California Department of Fish and Wildlife (CDFW) protocols and by a qualified botanist knowledgeable of the local flora. Since annual variation in weather may result in fewer specimens being observed, the locations of plants considered will be cumulative (i.e., all known plant locations over the course of the various surveys, will be noted). The full extent of the occurrence within the survey area shall be recorded using GPS.

The location of smooth tarplant shall be mapped and number of individuals for each occurrence documented. The outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented:

1. **Establish Environmentally Sensitive Areas (ESAs)**. Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the Project disturbance areas and within 100 feet of Project disturbance areas. The locations

of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field (e.g., with temporary construction fencing) to ensure that avoided plants are not inadvertently harmed during construction.

2. **Monitoring.** A qualified biologist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.

3. **Smooth Tarplant Mitigation Plan.** If impacts to smooth tarplant cannot be avoided a Smooth Tarplant Mitigation Plan shall be submitted to CDFW for review and approval prior to ground disturbance to occupied habitat. Upon approval, the plan will be implemented by the applicant or its designee. The plan will demonstrate the feasibility of enhancing or restoring smooth tarplant habitat in areas to be managed as natural open space (i.e., within the designated conservation areas west of Interstate 215) without conflicting with other resource management objectives. Habitat enhancement replacement will be at a 1:1 ratio (acres enhanced or restored:acres impacted).

   The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals.

MM-BIO-2 **Best Management Practices (BMPs).** To prevent inadvertent disturbance to areas outside the limits of the proposed Project construction limits, the following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum once a month) to ensure implementation with the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements.

1. **Workers Environmental Awareness Training.** All construction personnel must attend an environmental awareness training to educate personnel about special-status species that may potentially occur on site, their protective status,

avoidance and minimization measures to be implemented by all personnel, flagging/fencing of any exclusion areas, permit requirements, the boundaries within which the Project construction shall occur, trash and debris collection and disposal, spill avoidance and clean-up, and other environmental issues;

2. **Demarcate Construction Limits.** To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground disturbance activities and all construction activities, including, equipment staging and maintenance shall be conducted within the marked disturbance limits. The work limit delineation will be maintained throughout Project construction.
3. **Flush Special-Status Species.** Biologist will flush special-status species (i.e., avian or other mobile species) from suitable habitat areas to the maximum extent practicable immediately prior to initial vegetation removal activities.
4. **Speed Limit.** Construction vehicles shall not exceed 15 mph or unpaved roads adjacent to the Project site or the right-of-way accessing the site.
5. **Trash and Debris.** If trash and debris need to be stored overnight during the maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof will be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day, but must be removed each night.
6. **Open Trenches.** At the end of each workday, check that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled, covered, or sloped to allow wildlife egress. Should wildlife become trapped, a qualified biologist shall remove and relocate it.
7. **Vegetation Removal.** Cut vegetation must be hauled out of the channel and stored, if necessary, where it cannot be washed by rainfall or runoff into the channel. When maintenance activities are completed, any excess materials or debris will be removed from the Project site.
8. **Staging/Storage.** Temporary structures and staging/storage of construction equipment and materials will not be located in or within 100 feet of jurisdictional waters, including wetlands and riparian areas.
9. **Pets.** Pets on or adjacent to construction sites will not be permitted by the operator.
10. **Construction Lighting.** Construction activities will be limited to daylight hours to the extent feasible. If nighttime work is necessary, lighting will be

shielded away from surrounding natural areas. Fixtures will be shielded to downcast below the horizontal plane of the fixture height and mounted as low as possible.

11. **Permanent Lighting.** Permanent lighting will be shielded away from surrounding natural areas. Fixtures will be shielded to downcast below the horizontal plane of the fixture height and mounted as low as possible.

12. **Landscaping Guidelines.** As per the Landscaping Guidelines of the Resource Management Element of the March Joint Powers Authority (JPA) General Plan (1999a), drought tolerant vegetation and native vegetation will be used to the extent feasible, consistent with March JPA Landscape Water Efficiency Ordinance No. JPA 16-03, with the purpose of preserving existing mature trees and native vegetation. Landscape plans shall be reviewed by a qualified botanist to recommend appropriate provisions to minimize the spread of invasive plant species as defined by the County of Riverside, and listed by the California Invasive Plant Council (www.cal-ipc.org) and California Native Plant Society (www.cnps.org) within the Project area. Provision may include: a) installation of container plants and/or hydro-seeding areas adjacent to existing, undisturbed native vegetation areas with native plant species common within temporary impact areas; and (b) review and screening of proposed plants to identify and avoid potential invasive species and weed removal during the initial planting of landscaped.

MM-BIO-3 **Listed Vernal Pool Branchiopods and Western Spadefoot.** Focused surveys shall be conducted for federally listed large branchiopods and sensitive western spadefoot prior to initiation of construction related activities within suitable habitat present within the Project site (i.e., the K4 Parcel and Cactus Channel Improvement site). Surveys for federally listed branchiopods shall be conducted according to the current U.S. Fish and Wildlife Service (USFWS) *Survey Guidelines for the Listed Large Branchiopods* (USFWS 2015), which describes a complete survey for branchiopods as one wet season and one dry season survey conducted according to the new guidelines and within a 3-year period. Additionally, pre-construction surveys for western spadefoot shall be conducted during a time of year when the species can be detected (i.e., when the vernal pool and/or drainage channel on the south side of Cactus Avenue is inundated). Surveys shall be initiated at least one year prior to the initiation of construction related activities to allow sufficient time to complete one wet season and one dry season survey within the Project site, including suitable habitat within a 250-foot buffer. If focused surveys are negative, no additional mitigation is required.

If focused surveys are positive, the full extent of listed branchiopod and/or western spadefoot occurrence within the survey area shall be recorded using GPS. The location of occupied features shall be mapped and number of individuals for each occurrence documented. The outer extent of each occupied listed branchiopod and/or western spadefoot feature shall be flagged at the time of the survey. Consultation with USFWS shall occur and/or take authorization may be obtained from the USFWS through Section 7 Consultation for impacts to federally listed branchiopods. Alternatively, the applicant may choose to mitigate for impacts through the Western Riverside County (WRC) Multiple Species Habitat Conservation Plan (MSHCP) as a participating special entity. Occupied listed branchiopod habitat shall be mitigated at a minimum 1:1 ratio for temporary impacts, 2:1 ratio for permanent impacts, as specified by the resources agencies (e.g., within take authorization), or as per the requirements within the WRC MSHCP. Occupied western spadefoot habitat shall be mitigated at a minimum 1:1 ratio. Avoidance and minimization measures shall be implemented in accordance with provisions of the take authorization and shall include, at a minimum:

1. **Establish Environmentally Sensitive Areas (ESAs)**. Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid occupied federally listed branchiopod and/or western spadefoot breeding habitat that occur outside of the Project disturbance areas and within 250 feet of Project disturbance areas. The locations of ESAs shall be clearly delineated through brightly colored fencing or other highly visible means and include a designated avoidance buffer developed in consultation with the USFWS to prevent construction from affecting the pool and its associated watershed. Construction crews will be directed not to encroach beyond the limits of construction.
2. **Monitoring.** A qualified biologist shall be present during construction within 300 feet of occupied or assumed occupied vernal pool habitat(s) to conduct daily monitoring of the ESAs that protect occupied federally listed branchiopod and/or western spadefoot habitat. The monitor shall have the authority to stop construction activities in the vicinity (within 250 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.
3. **Best Management Practices (BMPs).** All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 100 feet from vernal pool or aquatic habitat.

4. **Mitigation, Monitoring, and Management Plan.** Prior to construction within 500 feet of occupied or assumed occupied vernal pool habitat, the Project applicant shall develop and implement a mitigation, monitoring, and management plan, with input from regulatory agencies that outlines long-term management strategies and performance standards to be attained to compensate for habitat losses resulting from the Project. At a minimum, the plan shall include standards for mitigation site selection and construction specifications for mitigation sites, a description of site conditions including aerial maps, an analysis of local vernal pool habitat, and performance criteria by which site quality can be assessed over time (e.g., size, vegetation communities and plant species present, date of initial ponding, ponding duration, and wildlife usage). The mitigation, monitoring and management plan shall provide species-specific conservation objectives for covered species and habitats; success criteria for meeting conservation objectives for covered species and habitats; success criteria for meeting conservation objectives; and methods for remediating restoration/enhancement sites that do not achieve the success criteria. A monitoring program shall be established to track the development of habitat conductions that are conducive to the establishment of vernal pool wildlife species.

5. **Creation/Restoration/Enhancement of Suitable Vernal Pool Habitat.** If impacts to occupied listed vernal pool branchiopod habitat cannot be avoided, then creation, restoration, and/or enhancement of suitable vernal pool habitat suitable for vernal pool fairy shrimp and/or Riverside fairy shrimp shall be required, as applicable (specific to the species impacted and habitat requirements). The creation, restoration, and/or enhancement effort would incorporate measures to salvage these species from on-site ponds and relocate them into created, restored, and/or enhanced pools within designated open space easement, upon coordination with the necessary regulatory agencies (i.e., USFWS and/or U.S. Army Corps of Engineers (ACOE)). The created, restored, and/or enhanced habitat would be monitored for fairy shrimp at intervals specified in the mitigation, monitoring, and management plan. Quarterly reports would be prepared by a qualified restoration specialist for the first year and annual reports thereafter. If the success criteria listed in the mitigation, monitoring, and management plan are not met at the end of a given year, remedial action would be taken, pursuant to the direction and approval from the regulatory agencies (i.e., USFWS and ACOE).

Alternatively, impacts to occupied listed branchiopod habitat may be mitigated by purchasing mitigation credits at a USFWS-approved mitigation bank for listed branchiopods.

MM-BIO-4 **Special-Status Small Mammals.** Potentially suitable habitat to support special-status small mammals (i.e., Stephens' kangaroo rat, Northwestern San Diego pocket mouse, and Los Angeles pocket mouse) occurs within the Project site and areas adjacent to the Project site. If potential burrows may be impacted by the proposed Project activities in areas of suitable habitat for these species, a qualified permitted biologist shall conduct focused small mammal surveys for Stephens' kangaroo rat, Northwestern San Diego pocket mouse, and/or Los Angeles pocket mouse to determine presence/absence of these species on the Project site and within 200 feet of the Project site (access permitting) prior to the initiation of construction activities. The survey shall consist of a habitat assessment, followed by five consecutive nights of trapping using Sherman live trapping within suitable habitat as determined by a permitted small mammal trapping individual. If special-status species are not found, no further action is required.

If special-status individuals are identified during focused surveys, potentially active special-status small mammal burrows shall be avoided to the extent feasible. If avoidance of active burrows is not possible, a trapping/relocation program shall be implemented and conducted by qualified biologists in consultation with the appropriate regulatory agencies (i.e., U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW)). In accordance with the trapping/relocation program, special-status small mammal individuals shall be relocated to adjacent suitable habitat areas or preserves (including within the conservation area west of Project site), and/or measures shall be provided to ensure exclusion during construction activities, including trenching. Occupied habitat for special-status mammals shall be mitigated at a minimum 1:1 ratio. The trapping/relocation program shall include submitting a plan for regulatory agency approval, with the following elements included at a minimum:

1. Allow for at least one night without disturbance to the burrow and surrounding area to allow the individuals to vacate the burrow. Remaining individuals shall be live-trapped and relocated out of impacted areas into adjacent occupied areas or into unoccupied areas within the same habitat.
2. Methods (e.g., one-way doors) shall be used to prevent reentry to any burrows not destroyed by construction until construction is complete in these areas.

3. At least 45 days before the start of construction within 200 feet of an active burrow, a trapping/relocation plan shall be submitted to the USFWS and/or CDFW for approval. The plan shall include but not be limited to the following: the methods for capturing animals, the procedures for evaluating health of the animals, the location and methods for storing live animals the methods for release (i.e., fencing), the location of release, on-site habitat restoration and methods for restoring temporarily destroyed burrows where appropriate, and remedial actions for injured or lost animals.

MM-BIO-5 **Burrowing Owl Habitat.** Prior to the initiation of construction activities, a qualified biologist shall conduct preconstruction surveys for burrowing owl to determine presence/absence of the species. The survey shall be conducted in accordance with the most current and applicable California Department of Fish and Wildlife (CDFW) protocol within 30 days of site disturbance to determine whether the burrowing owl is present at the site. Preconstruction surveys shall include suitable burrowing owl habitat within the Project footprint and within 500 feet of the Project footprint (or within an appropriate buffer as required in the most recent guidelines and where legal access to conduct the survey exists). If burrowing owls are not detected during the clearance survey, no additional mitigation is required.

1. If burrowing owl is located, occupied burrowing owl burrows shall not be disturbed during the nesting season (February 1 through August 31) unless a qualified biologist approved by CDFW verifies through non-invasive methods that either the birds have not begun egg-laying and incubation or that juveniles from the occurred burrows are foraging independently and capable of independent survival. A 500-foot non-disturbance buffer (where no work activities may be conducted) will be maintained between Project activities and nesting burrowing owls during the nesting season, unless otherwise authorized by CDFW.
2. If burrowing owl is detected during the non-breeding season (September 1 through January 31) or confirmed to not be nesting, a 160-foot buffer non-disturbance buffer will be maintained between the Project activities and occupied burrow. Alternatively, a Burrowing Owl Relocation and Mitigation Plan may be prepared and submitted for approval by CDFW. Once approved, the Plan would be implemented to relocate non-breeding burrowing owls from the Project site. The Plan will detail methods and guidance for passive relocation of burrowing owls from the Project site, provide monitoring and management of the replacement burrow sites, reporting requirements, and ensure that a minimum of two suitable, unoccupied burrows are available off site for every burrowing owl or pair of

burrowing owls to be passively relocated. Compensatory mitigation of habitat would be required if occupied burrows or territories occur within the permanent impact footprint. Ratios typically include a minimum of 19.5 acres per nesting burrow lost; however, habitat compensation will be approved by CDFW and detailed in the Burrowing Owl Relocation and Mitigation Plan. Suitable burrowing owl habitat conserved pursuant to the Settlement Agreement may be counted toward mitigation for impacts to burrowing owl habitat and would be based upon regulatory agency approval.

3. Construction work may proceed after owls have been excluded from the site following accepted protocol and approval of CDFW, and as approved by March Joint Powers Authority (JPA). Results of the surveys and relocation efforts shall be provided to CDFW.

MM-BIO-6 **Suitable Habitat for Nesting Birds.** The Migratory Bird Treaty Act (MBTA) of 1918 (50 CFR Section 10.13) and similar provisions under the CDFG Code (Sections 3503, 3503.5, and 3513) prohibit the "Take" of any native bird. March Joint Powers Authority (JPA) shall ensure that vegetation clearing on the Project site would be conducted outside of the nesting season (February 1 through September 15). If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey within three days prior to any disturbance of the site, including disking, demolition activities, and grading. If active nests of native species are identified, the biologist shall establish suitable buffers around the nests, and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests. Typically, established buffers are greater for raptors than songbirds and depend on the species, the nesting stage, and type of construction activity proposed. The buffer should be no less than 300 feet for raptors and no less than 150 feet for songbirds, unless specifically determined by a qualified biologist familiar with the nesting phenology of the nesting species. In some cases, the buffer may need to be larger. There are no specific protocols for nesting bird surveys or for buffers once nests are found. The key is to ensure that no direct mortality of a native bird, which when nesting includes eggs and young. Implementation of this measure would ensure the Project is not in violation of the MBTA and California Fish and Game Code (CFGC). Alternatively, the Project shall comply with survey requirements imposed by U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW).

MM-BIO-7 **Western Spadefoot.** Prior to construction, the applicant shall develop a relocation plan for adult western spadefoot. The plan should include, but not be limited to the

timing and location of the surveys conducted for western spadefoot, identify the habitats and conditions in the proposed relocation site(s); methods used for trapping and relocating the species, and documentation/recordation of the species and number of the animals relocated. The plan shall be provided to California Department of Fish and Wildlife (CDFW) for approval 30 days prior to any ground-disturbing activities within potentially occupied habitat. A qualified biologist will be present during ground-disturbing activities immediately adjacent to or within the grassland or coastal scrub habitat that could support populations of western spadefoot. The qualified biologist shall possess an appropriate California scientific collecting permit to handle special-status species likely to occur in the Project area. If special-status amphibian and/or reptile species (i.e., western spadefoot) are detected in the work area during pre-construction surveys and/or monitoring, the authorized biologist will capture and relocate individuals to nearby undisturbed areas with suitable habitat outside of the construction area, but as close to their origin as possible (i.e., within designated conservation areas west of Interstate 215). All wildlife moved during Project activities will be documented by the biologist on site and provided in the plan, which will be submitted to CDFW quarterly.

MM-BIO-8 **San Diego Black-Tailed Jackrabbit.** Thirty days prior to construction a qualified biologist shall conduct a survey within the proposed construction disturbance zone and within 200 feet of the disturbance zone for San Diego black-tailed jackrabbit. If San Diego black-tailed jackrabbits are present, non-breeding rabbits shall be flushed from areas to be disturbed. Dens, depressions, nests, or burrows occupied by pups shall be flagged and ground-disturbing activities avoided within a minimum of 200 feet during the pup-rearing season (February 15 through July 1). This buffer may be reduced based on the location of the den upon consultation with California Department of Fish and Wildlife (CDFW). Occupied maternity dens, depressions, nests, or burrows shall be flagged for avoidance, and a biological monitor shall be present during construction. If unattended young are discovered, they shall be relocated to suitable habitat by a qualified biologist. The applicant shall document all San Diego black-tailed jackrabbit identified, avoided, or moved and provide a written report to CDFW within 72 hours. Collection and relocation of animals shall only occur with the proper scientific collection and handling permits.

MM-BIO-9 **Jurisdictional Features.** In order to mitigate Project impacts to jurisdictional features under the jurisdiction of the U.S. Army Corps of Engineers (ACOE), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB), the Project applicant shall implement mitigation required by the regulatory agencies. March Joint Powers Authority (JPA) shall require proof that the applicable Section 404, 401, and 1600 permits and/or

clearances have been obtained or verification that they are not required shall be obtained prior to any disturbance of the jurisdictional features on site. All mitigation measures and conditions contained within the permits shall be implemented. At a minimum, the following shall be completed for mitigation for impacts to waters of the United States and jurisdictional streambeds. Mitigation options include on-site, off-site, in lieu fee mitigation, or a combination of mitigation strategies, to replace the disturbed jurisdictional features, including sensitive riparian vegetation communities, at a minimum of 1:1 ratio for temporary impacts and 2:1 for permanent impacts, or as otherwise required by the respective permits. Avoided jurisdictional waters shall be fenced or flagged for avoidance.

Best management practices (BMPs) shall be implemented to avoid indirect impacts to jurisdictional waters, including the following:

1. A biologist will conduct daily site visits during the removal of riparian vegetation.
2. Vehicles and equipment will not be operated in ponded or flowing water except as described in permits.
3. Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows.
4. Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages.
5. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters.
6. No equipment maintenance will be performed within 100-feet of jurisdictional waters, including wetlands and riparian areas, where petroleum products or other pollutants from the equipment may enter these areas. Fueling of equipment will not occur on the Project site.

4.3.7 Level of Significance after Mitigation

Impacts to biological resources on the Project site can be mitigated to less than significant levels by incorporating mitigation measures as described in the EIR. No significant adverse impacts would remain after mitigation.

4.3.8 References

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4.4 CULTURAL RESOURCES

This section provides an analysis of the potential impacts to cultural resources from the implementation of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). Meridian Park K4 LLC is proposing the development of an approximately 718,000-square-foot industrial warehouse on the K4 Parcel and the conversion of the existing Cactus Avenue Drainage Channel (Cactus Channel) from an open-air earthen channel into an underground concrete culvert for approximately 7,900 linear feet. This analysis is based on a review of two separate technical studies prepared by CRM TECH in support of the proposed Project. These studies include the following reports: *Identification and Evaluation of Historic Properties K4 Parcel Project* and the *Identification and Evaluation of Historic Properties Cactus Avenue Drainage Channel Improvement Project*, both prepared in August 2018 and revised in April 2019 (Appendices G and H, respectively, of this Environmental Impact Report (EIR)).

Both studies (Appendices G and H) were prepared in compliance with the California Environmental Quality Act (CEQA) and Section 106 of the National Historic Preservation Act (NHPA); however, only the Cactus Channel Improvements include a federal nexus. The Cactus Channel Improvements are subject to federal review by the U.S. Army Corps of Engineers as a responsible agency under Section 106. Furthermore, this analysis includes the review of existing cultural resources; technical data; and applicable laws, regulations, and guidelines from each study to adequately assess the potential impacts to cultural resources.

As discussed in Chapter 2, Project Description, of the EIR, the proposed Project includes the development of an approximately 718,000-square-foot industrial warehouse with 598 automobile parking stalls and 242 truck trailer parking stalls on the K4 Parcel and the conversion of the existing Cactus Channel from an open-air earthen channel into an underground concrete culvert for approximately 7,900 linear feet between Elsworth Street on the west and Heacock Street and Heacock Channel on the east. The K4 Parcel is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The proposed Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March Joint Powers Authority (JPA) General Plan. The proposed Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.

- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.4.1 Existing Conditions

The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location). The Interstate 215 is located approximately 0.8 miles east of the K4 Parcel. The K4 Parcel is comprised of five parcels designated as Assessor's Parcel Numbers 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The Cactus Channel runs along the south side of Cactus Avenue until it reaches Heacock Street and connects with the Heacock Channel.

The Project area of potential effect (APE), which collectively consists of the K4 Parcel and the Cactus Channel, is located on the south side of Cactus Avenue and immediately north of March Air Reserve Base (ARB). The five parcels within the K4 Parcel consists of undeveloped land situated along the northern perimeter of the March ARB. In addition, the Cactus Channel runs approximately 7,900 linear feet along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the K4 Parcel frontage, and ending at the Heacock Channel.

Appendices G and H of this EIR document the results of a California Historical Resources Information System (CHRIS) search conducted at the Eastern Information Center (EIC), and a search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF).

Eastern Information Center Records Search

CRM TECH completed a CHRIS search at the EIC for the Project APE and surrounding 1-mile radius on May 15, 2018, for the K4 Parcel Project (Appendix G) and July 19, 2018, for the Cactus Channel Project (Appendix H). This search included mapped prehistoric, historical, and built-environment resources; Department of Parks and Recreation site records; technical reports; properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Landmarks. Additional consulted sources included the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), and the California Historical Resources Inventory.

Records Search Results

The EIC records for the K4 Parcel Project indicate that 35 technical studies have been previously conducted within 1 mile of the Project APE between the mid-1990s and 2002. Of these, four studies partially or entirely overlap the Project APE (see Figure 5, Previous cultural resources

studies, in Appendix G of this EIR). Approximately 60% of the Project APE and 1-mile records search buffer has been previously surveyed. Moreover, the records search for the K4 Parcel Project indicates that 258 cultural resources comprised of historical and/or archaeological sites and one isolate have been previously recorded within 1 mile of the Project APE. All 258 previously recorded resources are historical in age and consist of the Atchison, Topeka and Santa Fe Railway, a drainage channel unrelated to the Project APE, structural remains from Camp Haan, and the remaining resources are comprised of historic built environment resources. Based on the records search, the majority of the buildings were located in the March Field Historic District within March ARB, a National Register-listed property lying roughly 0.5 miles to the south of the Project APE. None of these resources were identified within the Project APE.

The EIC records for the Cactus Channel component of the Project indicate that 46 technical studies have been previously conducted within 1 mile of the Project APE between 1991 and 2014. Of these, six studies partially or entirely overlap the Project APE. The entirety of the Project APE has been previously investigated (see Figure 5, Previous cultural resources studies, in Appendix H of this EIR). In addition, the records search for the Cactus Channel component of the Project indicates that 246 cultural resources comprised of historical and/or archaeological sites and one isolate have been previously recorded within 1-mile of the Project APE. All 246 previously recorded resources are historical in age and consist of the Atchison, Topeka and Santa Fe Railway, a drainage channel unrelated to the Project APE, structural remains from Camp Haan, and the remaining resources are comprised of historic built environment resources. The majority of the buildings were located in the March Field Historic District within March ARB, a National Register-listed property lying roughly 0.5 miles to the south of the Project APE. None of these resources were identified within the Project APE.

The isolate identified in both the K4 Parcel and Cactus Channel reports is a prehistoric resource comprised of a bifacial mano discovered on the surface approximately 0.75 miles southeast of the K4 Parcel and approximately 0.5 miles south of the eastern portion of the Cactus Channel.

Geoarchaeological Analysis

CRM TECH conducted a geoarchaeological analysis to assess the K4 Parcel and Cactus Channel's potential for the deposition and preservation of cultural deposits subsurface. Sources consulted for this analysis included primary topographic, geologic, and soil maps of the Project APE and vicinity (Appendix I1, Geotechnical Exploration Proposed Industrial Warehouse Site K4 Cactus Avenue; Morton and Cox 1994; Morton et al. 2001). The results of the geoarchaeological analysis (Appendix G and Appendix H) and paleontological field survey (Appendix I3) determined that the Project APE has been heavily disturbed by construction activities as a result of March ARB, Cactus Avenue, and Cactus Channel development. Disturbance was noted throughout the APE during geoarchaeological assessment, but predominantly in the eastern portion. In addition, the Cactus Channel portion of the

APE was observed to be extensively disturbed during the intensive pedestrian survey (Appendix H). Utility lines occur both above and below the ground surface, adding to subsurface disturbance. Moreover, the surface geology of the APE consists of exposures of locally formed alluvium of Pleistocene and Holocene age (Appendix I3) with soils near the ground surface identified as primarily artificial fill and, at depth, the soils are characterized as early Pleistocene alluvial fan deposits that would be expected to be sterile for cultural materials.[1] The artificial fill was noted mostly along Cactus Avenue and in the soil stockpiles, while the older alluvium was noted in all borings, at least below the surface (Appendix G).

Native American Coordination

Sacred Lands File Search and Tribal Outreach

CRM TECH requested a search of the SLF from the California NAHC for the K4 Parcel on May 14, 2018, and later deemed adequate for the Cactus Channel Improvement Site. The NAHC responded in a letter dated May 17, 2018, stating that the results of the SLF search failed to indicate the presence of Native American cultural resources within the Project APE, though the NAHC did note that the Project APE was sensitive for Native American cultural resources. The NAHC also provided a list of Native American groups and/or individuals who may have knowledge of cultural resources in the Project APE. In addition to or in lieu of some of the individuals recommended by the NAHC, CRM TECH also contacted other spokespersons for the tribes provided by the NAHC. Twelve responses were received as a result of the tribal outreach letters and are summarized in Table 4.4-1.

Table 4.4-1
Native American Tribal Communications

Native American Tribes	Response Received
San Manuel Band of Mission Indians	Stated that the Project APE is outside of tribe's ancestral territory and declined consulting party status.
Santa Rosa Band of Cahuilla Indians	No concerns regarding the proposed Project.
Agua Caliente Band of Cahuilla Indians	Requested all documentation associated with the cultural study for tribal review.
Morongo Band of Mission Indians	Requested all documentation associated with the cultural study for tribal review.
Augustine Band of Cahuilla Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project. The tribe recommended further consultation with other tribes in the vicinity, to be notified of the discovery of any Native American cultural resources, and monitoring of ground-disturbing work in the Project APE.

[1] The early Pleistocene (circa 2.6-0.8 million years ago) alluvial fan deposits well predate human habitation in California and would not be expected to contain deeply buried cultural materials.

Table 4.4-1
Native American Tribal Communications

Native American Tribes	Response Received
Cabazon Band of Mission Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project
Cahuilla Band of Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project. However, the tribe requested to be informed on the progress of the Project.
Pauma Band of Luiseno Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project. However, the tribe requested to be informed on the progress of the Project.
Rincon Band of Luiseno Indians	Stated that they did not have any information regarding Native American cultural resources within the Project APE that may be impacted by the implementation of the proposed Project
Serrano Nation of Indians	The tribe requested to be notified if any Native American cultural resources are encountered during the implementation of the proposed Project.
Pechanga Band of Luiseno Indians	The tribe participated in the survey of the Project APE and found the Project vicinity to be culturally sensitive and requested further consultation with March JPA. Furthermore, the tribe requested that a representative from their tribe and monitor for all earth-moving work associated with the proposed Project along with an archaeological monitor.
Soboba Band of Luiseno Indians	The tribe participated in the survey of the Project APE and found the Project vicinity to be culturally sensitive and requested further consultation with March JPA. Furthermore, the tribe requested that a representative from their tribe monitor for all earth-moving work associated with the proposed Project.

Notes: APE = area of potential effect; JPA = Joint Powers Authority.

The results of the tribal outreach process conducted for both the K4 Parcel and Cactus Channel, are available as Appendix 2 in both Cultural Resources Studies prepared by CRM TECH, which are included as Appendices G and H of this EIR. This outreach was conducted for informational purposes only and did not constitute formal government-to-government consultation as specified by Assembly Bill 52.

Historical Research

CRM TECH reviewed published literature, archival records, U.S. General Land Office land survey plat map, U.S. Geological Survey topographic maps, and aerial photographs to understand development of the Project APE and vicinity. The historical research did not identify any evidence of settlement or development within the Project APE during the historic period. The only historic-

era resource identified was a human-made feature located in the vicinity of the Project APE, to the west and is identified as the "Wagon Road to Timicula" in the U.S. General Land Office 1855 map.

In 1941, the Project APE became a part of the March Army Air Field, which was renamed March Army Air Base in 1942. In the 1939 U.S. Geological Survey topographic map, the Project APE did not depict any development; however, by the early 1950s a drainage channel in the northern portion of the Project APE is visible. Based on this time frame, it is likely that the channel was constructed when the APE was acquired by the military in 1941-1942.

Aerial photographs from the 1950s and 1960s depicted present-day Chanute Avenue as extending into the eastern portion of the APE and the mid-1960s, Cactus Avenue was shown extending across the Project vicinity, beyond the APE's northern boundary (NETR Online 1966). Sometime between the 1978 and 1994 aerials, the substation adjacent to the APE was constructed (NETR Online 1978, 1994) and images reviewed from Google Earth show the soil stockpiles within the APE in 2006–2008 (Google Earth 2018). Stockpiles of imported soil are found in the eastern portion of the APE, near the substation. Other than these and the various dirt roads, no additional features have appeared within or immediately adjacent to the APE (Appendix G).

Cultural Resources Survey

CRM TECH conducted a pedestrian survey on June 1, 2018, for the K4 Parcel and on July 27, 2018, for the Cactus Channel. The methods and results for the surveys conducted for each project are provided below.

The K4 Parcel survey was completed by walking a series of parallel north-south transects at 15-meter (approximately 50-foot) intervals by one CRM TECH archaeologist and two Native American monitors with one representing the Pechanga Band of Luiseno Indians and the second representing the Soboba Band of Luiseno Indians. The surveyors systematically surveyed for any evidence of archaeological resources, including both prehistoric and historical resources. Ground visibility was nearly 100%. Several power transmission lines and stockpiles of imported soil were surveyed in the eastern portion of the APE, near the substation. In addition, a small segment of Chanute Avenue was identified by surveyors in the southeastern corner of the Project APE. Chanute Avenue dates to the 1950s and 1960s and was maintained and used for accessing a nearby substation up until around 2006, when it was abandoned. CRM TECH determined that the Chanute Avenue was not a historical resource under CEQA and therefore it was not formally recorded.

The Cactus Channel survey resulted in the identification and recordation of the historical Cactus Channel (see Appendix 3 of Appendix H of this EIR), situated across the northernmost portion of the Project APE. This resource consists of an earthen, open-air drainage channel that was recorded during a recent study as site P-33-028200 (CA-RIV-12712) (see Appendix 3 in

Appendix G of this EIR). The Cactus Channel survey was conducted by walking a transect on each side of the existing channel for the entire length of the linear channel by one CRM TECH archaeologist and one Native American monitor representing the Soboba Band of Luiseno Indians. The surveyors systematically surveyed for any evidence of archaeological resources, including both prehistoric and historical resources. Ground visibility varied between 80% along the top of Cactus Channel, to approximately less than 5% along the bottom of the channel, due to dense vegetation growth and surface refuse obscuring any possible visible exposed ground surface. The survey resulted in the recordation of the Cactus Channel for submission into the CHRIS records (see Appendix 3 in Appendix H of this EIR). The resource was designated by the EIC as site P-33-028200. In addition, surveyors identified several streets including Riverside Dive, Fourth Street, and Cactus Avenue, adjacent to the channel that are historical in age; however, these streets appear to have undergone modifications over time and as such, are not considered historical resources under CEQA and therefore were not formally recorded.

In summary, no cultural or historic-era resources were identified within the Project APE as a result of the CHRIS records search, Native American outreach, or intensive pedestrian survey, with exception to the Cactus Channel. However, further analysis of the Cactus Channel concluded that the Cactus Channel is not considered a historical resource.

4.4.2 Relevant Plans, Policies, and Ordinances

Federal

The National Register of Historic Places

The NRHP is the United States' official list of districts, sites, buildings, structures, and objects worthy of preservation. Overseen by the National Park Service, under the U.S. Department of the Interior, the NRHP was authorized under the National Historic Preservation Act of 1966, as amended (16 USC 470 et seq.). Its listings encompass all National Historic Landmarks, as well as historic areas administered by the National Park Service.

NRHP guidelines for the evaluation of historic significance were developed to be flexible and to recognize the accomplishments of all who have made significant contributions to the nation's history and heritage. Its criteria are designed to guide state and local governments, federal agencies, and others in evaluating potential entries in the NRHP. For a property to be listed in or determined eligible for listing, it must be demonstrated to possess integrity and to meet at least one of the following criteria:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and

> objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B. That are associated with the lives of persons significant in our past; or
>
> C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D. That have yielded, or may be likely to yield, information important in prehistory or history.

Integrity is defined in NRHP guidance, *How to Apply the National Register Criteria,* as "the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity" (NPS 1990). Historic properties either retain integrity (convey their significance) or they do not. Within the concept of integrity, the National Register criteria recognizes seven aspects or qualities that define integrity. The seven aspects of integrity are locations, setting, design, materials, workmanship, feeling and association. In order to retain historic integrity "a property will always possess several, and usually most, of the aspects" (Andrus and Shrimpton 2002).

NRHP guidance further asserts that properties be completed at least 50 years ago to be considered for eligibility. Properties completed fewer than 50 years before evaluation must be proven to be "exceptionally important" (criteria consideration G) to be considered for listing.

Under Section 106 of the National Historic Preservation Act, a historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria (36 CFR Part 800.16(i)(1)).

Effects on historic properties under Section 106 of the National Historic Preservation Act are defined in the assessment of adverse effects in 36 CFR Part 800.5(a)(1):

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of

the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties are clearly defined and include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance (36 CFR 800.5 (2)).

To comply with Section 106, the criteria of adverse effect are applied to historic properties, if any exist in the Project APE, pursuant to 36 CFR Part 800.5(a)(1). If no historic properties are identified in the APE, a finding of "no historic properties affected" will be made for the proposed Project. If there are historic properties in the APE, application of the criteria of adverse effect will result in Project-related findings of either "no adverse effect" or of "adverse effect," as previously described. A finding of no adverse effect may be appropriate when the undertaking's effects do not meet the thresholds in criteria of adverse effect 36 CFR Part 800.5(a)(1), in certain cases when the undertaking is modified to avoid or lessen effects, or if conditions were imposed to ensure

review of rehabilitation plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (codified in 36 CFR Part 68).

If adverse effects findings were expected to result from the proposed Project, mitigation would be required, as feasible, and resolution of those adverse effects by consultation may occur to avoid, minimize, or mitigate adverse effects on historic properties pursuant to 36 CFR Part 800.6(a).

State

The California Register of Historical Resources

In California, the term "historical resource" includes, but is not limited to, "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC Section 5020.1(j)). In 1992, the California legislature established the CRHR "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1(a)). The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP, enumerated as follows. According to Public Resources Code (PRC) Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity" and (ii) meets at least one of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852(d)(2)).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic-era resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in

the CRHR, as are the California Historical Landmarks from No. 770 onward, California Points of Historical Interest designated after January 1998, and resources recommended by the State Historical Resources Commission (SHRC). The CRHR also includes properties designated under local ordinances or identified through local historical resource surveys.

California Environmental Quality Act

As described further, the following CEQA Statute (PRC Section 21000 et seq.) and Guidelines (14 CCR 15000 et seq.) are of relevance to the analysis of historical and archaeological resources and human remains.

- PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) defines "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of an historical resource," it also defines the circumstances when a project would materially impair the significance of a historical resource.
- PRC Section 21083.2(g) defines "unique archaeological resource."
- PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated ceremony.
- PRC Sections 21083.2(b) and 21083.2(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic-era resources, including examples of preservation-in-place mitigation measures. Preservation in place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context, and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site(s).

More specifically, under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; 14 CCR 15064.5(b)). If a resource is listed or eligible for listing in the CRHR, included in a local register of historic resources, or identified as significant in a historical resources survey (meeting the requirements of PRC Section 5024.1(q)), it is an "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (PRC Section 21084.1; 14 CCR 15064.5(a)). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (PRC Section 21084.1; 14 CCR 15064.5(a)).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would

be materially impaired" (14 CCR 15064.5(b)(1); PRC Section 5020.1(q)). In turn, the significance of a historical resource is materially impaired when a project does any of the following:

(1) Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or

(2) Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or

(3) Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA (14 CCR 15064.5(b)(2)).

Pursuant to these sections, the CEQA inquiry begins with evaluating whether a project site contains any "historical resources," then evaluates whether that project will cause a substantial adverse change in the significance of a historical resource such that the resource's historical significance is materially impaired.

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (PRC Sections 21083.2(a)–(c)).

Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC Section 21083.2(g)).

Impacts on non-unique archaeological resources are generally not considered a significant environmental impact (PRC Section 21083.2(a); 14 CCR 15064.5(c)(4)). However, if a non-unique archaeological resource qualifies as a tribal cultural resource (PRC Sections 21074(c) and 21083.2(h)), further consideration of significant impacts is required (refer to Section 4.12, Tribal Cultural Resources).

CEQA Guidelines Section 15064.5(d) and (e) assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. Described as follows, these procedures are detailed in California Health and Safety Code Section 7050.5 and PRC Section 5097.98.

California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains can occur until the county coroner has examined the remains (Health and Safety Code Section 7050.5(b)). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the NAHC within 24 hours (Health and Safety Code Section 7050.5(c)). The NAHC will notify the most likely descendant (MLD). With the permission of the landowner, the MLD may inspect the site of discovery. The inspection must be completed within 48 hours from being granted access to the site. The MLD may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

Local

County of Riverside General Plan

The County of Riverside's General Plan recognizes the CEQA Guidelines Section 15064.5 as a threshold for the identification and protection of historic resources, archaeological and paleontological resources as well as the determination of significant impacts on those resources. In addition, the County's General Plan includes several Open Space policies to reduce or minimize the effects of development on historic, archaeological and paleontological resources.

Historical Resources

The County Board of Supervisors of Riverside County established a Riverside County Historical Commission on May 6, 1968. The Commission advises the Board of Supervisors in order to

discover and identify persons, events, and places of historical importance within Riverside County and to make recommendations relating to the preservation of historic sites and structures.

The Riverside County Historical Commission has adopted a set of criteria and procedures for nominating and recognizing Historic Landmarks. Individuals, organizations, or governmental agencies may apply for a County Landmark to the County's Historic Preservation Officer (HPO) at the Riverside County Regional Park and Open Space District. The HPO assesses applications and advises the County Regional Park and Open Space District General Manager, who forwards nominations to the Historical Commission for consideration and recommendation. The Historical Commission may recommend a nomination to the County Board of Supervisors. A nomination approved by the County Board of Supervisors will be officially listed as a Riverside County Historic Landmark.

Historical resources that may be considered by nomination include those found eligible for local, state, or national landmark status during CEQA cultural review or a historic resource survey, or historic resources that are already designated under a municipal or county preservation or landmark ordinance. Nominations for historic resources that do not already have some level of landmark designation, or that are found to be eligible for such, will be reviewed under County criteria. The Commission may deem a resource eligible for designation but will not officially landmark the property without owner consent.

Cultural Resources

Cultural Resources are evidence of past human activity that become important for scientific, historic, and/or religious reasons to communities, descendant groups, and individuals. They may include objects, buildings, structures, sites (particularly archaeological sites), areas, places, records, or manuscripts associated with history. The following policies are intended to ensure that cultural resources are appropriately considered:

OS 19.3: Review proposed development for the possibility of cultural resources and for compliance with the cultural resources program.

OS 19.4: To the extent feasible, designate as open space and allocate resources and/or tax credits to prioritize the protection of cultural resources preserved in place or left in an undisturbed state.

OS 19.5: Exercise sensitivity and respect for human remains from both prehistoric and historic time periods and comply with all applicable laws concerning such remains.

4.4.3 Thresholds of Significance

March JPA uses the CEQA Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A) and the newly adopted CEQA Guidelines Appendix G (December 2018), a significant impact related to cultural resources would occur if the project would:

- **CUL-1**: Cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5.
- **CUL-2**: Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5.
- **CUL-3**: Disturb any human remains, including those interred outside of dedicated cemeteries.

4.4.4 Impacts Analysis

Threshold CUL-1. Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to CEQA Guidelines Section 15064.5?

The proposed Project involves the development of an approximately 718,000-square-foot industrial warehouse and the conversion of the existing Cactus Channel from an open-air earthen channel into an underground concrete culvert. CRM TECH completed a CHRIS records search and conducted pedestrian surveys of the Project APE on June 1, 2018 for the K4 Parcel and on July 27, 2018 for the Cactus Channel, for historic built-environment resources. As a result of the study, only one resources was identified in the Project APE. The Cactus Channel (33-028200/CA-RIV-12721), constructed between 1941 and 1953, was found ineligible under all NRHP and CRHR designation criteria. Cactus Channel is a peripheral feature associated with the WWII-era military base, but does not demonstrate a unique or particularly close association with that event or with any other events (Criterion A/1) or persons (Criterion B/2) of recognized historic significance. Additionally, the channel does not stand out as an important example of any style, type, period, region, or method of construction, nor is it known to represent the work of a prominent architect, designer, engineer, or builder (Criterion C/3). Finally, as a late-historic-period infrastructure feature of standard construction, it demonstrates little potential for any important historical/archaeological information (Criterion D/4; Appendix H). The channel is not considered a historical resource for the purposes of CEQA. As such, the Project would result in **no impact** on historical resources.

Threshold CUL-2. Would the Project cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines Section 15064.5?

The proposed Project involves development of an approximately 718,000-square-foot industrial warehouse and the conversion of the existing Cactus Channel from an open-air earthen channel into

an underground concrete culvert. CRM TECH conducted pedestrian surveys of the Project APE on June 1, 2018 for the K4 Parcel and on July 27, 2018 for the Cactus Channel, for archaeological resources. Additionally, a CHRIS records search was conducted for the Project APE and within 1-mile buffer around the APE, and an NAHC SLF search and tribal outreach were conducted. No archaeological resources were identified within the Project APE as a result of the CHRIS records search, Native American outreach, or intensive pedestrian survey.

Geoarchaeological analysis was conducted to assess the Project APE's potential for the deposition and preservation of cultural deposits subsurface. The results of the geoarchaeological analysis determined that the Project APE has been heavily disturbed by construction activities as a result of March ARB, Cactus Avenue, and Cactus Channel development. Moreover, the soils near the ground surface are primarily engineered fill and, at depth, the soils are characterized as early Pleistocene alluvial fan deposits and would be expected to be sterile for cultural materials.

It is always possible that unanticipated discoveries could be encountered during ground-disturbing activities associated with the proposed Project. If such unanticipated discoveries were encountered, impacts to encountered resources could be potentially significant. However, with implementation of mitigation measure **MM-CUL-1**, which requires that all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology, can evaluate the significance of the find, potentially significant impacts to archaeological resources would be reduced to **less than significant** levels.

Threshold CUL-3 Would the Project disturb any human remains, including those interred outside of dedicated cemeteries?

No prehistoric or historic burials were identified within the Project APE as a result of the CHRIS and SLF records search, tribal outreach, and pedestrian survey. Although the likelihood of encountering human remains as a result of Project implementation is low to non-existent, mitigation measure **MM-CUL-2** is provided to ensure impacts would be considered **less than significant** in the unexpected event that human remains are unearthed during construction activities within the proposed Project APE. The discovery of human remains would require handling in accordance with PRC 5097.98, which states that in the event that human remains are discovered during construction, construction activity shall be halted and the area shall be protected until consultation and treatment can occur as prescribed by law.

4.4.5 Mitigation Measures

The following mitigation measures would reduce potentially significant impacts to archaeological resources and human remains to a less-than-significant level.

MM-CUL-1 **Inadvertent Discovery of Archaeological Resources.** In the event that archaeological resources are inadvertently unearthed during excavation and grading activities for the Project and no monitors are present, the contractor shall cease all earth-disturbing activities within a 100-foot radius of the area of the discovery, March Joint Powers Authority (JPA) shall be notified, and a qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology shall evaluate the significance of the find and determine the appropriate course of action. Depending upon the significance of the find under the California Environmental Quality Act (CEQA) (14 CCR 15064.5(f); PRC, Section 21082), the archaeologist may simply record the find and allow work to continue.

If the resource is a Native American cultural resource or is prehistoric, the appropriate tribe(s) shall weigh in on the evaluation of the resource and the appropriate course of action.

Pursuant to California Public Resources Code Section 21083.2(b) and CEQA Guidelines Section 15126.4, avoidance is the preferred method of preservation for archaeological resources. If avoidance of the resources is not feasible, salvage operation requirements pursuant to Section 15064.5 of the CEQA Guidelines shall be followed and shall take in to account tribal preferences and sensitivity concerns. If potentially significant features or sites are discovered, an Evaluation and Treatment Plan shall be developed by the qualified archaeologist and the Native American representative and shall contain, at a minimum, a research design and field methodology designed to address the criterion outlined in the CRHR. If a site is determined to be significant, data recovery excavations may be necessary unless the resource is avoided and preserved/protected in place. The qualified archaeologist shall also be required to curate specimens in a repository with permanent retrievable storage and submit a written report to March JPA for review and approval. Once artifact analysis is completed, a final written report detailing the results of all research procedures and interpretation of the site shall be submitted to March JPA for review and approval. Evaluation and treatment shall be supervised by an individual or individuals that meet the Secretary of the Interior's Professional Qualification Standards.

After the find has been appropriately avoided or mitigated and cleared by March JPA, the qualified archaeologist and, if applicable, the Native American representative, work in the area may resume. Resources shall be documented on Department of Parks and Recreation 523 series forms and shall be submitted to the Eastern Information Center (EIC) along with the final written report for inclusion in the California Historical Resources Information System (CHRIS).

MM-CUL-2 **Inadvertent Discovery of Human Remains.** In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found, the Riverside County Coroner shall be immediately notified of the discovery. No further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined, within 2 working days of notification of the discovery, the appropriate treatment and disposition of the human remains. If the County Coroner determines that the remains are, or are believed to be, Native American, he or she shall notify the Native American Heritage Commission (NAHC) within 24 hours. In accordance with California Public Resources Code, Section 5097.98, the NAHC must immediately notify those persons it believes to be the most likely descendant (MLD) from the deceased Native American. The MLD shall complete their inspection within 48 hours of being granted access to the site. The MLD representative would then determine, in consultation with the property owner, the disposition of the human remains.

4.4.6 Level of Significance After Mitigation

With adherence to mitigation measures **MM-CUL-1** and **MM-CUL-2**, no significant impacts to cultural resources would occur as a result of the proposed Project.

4.4.7 References

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4.5 GEOLOGY AND SOILS

This section analyzes the potential impacts of the proposed K4 Warehouse and Cactus Channel Improvement Project (proposed Project or Project) related to exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and seismic-related ground failure, unique paleontological resources and sites, and additional geological hazards.

The Initial Study (Appendix A, Initial Study and Notice of Preparation) concluded that potential impacts related to exposing people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault or landslides would be less than significant. The Initial Study also concluded that the Project would have no impact with respect to the potential for the proposed Project to have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater. Therefore, these issues are not discussed further in this Environmental Impact Report (EIR).

The following resources were used in the preparation of this section of the EIR:

- *Geotechnical Exploration Proposed Industrial Warehouse Site K4 Cactus Avenue* (Appendix I1)
- *Geotechnical Addendum Report K4 Moreno Valley Storm Drain Cactus Avenue* (Appendix I2)
- *Paleontological Resources Assessment Report* (Appendix I3)
- *Phase I and Limited Phase II Environmental Site Assessment Proposed Industrial Warehouse Site K4* (Appendix K)
- *General Plan of the March Joint Powers Authority (JPA)* (March JPA 1999a)
- *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA 1999b)

As mentioned in Chapter 2, Project Description, of this EIR, the Project includes the development of the five parcels on approximately 35.4-acre site (K4 Parcel) with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) that runs along the south side of Cactus Avenue, commencing just east

of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel (Channel Improvement Site). The proposed Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The proposed Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.5.1 Existing Conditions

The K4 Parcel and Cactus Channel are located on the south side of Cactus Avenue and extends from the terminus of Veterans Way at Cactus Avenue on the west to the terminus of Frederick Street at Cactus Avenue on the east. The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California. The K4 Parcel is located within the former boundaries of the March Air Force Base (now known as the March Air Reserve Base (ARB)), in the northern area.

The surrounding area consists of vacant land, commercial and industrial properties and the March ARB. Adjacent to the north of the K4 Parcel and Cactus Channel, across Cactus Avenue, is an industrial and commercial center. To the east, the K4 Parcel is bounded by vacant land and an electrical substation. To the south, the K4 Parcel is bordered by March ARB and to the west the K4 Parcel is bordered by a vacant lot and March ARB. Harvest Time Christian School is located at 14420 Elsworth Street, Moreno Valley, CA 92553, and approximately 0.2 miles northwest of the Cactus Channel component of the proposed Project site.

Topographically, the K4 Parcel is relatively flat, draining gently in a southeastern direction. The K4 Parcel is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. The K4 Parcel is underlain by localized undocumented artificial fill and older (Appendix I1). There is an approximately 152,000-square-foot area with stockpiled soil in the southern portion of the K4 Parcel, adjacent to the transformer station. No buildings or structures are located on site; the southeastern perimeter of the K4 Parcel wraps around an electrical substation that is not included as part of the subject site. The substation has two paved entrances on the east that are accessible by

Chanute Avenue, these entrances and Chanute Avenue are part of the K4 Parcel. The Cactus Channel is earthen and flows within the channel drain to the east.

Surrounding Land Uses

Adjacent to the north of the proposed K4 Parcel, across Cactus Avenue, are commercial, office, and industrial uses. Beyond these initial uses to the north, are other office, commercial, and industrial uses within the City of Moreno Valley, such as the Riverside County Waste Management Department, and commercial concrete facility. To the east, the proposed K4 Parcel is bounded by vacant land and an electrical substation. Further east is the March ARB, which previously the March Air Force Base. To the south, the proposed K4 Parcel is bordered by March ARB, including the March ARB runway. Lastly, to the west, the proposed K4 Parcel is bordered by a vacant lot and March ARB. Interstate 215 is approximately 0.7 miles west of the K4 Parcel, which intersects the March ARB. Further west is the City of Riverside, along with unincorporated areas of Riverside County.

The Cactus Channel portion of the proposed Project runs along the south side of Cactus Avenue, passing a variety of uses along the Cactus Avenue corridor, primarily consisting of March ARB, Industrial Warehouse, and commercial uses.

Geologic Setting and Soils

The site located in the March JPA Planning Area, which is part of the eroded Cretaceous and older crystalline basement rock (Perris Erosional Surface) and the alluvial filled valley (Perris Plain). The Perris Plain alluvial deposits are composed of alternating layers of varying amounts of clay, silt, sand, and gravel. The thickness of the Perris Plain varies from a few feet to greater than 800 feet. On-site soils are generally suitable for reuse as compacted fill, provided they are free of debris and organic matter (Appendix I1). Groundwater was encountered at the Project site, at a depth of approximately 19 feet below ground surface and 23 feet below ground surface.

The site is located in the natural geomorphic province in southwestern California known as the Peninsular Ranges. The province is characterized by steep, elongated, mountains and valleys that trend northwestward. The site is located in the Perris Block, which is approximately 20 by 50 miles and is bounded by the San Jacinto Fault Zone to the northeast and the Elsinore Fault Zone to the southwest. The Perris Block is characterized by vertical land movements of several thousand feet in response to movement

The Project vicinity is primarily located within Quaternary-age very old fan deposits. More specifically, the K4 Parcel is underlain by localized artificial fill and older alluvium. The undocumented artificial fill is generally associated with existing Cactus Avenue and a large stockpile. The older alluvium soils encountered in all borings, generally consist of medium dense to very dense

silty to clayey sand and localized layers of sandy silty to sandy clay. This older alluvium is expected to generally possess a low expansion potential and slight collapse potential (<1%) (Appendix I1).

Based on the results of the geotechnical report (Appendix I2), the alignment of the proposed storm drain (Cactus Channel) is likely underlain by the recent sediments/young alluvium and older alluvium. Recent sediments/young alluvium is likely generated during past cycles of flooding within this earthen channel. Based on visual observations during field exploration performed for the Project, recent sediments/young alluvium generally consist of fine sands and silt and are expected to be loose and possess low expansion (EI<51). The older alluvium deposits are expected to consist of medium dense to very dense silty to clayey sand (SM/SC) and localized layers of sandy silty to sandy clay (ML/CL). This older alluvium is expected to generally possess a low expansion potential (EI<51) and slight collapse potential (<1%).

Topography

Both the K4 Parcel and the Cactus Channel are relatively flat, draining gently in a southeastern direction. The K4 Parcel is currently undeveloped and vacant land.

Faults and Seismicity

The proposed Project site, similarly to the planning area and the Southern California region, is a located in a seismically active region, as it is located between the North American and Pacific tectonic plates. The Project site is located between two major fault zones: the Elsinore-Whittier fault, approximately 13 miles to the southeast, and the San Jacinto fault, approximately 7 miles to the northeast. The area between the two faults is known as the Perris Block or Perris Plain. The primary source of seismic activity on the site is the tectonic boundary condition which is expressed by the predominant northwest trending faults.

Ground Shaking

Strong ground shaking can be expected at the site during moderate to severe earthquakes in the general Southern California region. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (i.e., soil type) characteristics.

Liquefaction/Lateral Spreading

Liquefaction is a process in which loose sand and silt that is saturated with water can behave like a liquid when shaken by an earthquake (USGS 2018a). According to the Riverside County Geologic Hazards maps, the K4 Parcel and the Cactus Channel are located in a zone of high liquefaction potential. However, liquefaction-induced ground settlement is not expected to be a significant hazard at the site due to the absence of near-surface saturated sand layers and

underlying dense older alluvium. The dynamic settlement due to ground shaking, based on a peak ground acceleration of 0.5g (percent of gravity), with a moment magnitude of 7.2, is estimated to be less than 1 inch. This settlement is expected to be generally global and over a large area. As such, the seismic differential settlement is not expected to exceed 0.5 inch in a 40-foot horizontal distance within this site (Appendix I1).

Lateral spreading is the finite, lateral movement of gently to sloping, saturated soils deposits, caused by earthquake-induced liquefaction. Based on the low potential for liquefaction, in combination with the relatively flat topography, the potential for lateral spreading is low.

Landslides

Due to the relatively flat site topography, the potential for landslides at the Project site is very low.

Collapsible Soils

Laboratory testing indicates that on-site soils (older alluvium) are expected to possess a slight collapse potential (<1%) (Appendix I2).

Subsidence

Land subsidence is a settling or sudden sinking of a geological surface owing to subsurface movement of earth materials. The principal causes in Southern California are aquifer-system compaction, drainage and decomposition of organic soils, and oil and gas extraction. Effects of land subsidence include damage to buildings and infrastructure such as roads and canals, increased flood risk in low-lying areas, and lasting damage to groundwater aquifers and aquatic ecosystems (USGS 2017). Based on a review of a United States Geological Survey subsidence map, the Project site is not located in an area subject to subsidence (USGS 2018b).

Expansive Soils

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Foundations constructed on these soils are subject to large uplifting forces caused by the volumetric changes over time. Without proper measures taken, heaving and cracking of building foundations and slabs-on-grade could result. According to laboratory testing of on-site soils performed for the proposed Project geotechnical report (Appendix I2), it was indicated that the soils on site possess an expansion potential of EI<51, which is considered to be low.

Paleontological Setting

March ARB is located in a valley floor area in the northern portion of the Peninsular Ranges Geomorphic Province, which is bounded on the north by the Transverse Ranges province, on the

northeast by the Colorado Desert province, and on the west by the Pacific Ocean (Appendix I3). The Project area lies on the edge of a high portion of the Perris Block, which was defined as a region between the San Jacinto and Elsinore-Chino fault zones and consisting of a series of tectonically controlled valleys and ridges (Appendix I3). The structural blocks are considered to have been active since Pliocene (~ 5.3 million years ago [mya] – 2.6 mya) time. The Pliocene- and Pleistocene (~ 2.6 mya – 11,700 years ago)-age non-marine sedimentary rocks found filling the valley areas have produced vertebrate fossils, as well as plant and invertebrate fossil remains (Appendix I3). The ground surface in the Project vicinity has been disturbed extensively in the past and appears to have been cleared of much of the vegetation recently, except in the Cactus Channel.

There is disagreement regarding the 1:24,000 scale, surficial geological mapping of the Project area. According to surficial geological mapping by Morton and Cox (1994), the western Project area is underlain by Pleistocene older alluvium (map unit Qoa); whereas, Morton et al. (2002a; 2002b) mapped the entire Project area as early Pleistocene (~ 2.6 mya – 781,000 years ago) very old alluvial fan deposits (map unit $Qvof_a$). Morton (1978) mapped the surficial geology of the eastern Project area as underlain by Holocene (< 11,700 years ago) younger alluvium (map unit Qya) and Dibblee and Minch (2003a; 2003b) mapped the entire Project area as Holocene alluvium (map unit Qa). Geotechnical borings indicated the Project area to be underlain by Pleistocene alluvial deposits (Leighton Consulting Inc. 2018a; Leighton Consulting Inc. 2019b). Pleistocene alluvial deposits have high paleontological sensitivity, and Holocene alluvial deposits have low paleontological sensitivity on the surface that increases with depth.

CRM TECH (2019) requested a paleontological records search of the Project area and a one-mile radius buffer through the Western Science Center (WSC) in Hemet and conducted field surveys on June 1 and July 27, 2018, in which no evidence of any paleontological resources was observed on the ground surface throughout the Project area. The field observations confirmed that the surface sediments in and near the Project area had been extensively disturbed in the past, especially along the drainage channel and the various roadways nearby (Appendix I3). While no paleontological resource localities were reported by the WSC within the Project area or the one-mile radius buffer, the WSC reported 100's of fossil localities from outside the one-mile buffer recovered from sediments similar to those underlying the Project area. The WSC concluded the Project has a high potential to impact scientifically significant paleontological resources (CRM TECH 2019).

4.5.2 Relevant Plans, Policies, and Ordinances

Federal

Occupational Safety and Health Administration Regulations

Excavation and trenching are among the most hazardous construction operations. OSHA Excavation and Trenching Standard, Title 29 of the Code of Federal Regulations, Part 1926.650, covers requirements for excavation and trenching operations. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. In California, California OSHA (Cal/OSHA) has responsibility for implementing federal rules relevant to worker safety, including slope protection during construction excavations. Cal/OSHA's requirements are more restrictive and protective than federal OSHA standards.

State

The statewide minimum public safety standard for mitigation of earthquake hazards (as established through the California Building Code (CBC)), Alquist–Priolo Earthquake Fault Zoning Act, and Seismic Hazards Mapping Act) is that the minimum level of mitigation for a proposed Project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy,[1] but in most cases, is not required to prevent or avoid the ground failure itself. It is not feasible to design all structures to completely avoid damage in worst-case earthquake scenarios. Accordingly, regulatory agencies have generally defined an "acceptable level" of risk as that which provides reasonable protection of the public safety, although it does not necessarily ensure continued structural integrity and functionality of a proposed Project (14 CCR 3721(a)). Nothing in these acts, however, precludes lead agencies from enacting more stringent requirements, requiring a higher level of performance, or applying these requirements to developments other than those that meet the acts' definitions of "proposed Project."

CEQA

CEQA requires lead agencies to consider the potential effects of a project on unique paleontological resources. CEQA requires an assessment of impacts associated with the direct or indirect destruction of unique paleontological resources or sites that are of value to the region or state. This study satisfies project requirements in accordance with CEQA (Pub. Resources Code, § 2100 et seq.) and Public

[1] A "structure for human occupancy" is any structure used or intended for supporting or sheltering any use or occupancy that is expected to have a human occupancy rate of more than 2,000 person-hours per year.

Resources Code Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by the Society of Vertebrate Paleontology ([SVP] 2010).

Paleontological resources are explicitly addressed by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the "Environmental Checklist Form," which addresses the potential for adverse impacts to "unique paleontological resource[s] or site[s] or … unique geological feature[s]." This provision covers scientifically significant fossils of signal importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth. The Public Resources Code, sections 5097.5 and 30244, also regulate removal of paleontological resources from state lands, define unauthorized removal of fossil resources as a misdemeanor, and require mitigation of disturbed sites.

California Building Code

The CBC has been codified in the California Code of Regulations as Title 24, Part 2. Title 24 is administered by the California Building Standards Commission, which is responsible for coordinating all building standards. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The CBC is based on the International Building Code published by the International Code Conference. The CBC contains California amendments based on the American Society of Civil Engineers Minimum Design Standards 7-16, which provides requirements for general structural design and includes means for determining earthquake loads and other loads (such as wind loads) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

State Earthquake Protection Law

The State Earthquake Protection Law (California Health and Safety Code, Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC requires a site-specific geotechnical study to address seismic issues and identifies seismic factors that must be considered in structural design.

California Occupational Safety and Health Administration Regulations

Excavation and trenching are among the most hazardous construction operations. In California, the Cal/OSHA has responsibility for implementing state standards that have been determined to be "as effective as" federal rules relevant to worker safety, including slope protection during construction excavations. Cal/OSHA's requirements are more restrictive and protective than federal OSHA standards.

Local

March JPA General Plan Safety Element

The Safety/Risk Management Element of the March JPA General Plan identifies and establishes goals and policies related to strong seismic shaking and seismic related ground failure including liquefaction that will be applied to the proposed Project. The following goals and policies form the March JPA General Plan apply to the proposed Project. Consistency with these goals and policies is discussed in Section 4.9, Land Use and Planning.

Goal 1: Minimize injury and loss of life, property damage, and other impacts caused by seismic shaking, fault rupture, ground failure, and landslides.

Policy 1.1: Require geological and geotechnical investigations in areas of potential seismic or geologic hazards as part of the environmental development review process. Require mitigation of seismic of geologic hazards to the satisfaction of the responsibility.

Policy 1.2: Ensure all grading plans comply with the Uniform Building Code (UBC) and California Building Code including, if necessary, requiring preliminary investigations of development sites by a State-registered geotechnical engineers and certified engineering geologists.

Policy 1.3: If necessary, require liquefaction assessment studies in any area identified as having moderate to high liquefaction susceptibility.

4.5.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the Initial Study prepared for the Project (Appendix A) and the newly adopted California Environmental Quality Act Guidelines Appendix G (December 2018), the proposed Project could have a significant impact on geology and soils if the proposed Project would:

- **GEO-1**: Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and/or liquefaction.

- **GEO-2**: Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.
- **GEO-3**: Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.
- **GEO-4**: Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.5.4 Impacts Analysis

Threshold GEO-1. Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and/or liquefaction?

The Project site is located between two major fault zones: the Elsinore-Whittier fault, approximately 13 miles to the southeast, and the San Jacinto fault, approximately 7 miles to the northeast. Along with the San Andreas fault, these faults are the primary seismic sources in the area. Similar to most of Southern California, strong ground shaking can be expected at the site during moderate to severe earthquakes. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (i.e., soil type) characteristics. Construction of the proposed Cactus Channel improvements would include trenching. As discussed in the Geotechnical Report (Appendix I2), excavation shall be performed in accordance with the Project plans, "Standard Specifications for Public Works Construction" (Public Works Standard Inc. 2018), applicable Riverside County Flood Control and Water Conservation District requirements, applicable OSHA requirements, and the recommendations included in the Geotechnical Explorations (Appendices I1 and I2). Implementation or the recommendations within Appendix I1 and Appendix I2 are ensured through MM-GEO-1. As included as a recommendation in Appendix I2, the contractor shall be consulted for the proper excavation method, equipment, and production rate based on the findings of Appendix I2. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. Other earthwork recommendations are included in the Geotechnical Report that would reduce potential risk from earthwork activities during construction.

Based on Riverside County Geologic Hazards maps, the K4 Parcel and the Cactus Channel are located in a zone of high liquefaction potential. However, liquefaction-induced ground settlement is not expected to be a significant hazard at the site due to the absence of near-surface saturated sand layers and underlying dense older alluvium (Appendix I1).

The proposed Project would be designed to current CBC seismic design standards to anticipate the effects associated with direct or indirect effects of potential seismic ground shaking and liquefaction. As part of its plan check process, the March JPA reviews project plans to ensure compliance with the existing and regularly amended seismic design provisions of the CBC or UBC, whichever is more restrictive. The March JPA's building plan check process would review the Project with consideration of the following (March JPA 1999a):

- Symmetrical, concrete, and steel-framed buildings are particularly earthquake resistant forms of non-residential construction and shall be encouraged.
- Irregularly shaped buildings are more difficult to design to withstand strong ground motions, and are therefore, more susceptible to damage during an earthquake. Irregularly shaped buildings shall be discouraged.
- Buildings with adverse discontinuities in strength between major structural elements are susceptible to earthquake damage and shall be discouraged.
- Nonstructural elements must not block exit routes and constrain rescue operations if damaged or overturned during a tremor.
- Non-residential, precast tilt-up construction must have adequate diaphragms (horizontal bracing system that transmits horizontal forces to vertical resisting components) and adequate tie-ins or connections between structural components to prevent roof collapse.
- Stairways and elevators shall be adequately strengthened, and nonstructural components such as emergency generators, computers, and cabinets shall be anchored.

March JPA-designated building inspectors would review proposed Project plans to ensure compliance with the existing and regularly amended seismic design provisions of the CBC, in order to reduce potential impacts from seismic ground shaking, including liquefaction. In addition, the Project would be constructed in compliance with recommendations of the Project-specific geotechnical investigations as required by **MM-GEO-1**, included within Appendix I2 of this EIR, thus minimizing exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and/or liquefaction. As a result, with implementation of **MM-GEO-1**, impacts would be **less than significant**.

Threshold GEO-2. Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Based on Project-specific geotechnical investigations (Appendix I1), the potential for liquefaction and lateral spreading is low. Regarding landslide potential, landslides and rock falls occur most often on

steep or compromised slopes. Factors controlling the stability of slopes include (1) slope height and steepness, (2) engineering characteristics of the earth materials comprising the slope, and (3) intensity of ground shaking (County of Riverside 2016). Considering the site is generally level without significant slopes, and the site is underlain by recent sediments/young alluvium and dense, older alluvium, the site is not considered susceptible to static slope instability or seismically induced landslides. Laboratory testing indicates that on-site soils (older alluvium) are expected to possess a slight collapse potential (<1%). However, based on the remedial grading recommendations to remove and compact the near surface soils, this geologic hazard on the site is considered very low. Based on a review of a United States Geological Survey subsidence map, the Project site is not located in an area subject to subsidence.

All structures associated with the proposed Project would be designed to the CBC standards to anticipate impacts associated with ground failure, including soil collapse. March JPA-designated building inspectors would review proposed Project plans to ensure compliance with the existing and regularly amended provisions of the CBC, in order to reduce potential impacts from ground failure. In addition, the Project would be constructed in compliance with recommendations of the Project-specific geotechnical investigations, included as Appendix I2, as required by MM-GEO-1. Specifically, recommendations from the Geotechnical Report related to reducing the potential risks associated with landslide, lateral spreading, subsidence, liquefaction, and collapse within the geotechnical explorations include recommendations 4.2.1, 4.2.2, 4.2.5, and 4.3.2 for the proposed warehouse building on the K4 Parcel and recommendations 3.2.2 and 3.4.1 for the proposed Cactus Channel improvements (Appendix I2). As such, with implementation of **MM-GEO-1**, impacts would be **less than significant**.

Threshold GEO-3. Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Soil test results indicated that on-site soils generally possess a low expansion potential of (EI<51). Based on these results, the on-site soils are not anticipated to have a variable expansion potential. Nonetheless, to reduce potential impacts associated with expansive soils, mitigation measure **MM-GEO-1**, which requires compliance with the recommendations included within the geotechnical investigations prepared for the proposed Project, would be implemented. With implementation of **MM-GEO-1**, soil expansion related impacts would be **less than significant**.

Threshold GEO-4. Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

As stated in Section 4.5.1, Existing Conditions, no evidence of any paleontological resources was observed on the ground surface throughout the Project area (Appendix I3). The surface geology at the

Project location consists of exposures of locally formed Pleistocene alluvium. While not indicated within the geotechnical borings for the Project, Holocene alluvium (if present within the Project area) has a low potential for containing nonrenewable paleontological resources, but these surface sediments rest atop older, Pleistocene-age sediments that have a high potential for such resources (Appendix I3). The results of the records searches, literature research, and field survey demonstrate that the proposed Projects' potential to impact paleontological resources appears to be low in the surface soils but high in the undisturbed subsurface deposits of older Quaternary age. However, **MM-GEO-2**, would further prevent potential impacts. As such, with implementation of **MM-GEO-2**, impacts to nonrenewable paleontological would be less than significant.

4.5.5 Mitigation Measures

To ensure that the Project is designed and constructed in a manner that reduces the potential for impacts associated with geology and soils, the following mitigation measure is required:

MM-GEO-1 **Geotechnical Exploration Recommendations.** The recommendations included within both the Geotechnical Exploration for the Proposed Industrial Warehouse Site K-4 and Geotechnical Addendum Report for the K4 Moreno Valley Storm Drain, prepared by Leighton Consulting Inc. shall be implemented throughout Project design and construction (Leighton Consulting Inc. 2018a, 2018b). Prior to the issuance of building permits, the March Joint Powers Authority (JPA)-designated plan reviewer shall ensure that design recommendations are incorporated into the K4 Warehouse and Cactus Channel improvements designs.

MM-GEO-2 **Paleontological Resources.** In accordance with the provisions of the California Environmental Quality Act and the proposed guidelines of SVP (2010) and the Paleontological Resources Assessment Report prepared by CRM TECH, the proposed Project shall implement the following actions:

- Prior to the commencement of any grading activity, the applicant shall retain a qualified paleontologist to ensure the implementation of a paleontological monitoring program. The qualified paleontologist shall obtain a repository agreement from an accredited paleontological repository such as the WSC prior to the initiation of ground disturbing activities associated with the Project. The Society of Vertebrate Paleontology (SVP 2010) defines a qualified paleontologist as having:

  "1. A graduate degree in paleontology or geology, and/or a publication record in peer reviewed journals; and demonstrated competence in field techniques, preparation, identification, curation, and reporting in the state

or geologic province in which the project occurs. An advanced degree is less important than demonstrated competence and regional experience.

2. At least two full years professional experience as assistant to a Project Paleontologist with administration and project management experience; supported by a list of projects and referral contacts.
3. Proficiency in recognizing fossils in the field and determining significance.
4. Expertise in local geology, stratigraphy, and biostratigraphy.
5. Experience collecting vertebrate fossils in the field."

- The qualified paleontologist should attend any preconstruction meetings; present a worker environmental training to construction personnel outlining pertinent laws protecting paleontological resources, typical fossils recovered from the geological units onsite, and the steps to take if paleontological resources are discovered during project implementation; and manage the paleontological monitor(s) if he or she is not doing the monitoring. A paleontological monitor should be on-site during all excavations below the depth of previously disturbed sediments. Specifically, all earth-moving operations above the depth of three feet shall be monitored periodically to identify the sediments being impacted, and any earth-moving operations reaching beyond the depth of three feet will require continuous monitoring for potential paleontological remains. The SVP (2010) defines a qualified paleontological monitor as having:

"1. BS or BA degree in geology or paleontology and one year experience monitoring in the state or geologic province of the specific project. An associate degree and/or demonstrated experience showing ability to recognize fossils in a biostratigraphic context and recover vertebrate fossils in the field may be substituted for a degree. An undergraduate degree in geology or paleontology is preferable, but is less important than documented experience performing paleontological monitoring, or
2. AS or AA in geology, paleontology, or biology and demonstrated two years experience collecting and salvaging fossil materials in the state or geologic province of the specific project, or
3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in the state or geologic province of the specific project.
4. Monitors must demonstrate proficiency in recognizing various types of fossils, in collection methods, and in other paleontological field techniques."

- The monitor shall be prepared to quickly salvage fossils, if they are unearthed, to avoid construction delays, but must have the power to temporarily halt or divert construction equipment to allow for removal of abundant or large specimens. In the event that paleontological resources (e.g., fossils) are unearthed during grading, the paleontological monitor will temporarily halt and/or divert grading activity to allow evaluation and potential recovery of paleontological resources by the qualified paleontologist. The area of discovery will be roped off with a 50-foot radius buffer. Once documentation and collection of the find is completed, the monitor will remove the rope and allow grading to recommence in the area of the find.
- If appropriate sedimentological indicators, as outlined in the SVP (2010) guidelines, are observed, sediment samples shall be collected and processed to recover small fossil remains following SVP (2010) guidelines for collection and processing of sediment samples. The amount of sediment collected and processsed shall be consistent with SVP (2010) or determined by the qualified paleontologist.
- Recovered specimens shall be identified to the lowest taxonomic and curated at a repository with permanent retrievable storage that allows for further research in the future, such as the WSC.
- If during the paleontological monitoring program, half the Project excavations have occurred with no fossil recovery, monitoring can be reduced or terminated, as determined by the qualified paleontologist.
- A report of findings, including an itemized inventory of recovered specimens and a discussion of their significance when appropriate, shall be prepared upon completion of the research procedures outlined above. The report should summarize the monitoring program and include geological observations and any paleontological resources recovered during paleontological monitoring for the proposed project. The approval of the report and the inventory by the March Joint Powers Authority shall signify completion of the mitigation program.

4.5.6 Level of Significance After Mitigation

With implementation of **MM-GEO-1** and **MM-GEO-2**, impacts would be less than significant.

4.5.7 References

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4.6 GREENHOUSE GAS EMISSIONS

This section analyzes the potential impacts associated with the generation of greenhouse gas (GHG) emissions resulting from construction and operation of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project). The focus of the following analysis per the Initial Study and Notice of Preparation (Appendix A) is related to the direct or indirect impacts of the generation of GHG emissions and consistency with an applicable plan, policy, or regulation adopted for the purpose of reducing GHGs. This analysis is based on emission calculations and California Emissions Estimator Model (CalEEMod) outputs presented in the *Greenhouse Gas Technical Report* (Appendix J).

As mentioned in Chapter 2, Project Description, of this Environmental Impact Report (EIR), the Project includes the development of the five parcels on approximately 35.4-acre site ("K4 Parcel") with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the K4 Parcel via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the K4 Parcel. Once constructed, the e-commerce/fulfillment center use occupying the K4 Parcel could potentially be used up to 7 days per week and 24 hours per day. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan, which would convert the existing Cactus Channel drainage ditch into a box culvert, which would either be constructed contemporaneously with the Project or built separately depending on permitting and timing.

4.6.1 Existing Conditions

4.6.1.1 Greenhouse Effect and Greenhouse Gases

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind, lasting for an extended period (decades or longer). Gases that trap heat in the atmosphere are often called GHGs. The greenhouse effect traps heat in the troposphere through a threefold process: short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and back toward the Earth. This

trapping of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

Principal GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), ozone, and water vapor. Some GHGs, such as CO_2, CH_4, and N_2O, can occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are largely byproducts of fossil-fuel combustion, whereas CH_4 results mostly from off-gassing associated with agricultural practices and landfills. Human-caused GHGs, which are produced by certain industrial products and processes, have a much greater heat-absorption potential than CO_2. They include fluorinated gases, such as hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (NF_3) (CAT 2006).

The greenhouse effect is a natural process that contributes to regulating the Earth's temperature. Without it, the average temperature of the Earth would be about 0°F (−18°C) instead of its current 57°F (14°C). Global climate change concerns are focused on whether human activities are leading to an enhancement of the greenhouse effect.

The effect each GHG has on climate change is measured as a combination of the mass of its emissions and the potential of the gas or aerosol to trap heat in the atmosphere, known as its global warming potential (GWP). The GWP varies between GHGs; for example, CO_2 is the reference GHG and has a GWP of 1. CH_4 and N_2O are substantially more potent than CO_2, with GWPs of 25 and 298, respectively.[1] Total GHG emissions are expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG gas emissions are typically measured in terms of tons or metric tons (MT) of CO_2 equivalent (CO_2e).

4.6.1.2 Contributions to Greenhouse Gas Emissions

Per the U.S. Environmental Protection Agency's (EPA's) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2016, total United States GHG emissions were approximately 6,511 million metric tons (MMT) of CO_2e in 2016 (EPA 2018). The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 81% of total GHG emissions (5,313 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 94% of CO_2 emissions in 2016 (4,966 MMT CO_2e). Relative to 1990, gross United States GHG emissions in 2016 are higher by 5%; down from a high of 16% above 1990 levels in 2007. GHG emissions decreased from 2015 to 2016 by 2% (83 MMT CO_2e), and overall, net emissions in 2016 were 12% below 2005 levels (EPA 2018).

[1] In the Scoping Plan Update published by CARB in 2014, the GWPs for CH4 and N2O were updated from 21 to 25 and from 310 to 298, respectively. This analysis relies upon these updated GWPs.

According to California's 2000–2016 GHG emissions inventory (2018 edition), California emitted 429 MMT CO_2e in 2016, including emissions resulting from out-of-state electrical generation (CARB 2017a). The sources of GHG emissions in California include transportation, industry, electric power production from both in-state and out-of-state sources, residential and commercial activities, agriculture, high GWP substances, and recycling and waste. The California GHG emission source categories and their relative contributions in 2016 are presented in Table 4.6-1.

Table 4.6-1
Greenhouse Gas Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total*
Transportation	176.1	41%
Industrial	98.8	23%
Electricity (in state)	42.9	10%
Electricity (imports)	25.8	6%
Agriculture	34.4	8%
Residential	30.1	7%
Commercial	21.5	5%
Total	**429.4**	**100%**

Source: CARB 2017a.
Notes: MMT CO_2e = million metric tons of carbon dioxide equivalent.
* Column may not add due to rounding.

4.6.1.3 Potential Effects to the Environment and Human Health Due to Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 *Intergovernmental Panel on Climate Change Synthesis Report* indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, and rising sea levels (IPCC 2014).

In California, climate change impacts have the potential to affect sea level rise, agriculture, snowpack and water supply, forestry, wildfire, public health, and electricity demand and supply (CCCC 2006). The primary effect of global climate change has been a 0.2°C rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates could induce more extreme climate changes during the twenty-first century than were observed during the twentieth century.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased leading to more extreme hot days and fewer cold nights. Shifts in the water cycle have been observed with less winter precipitation falling as snow and both snowmelt and rainwater running off earlier in the year. Sea levels have risen. Wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010a).

Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by about 1.7°F from 1895 to 2011 and warming in the Sierra Nevada area has been the greatest (CCCC 2012). By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures would rise more than winter temperatures, and the increases would be greater in inland California, compared to the coast. Heat waves will be more frequent, hotter, and longer. There would be fewer extremely cold nights (CCCC 2012). A decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 30% to as much as 90% is predicted over the next 100 years (CAT 2006).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid-to-late 21st century in Central and, most notably, Southern California. By late-century, all projections show drying, and half of them suggest 30-year average precipitation would decline by more than 10% below the historical average (CCCC 2012).

Wildfire risk in California will increase as a result of climate change. Earlier snowmelt, higher temperatures and longer dry periods over a longer fire season would directly increase wildfire risk. Indirectly, wildfire risk will also be influenced by potential climate-related changes in vegetation and ignition potential from lightning. However, human activities will continue to be the biggest factor in ignition risk. It is estimated that the long-term increase in fire occurrence associated with a higher emissions scenario is substantial, with increases in the number of large fires statewide ranging from 58% to 128% above historical levels by 2085. Under the same emissions scenario, estimated burned area will increase by 57% to 169%, depending on location (CCCC 2012).

Reduction in the suitability of agricultural lands for traditional crop types may occur. However, adaptation could allow farmers and ranchers to minimize potential negative effects on agricultural outcomes through adjusting timing of plantings or harvesting and changing crop types. Public health-related effects of increased temperatures and prolonged temperature extremes, including heat stroke,

heat exhaustion, and exacerbation of existing medical conditions, could be particular problems for the elderly, infants, and those who lack access to air conditioning or cooled spaces (CNRA 2009a).

4.6.2 Relevant Plans, Policies, and Ordinances

International Treaties and Other Developments

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. It was adopted in Kyoto, Japan, on December 11, 1997, and entered into force on February 16, 2005. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The targets amount to an average of 5% reduction against 1990 levels over the 5-year period 2008–2012. The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities" (United Nations 1998).

Negotiations after Kyoto have continued in an attempt to address the period after the first "commitment period" of the Kyoto Protocol, concluded at the end of 2012. In Durban, South Africa in 2011, parties to the protocol agreed in principle to negotiate a new comprehensive and legally binding climate agreement by 2015 and to enter it into force for all parties starting from 2020. However, significant divisions remain in determining the parameters of any such new protocol, including its enforcement mechanisms and the degree to which developing economies will begin to be subject to binding emissions targets.

During the Paris Climate Conference (21st Conference of the Parties or COP) on December 12, 2015, parties to the United Nations Framework Convention on Climate Change reached "a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future." The Paris Agreement aims to limit global warming to "well below 2 degrees Celsius above pre-industrial levels" (United Nations 2015). On August 4, 2017 President Trump's administration delivered an official notice for the United States of America to withdraw from the Paris Agreement (United Nations 2017a). Under Article 28 of the Agreement, the United States of America is required to stay in the pact until at least 2019 (United Nations 2017b).

Federal

Massachusetts v. U.S. Environmental Protection Agency

On April 2, 2007, in *Massachusetts v. U.S. Environmental Protection Agency*, the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA administrator is required to follow the language of Section 202(a) of the Clean Air Act. On December 7, 2009, the administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the Clean Air Act:

- The elevated concentrations of GHGs—CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The combined emissions of GHGs—CO_2, CH_4, N_2O, and hydrofluorocarbons—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

It was expected that Congress would enact GHG legislation, primarily for a cap-and-trade system. However, proposals circulated in both the House of Representative and Senate were controversial and it may be some time before Congress adopts major climate change legislation. Under the Consolidated Appropriations Act of 2008 (HR 2764), Congress has established mandatory GHG reporting requirements for some emitters of GHGs. In addition, on September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. The rule requires annual reporting to the EPA of GHG emissions from large sources and suppliers of GHGs, including facilities that emit 25,000 MT or more a year of GHGs.

Heavy-Duty Engines and Vehicles Fuel Efficiency Standards

In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the EPA and the National Highway Traffic Safety Administration (NHTSA) announced fuel economy and GHG standards for medium- and heavy-duty trucks, which applies to vehicles from model years 2014–2018 (EPA 2016a). EPA and NHTSA have adopted Phase 1 standards for CO_2 emissions and fuel consumption, respectively, tailored to each of three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to EPA, this program will reduce GHG emissions and fuel consumption for affected vehicles by 9% to 23%. In August 2016, EPA and NHTSA announced adoption of Phase 2 standards, affecting model years

2021–2027 for semi-trucks, large pickup trucks, vans and all types of sizes of buses and work trucks, and expected to reduce GHG emissions beyond the first phase by 16%–25%. The second round of regulation introduces an additional vehicle category, trailers. Commitments for trailers are voluntary from 2018–2021 and mandatory after 2021, and are projected to reduce GHG emissions up to 9%. The final rule was adopted on August 16, 2016.

In August 2018, the EPA and NHTSA released a notice of proposed rulemaking called Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). This rule would modify the existing Corporate Average Fuel Economy standards and tailpipe CO_2 emissions standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026. SAFE standards are expected to uphold model year 2020 standards through 2026 (NHTSA 2018).

Energy Independence and Security Act

On December 19, 2007, President George W. Bush signed the Energy Independence and Security Act of 2007. Among other key measures, the act would do the following to aid in the reduction of national GHG emissions:

1. Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel by 2022.
2. Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020 and direct the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.
3. Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

EPA and National Highway Traffic Safety Administration Joint Final Rule for Vehicle Standards

The EPA and NHTSA announced a joint final rule to establish a national program consisting of new standards for light-duty vehicles model years 2012 through 2016 (April 2010) that is intended to reduce GHG emissions and improve fuel economy. The EPA approved the first-ever national GHG emissions standards under the Clean Air Act, and NHTSA approved Corporate Average Fuel Economy standards under the Energy Policy and Conservation Act (75 FR 25324–25728), which became effective on July 6, 2010 (75 FR 25324–25728).

American Recovery and Reinvestment Act

On February 17, 2009, President Obama signed the American Recovery and Reinvestment Act of 2009. The act was passed in response to the economic crisis of the late 2000s, with the primary purpose to maintain existing jobs and create new jobs. Among the secondary objectives of the American Recovery and Reinvestment Act was investment in "green" energy programs, including funding the following through grants, loans, or other funding; private companies developing renewable energy technologies; local and state governments implementing energy efficiency and clean energy programs; research in renewable energy, biofuels, and carbon capture; and development of high efficiency or electric vehicles (EPA 2016a).

Multi-State

The Western Regional Climate Action Initiative (WCI)

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states including California and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region's electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15% below 2005 levels by 2020 When the WCI adopted this goal in 2007, it estimated this would require 2007 levels to be reduced worldwide between 50% and 85% by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board's (CARB's) planned Cap-and-Trade Program is also intended to link California and the other member states and provinces. The cap-and-trade regulation, which is a key element of California's climate plan, took effect in January 2012 and compliance obligation began in January 2013. The cap-and-trade program sets a statewide limit on sources responsible for 85% of California's GHG emissions and establishes a price signal needed to drive long-term investment in cleaner fuels and more efficient use of energy. As of January 1, 2014, California's Cap-and-Trade Program is linked to Quebec's pursuant to the Agreement Between the CARB and the Gouvernement du Québec Concerning the Harmonization and Integration of Cap-and-Trade Programs Reducing Greenhouse Gas Emissions, in accordance with the direction in CARB Board Resolution 13-7 (CARB 2013). As of January 1, 2018, California's Cap-and-Trade Program along with Québec's Program linked with Ontario's Cap-and-Trade Program (Ontario Program). However, on July 3, 2018 the Ontario government revoked its cap-and-trade regulation. With Ontario's withdrawal from the linked program, California and Québec will work together to ensure environmental integrity and stringency of the Cap-and-Trade program/market is sustained (CARB 2018). The program is designed to provide covered entities the flexibility to seek out and implement the lowest-cost options to reduce emissions. The first phase of the cap-and-trade regulation included electricity generated in and imported into California, large combustion sources

(i.e., generally those emitting more than 25,000 MT CO_2e per year), and certain industrial sectors. The second phase added providers of transportation fuels and other combustion fuels (e.g., natural gas, propane) to the cap-and-trade program. The regulation requires that emissions generated by these facilities and combustion of fuels be reduced over time under a declining "cap." Appendix F of the CAP includes additional detail on the cap-and-trade program.

Pacific Coast Action Plan on Climate and Energy

On October 28, 2013, the Governors of California, Oregon, and Washington and the Premier of British Columbia signed a clean energy pact, known as the Pacific Coast Action Plan on Climate and Energy (Pacific Coast Action Plan). Although the Action Plan does not impose legally enforceable obligations and lacks a specific schedule for implementation, the pact sets out a number of goals and aspirational measures. The Action Plan calls upon each of the parties to undertake a number of measures to address the use of carbon-based fuels in the transportation sector, including the adoption or maintenance of low-carbon fuel standards, the development of targets and action plans in order to encourage public and private investment in low-carbon commercial fleets that use alternative fields, and the expansion of the sale of zero-emissions vehicles to a goal of 10% of new vehicle purchases by 2016.

State

California Code of Regulations, Title 20

Title 20 Public Utilities and Energy, of the California Code of Regulations, was most recently updated in 2017. Title 20 provides regulations to supplement the Warren-Alquist State Energy Resources Conservation and Development Act, including energy conservation, environmental protection, solar energy policies, appliance energy efficiency standards, and other energy and development standards and regulations.

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. While not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes energy efficiency standards for residential and non-residential buildings constructed in the State of California to reduce energy demand and consumption. The Title 24, Part 6 standards are updated every three years. The most recent amendments to Title 24, Part 6, referred to as the 2016 standards, will become effective on January 1, 2017.

Title 24 also includes Part 11, known as California's Green Building Standards. California's Green Building Standards, which initially took effect in January 2011, were updated effective January 1, 2014, and instituted mandatory minimum environmental performance standards for all ground-up,

new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The standards were further revised with the 2016 Building Energy Efficiency Standards. For non-residential buildings, the most substantial efficiency improvement is alignment with the ASHRAE 90.1 2013 national standards. The non-residential standards include new efficiency requirements for elevators, escalators, and moving walkways and direct digital controls and requirement revisions for building envelope, lighting, and mechanical and electrical systems. The California Energy Commission's (CEC's) 2016 Building Energy Efficiency Standards (2016 Building Standards), which become on effective January 1, 2017, are the most current version of these standards.

Assembly Bill 1493

In response to the transportation sector accounting for more than half of California's CO_2 emissions, Assembly Bill (AB) 1493 (Pavley) was enacted on July 22, 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. Compared to the 2009 fleet, the near-term (2009–2012) standards resulted in a reduction of about 22% in GHG emission rates from passenger vehicles and the mid-term (2013–2016) standards will result in a reduction of about 30% (CARB 2017b).

Executive Order S-3-05

Executive Order S-3-05 (June 2005) established California's GHG emissions reduction targets. The executive order established the following goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050. Under the executive order, the California EPA is directed to report biannually on progress made toward meeting the GHG targets and the impacts to California due to global warming, including impacts to water supply, public health, agriculture, the coastline, and forestry. The Climate Action Team was formed, which subsequently issued the 2006 Climate Action Team Report to Governor Schwarzenegger and the Legislature (CAT 2006).

The 2009 Climate Action Team Biennial Report (CAT 2010b) expands on the policy outlined in the 2006 assessment. The 2009 report identifies the need for additional research in several different aspects that affect climate change in order to support effective climate change strategies. Subsequently, the 2010 Climate Action Team Report to Governor Schwarzenegger and the California Legislature (CAT 2010a) reviews past climate action milestones including voluntary reporting programs, GHG standards for passenger vehicles, the Low Carbon Fuel Standard (LCFS), a statewide renewable energy standard, and the cap-and-trade program.

The extent to which GHG emissions from traffic at the Project will change in the future depends on the quantity (e.g., number of vehicles, average daily mileage) and quality (i.e., carbon content) of fuel that will be available and required to meet both regulatory standards and residents' needs. As discussed above, renewable power requirements, the LCFS, and vehicle emissions standards will all decrease GHG emissions per unit of energy delivered or per vehicle mile traveled. Future regulated fuel decarbonization will reduce the carbon emissions from the vehicular emissions for the proposed Project.

The CEC published "State Alternative Fuels Plan" (CEC 2007) in which it noted the existence of "challenging but plausible ways to meet 2050 [transportation] goals." The main finding from this analysis is that reducing today's average per capita driving miles by about 5% (or back to 1990 levels), in addition to the decarbonization strategies listed below, would achieve S-03-05 goals of 80% below 1990 levels. The approach described below is directly (CEC 2007) from the CEC report and similar to CARB's anticipated path (CARB 2008).

An 80% reduction in GHG emissions associated with personal transportation can be achieved even though population grows to 55 million, an increase of 50%. The following set of measures could be combined to produce this result:

- Lowering the energy needed for personal transportation by tripling the energy efficiency of on-road vehicles in 2050 with:
    - Conventional gas, diesel, and flexible fuel vehicles averaging more than 40 miles per gallon.
    - Hybrid gas, diesel, and flexible fuel vehicles averaging almost 60 miles per gallon.
    - All electric and plug-in hybrid electric vehicles averaging well over 100 miles per gallon (on a GHG equivalents basis) on the electricity cycle.
    - Fuel cell vehicles averaging over 80 miles per gallon (on a GHG equivalents basis).
- Moderating growth in per capita driving, reducing today's average per capita driving miles by about 5% or back to 1990 levels.
- Changing the energy sources for transportation fuels from the current 96% petroleum based to approximately:
    - 30% from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.
    - 30% from transportation biofuels.
    - 40% from a mix of electricity and hydrogen.

- Producing transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result in, on average, at least 80% lower life cycle GHG emissions than conventional fuels.
- Encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

Studies have shown that in order to meet the 2050 target, aggressive technologies in the transportation and energy sectors, such as electrification and maturation of technologies such as advanced batteries and more efficient biofuels will be required (LBL 2011).

Due to the wholesale shifts in energy technology required and more aggressive regulations needed both of which are not currently in place, analyzing a Project's impacts relative to the 2050 target are speculative for purposes of the California Environmental Quality Act (CEQA). As a result, this report does not analyze the Project's consistency with the 2050 target.

Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the legislature enacted AB 32 (Núñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed in September 2006. The GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020.

CARB was assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions. AB 32 allows CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted.

The first action under AB 32 resulted in the adoption of a report listing early action GHG emissions reduction measures in June 2007.

In December 2008, CARB approved the *Climate Change Proposed Scoping Plan: A Framework for Change* (Scoping Plan) (CARB 2008) to achieve the goals of AB 32. An update to the Scoping Plan (First Scoping Plan Update) was adopted in May 2014 (CARB 2014). In November 2017, CARB published California's 2017 Climate Change Scoping Plan (Second Scoping Plan Update) (CARB 2017c). The 2017 Climate Change Scoping Plan was adopted by CARB on December 14, 2017.

The Second Scoping Plan Update outlines CARB's strategy for achieving the state's 2030 GHG target as established in Senate Bill (SB) 32, including continuation of the Cap-and-Trade Program through 2030, and incorporation of a Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration and a more stringent target for the LCF by 2030. The Second Scoping Plan Update also incorporates approaches to cutting short-lived climate pollutants under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017) and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon.

With regard to project-level GHG emissions reduction actions and thresholds, the Second Scoping Plan Update states "[a]chieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."

Senate Bill 1368

In September 2006, Governor Schwarzenegger signed SB 1368, which requires the CEC to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the California Public Utilities Commission. This effort will help protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low as or lower than new combined-cycle natural gas plants by requiring imported electricity to meet GHG performance standards in California and by requiring that the standards be developed and adopted in a public process.

Executive Order S-1-07

Issued on January 18, 2007, Executive Order S-1-07 sets a declining LCFS for GHG emissions measured in CO_2e grams per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. The LCFS is anticipated to lead to the replacement of 20% of the fuel used in motor vehicles with alternative fuels by 2020.

Senate Bill 375

In August 2008, the legislature passed, and in September 2008, Governor Schwarzenegger signed SB 375 (Steinberg), which addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. By September 30, 2010, CARB was

required to assign regional GHG reduction targets for the automobile and light truck sector for 2020 and 2035. Regional metropolitan planning organizations will be responsible for preparing a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP). The goal of the SCS is to establish a development plan for the region that, after considering transportation measures and policies, will achieve the GHG reduction targets. SB 375 provides incentives for streamlining CEQA requirements by substantially reducing the requirements for "transit priority projects," as specified in SB 375, and eliminating the analysis of the impacts of certain residential projects on global warming and the growth-inducing impacts of those projects when the projects are consistent with the SCS or Alternative Planning Strategy. In September 2010, CARB adopted the SB 375 targets for the regional metropolitan planning organizations.

On April 7, 2016, the Southern California Association of Governments (SCAG) adopted the 2016-2040 RTP/SCS which looks to build on the success of the 2012-2035 RTP/SCS. Targets for the SCAG region in the updated plan includes an 8% per capita reduction in GHG emissions from automobiles and light trucks by 2020, an 18% reduction by 2035, and a 21% reduction by 2040 compared with 2005 levels (SCAG 2016).

Supreme Court Ruling in Center for Biological Diversity. v. California Fish and Wildlife

In its 2015 decision, *Center for Biological Diversity v. Department of Fish and Wildlife*, S217763 (Newhall),[2] the California Supreme Court evaluated the California Department of Fish and Wildlife's analysis of potential impacts caused by GHG emissions contained in the EIR for the proposed land development called Newhall Ranch. In the EIR, the California Department of Fish and Wildlife analyzed GHG emissions under AB 32, using the business-as-usual comparison as its sole criterion of significance.

In Newhall, the California Supreme Court concluded that a finding of consistency with meeting statewide emission reduction goals is a legally permissible criterion of significance when analyzing potential impacts of GHG emissions under CEQA. However, the Court found that the EIR's conclusion that the project's emissions would be less than significant under that criterion was not supported by substantial evidence, and remanded back to the appellate court the narrow issue of whether substantial evidence supported the application of AB 32 statewide GHG reduction goal of 29% to new land use projects.

[2] The Newhall decision is available at https://caselaw.findlaw.com/ca-supreme-court/1719578.html (accessed November 2018).

The Court then identified "potential options" for lead agencies evaluating cumulative significance of a proposed land use development's GHG emissions in future CEQA documents:

1. Business-As-Usual Model: While the Court cautioned that the Scoping Plan may not be appropriate at the project-level, the business-as-usual model might be used to determine what level of reduction from business as usual a new land use development at the proposed location must contribute in order to comply with statewide goals pursuant to AB 32.
2. Compliance With Regulatory Programs Designed To Reduce Greenhouse Gas Emissions: The Court suggests that a lead agency could rely on a showing of compliance with regulatory programs designed to reduce GHG emissions. The Court clarifies that a significance analysis based on compliance with such statewide regulations only goes to impacts within the area governed by the regulations.
3. Local Climate Action Plan (CAP) Or Other "Geographically Specific Greenhouse Gas Emission Reduction Plans": The Court points out that these plans may provide a basis for the tiering or streamlining of project-level CEQA analysis, so long as the plan is "sufficiently detailed and adequately supported." Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
4. Regional Sustainable Community Strategy (SCS): The Court also articulates that a lead agency need not additionally analyze GHG emissions from cars and light trucks in CEQA documents for certain residential, mixed use and transit priority projects that are consistent with an applicable SCS adopted pursuant to SB 375.
5. Numerical GHG Significance Thresholds: Although noting that use of such thresholds are GHG significance thresholds, which are based on compliance with AB 32, and use a "service population" GHG ratio threshold for land use projects and a 10,000-ton annual GHG emission threshold for industrial projects. The Court remanded for further consideration the application of the 29% overall Scoping Plan metric, which is used by several Air Districts and, like the favorably-cited Bay Area Air Quality Management District metric, is based on AB 32.

Citing to Executive Order Nos. S-3-05 and B-30-15, the Court cautioned that those EIRs taking a goal-consistency approach to CEQA significance may in the future need to consider the project's effects on meeting emissions reduction targets beyond 2020.

Renewable Portfolio Standards (SB 1078, SB 107, SBX1-2, and SB 100)

As most recently amended by SB 350, California's Renewables Portfolio Standard Program requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 33% of total retail sales by 2020, 40% of total retail sales by 2024, 45% of total retail sales by 2027, and 50% of total retail sales by 2030. On September 10, 2018

the goals of this standard were revised to a 50% renewable resources target by December 21, 2026, and to a 60% target by December 31, 2030.

Senate Bill 350

Governor Jerry Brown signed SB 350 on October 7, 2015, which expands the Renewable Portfolio Standard by establishing a goal of 50% of the total electricity sold to retail customers in California per year by December 31, 2030. In addition, SB 350 includes the goal to double the energy efficiency savings in electricity and natural gas final end uses (such as heating, cooling, lighting, or class of energy uses upon which an energy efficiency program is focused) of retail customers through energy conservation and efficiency.

Executive Order B-30-15

On April 29, 2015, Governor Jerry Brown issued an executive order that identified an interim GHG reduction target in support of targets previously identified under S-3-05 and AB 32. Executive Order B-30-15 set an interim target goal of reducing GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing GHG emissions to 80% below 1990 levels by 2050, as set forth in Executive Order S-3-05. To facilitate achievement of this goal, Executive Order B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2e. The executive order also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets.

Senate Bill 32 and Assembly Bill 197

Enacted by the Legislature in August 2016, SB 32 and AB 197 are companion bills that will extend GHG reduction targets and make changes to CARB membership; increase legislative oversight of CARB climate change activities; and expand dissemination of GHG, criteria air pollutant, and toxic air contaminant (TAC) emissions data to enhance transparency and accountability. SB 32 requires CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies consisting of at least three members of the Senate and three members of the Assembly in order to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members, requires CARB to make available and update at least annually via its website emissions of GHGs, criteria air pollutants, and TACs from reporting facilities, and requires CARB to identify specific information for GHG emissions reduction measures when updating the scoping plan.

Assembly Bill 1613 (Waste Heat and Carbon Emissions Reduction Act)

AB 1613 directed the CEC, the California Public Utilities Commission, and CARB to implement the Waste Heat and Carbon Emissions Reduction Act, which is designed to encourage development of new combined heat and power systems in California with a generating capacity of not more than 20 megawatts.

A January 2011 decision by an administrative law judge determined that the pilot program will not be established due to lack of customer interest and difficulties in instituting a program that meets California Department of Corporations requirements (CPUC 2011).

Assembly Bill 341

AB 341 (2011) amended the California Integrated Waste Management Act of 1989 to include a provision declaring that it is the policy goal of the state that not less than 75% of solid waste generated be source reduced, recycled, or composted by the year 2020, and annually thereafter (California Public Resources Code Section 41780.01(a)). In addition, AB 341 required the California Department of Resources Recycling and Recovery to develop strategies to achieve the state's policy goal (California Public Resources Code Section 41780.02).

Senate Bill X7-7(Water Conservation Act of 2009)

The Water Conservation Act of 2009 sets an overall goal of reducing per-capita urban water use by 20% by December 31, 2020. The state was required to make incremental progress toward this goal by reducing per-capita water use by at least 10% by December 31, 2015. Reduction in water consumption directly reduces the energy necessary and the associated emissions to convene, treat, and distribute the water; it also reduces emissions from wastewater treatment.

Executive Order B-55-18

On September 10, 2018, Governor Brown signed EO B-55-18, to achieve carbon neutrality by moving the state of California to 100% clean energy by 2045. This Executive Order also includes specific measures to reduce GHG emissions via clean transportation, energy efficient buildings, directing cap-and-trade funds to disadvantaged communities, and better management of state's forest land.

California Air Pollution Control Officers Association

The California Air Pollution Control Officers Association (CAPCOA) is the association of air pollution control officers representing all 35 air quality agencies throughout California. CAPCOA is not a regulatory body, but it has been an active organization in providing guidance in addressing the CEQA significance of GHG emissions and climate change as well as other air quality issues. The GHG analysis set forth in this EIR has been informed, in part, by the expertise and methodologies

described in the following documents published by CAPCOA: (1) *CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act* (CAPCOA 2008) and (2) *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures* (CAPCOA 2010).

Regional

South Coast Air Quality Management District

CEQA Guidelines and Proposed GHG Thresholds. The South Coast Air Quality Management District **(**SCAQMD) is principally responsible for comprehensive air pollution control in the Basin, which includes Los Angeles, Orange, and the urbanized portions of Riverside and San Bernardino Counties, including the Project site. SCAQMD works directly with SCAG, County transportation commissions, and local governments and cooperates actively with all federal and state government agencies to regulate air quality.

In April 2008, SCAQMD convened a Working Group to develop GHG significance thresholds. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. As to all other projects, where the SCAQMD is not the lead agency, the Board has, to date, only adopted an interim threshold of 10,000 MT CO_2e per year for industrial stationary source projects (SCAQMD 2008a).

For all other projects, SCAQMD staff proposed a multiple tier analysis to determine the appropriate threshold to be used. The draft proposal suggests the following tiers: Tier 1 is any applicable CEQA exemptions, Tier 2 is consistency with a GHG reduction plan, Tier 3 is a screening value or bright line, Tier 4 is a performance based standard, and Tier 5 is GHG mitigation offsets (SCAQMD 2008a).

According to the presentation given at the September 28, 2010, Working Group meeting, SCAQMD staff reviewed the tiered significance threshold approach (SCAQMD 2010a). The proposed tiers are as follows:

- Tier 1: Determine if CEQA categorical exemptions are applicable. If not move to Tier 2;
- Tier 2: Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan (i.e., CAP) that has gone through public hearings and CEQA review, which has an approved inventory that includes monitoring, etc. If not move to Tier 3;
- Tier 3: For all land use types, if projects are less than 3,000 MT/year of CO_2e, the project is presumed to be less than significant for GHGs. If the project exceeds 3,000 MT CO_2e per year (MT CO_2e/yr); move to Tier 4. More specific screening thresholds were also provided, which include 1,400 MT CO_2e/yr for commercial projects and 3,500 MT CO_2e/yr

for residential projects. These thresholds were based on a review of the Office of Planning and Research database which included 711 CEQA projects using a 90% capture approach;

- Tier 4: The proposed performance standards include three options:
  1. Percent Emission Reduction Target (no further recommendation
  2. Early Implementation of Applicable AB 32 Scoping Plan Measures (incorporated into option 3)
  3. SCAQMD Efficiency Target

For option 3, there are targets for 2020 and 2035, using an approach similar to the Bay Area Air Quality Management District Thresholds. The proposed 2020 target is:

- 4.8 MT/year CO_2e per service population for project level threshold (land use employment only)
- 6.6 MT/year CO_2e per service population for plan level threshold

The proposed 2035 target is:

- 3.0 MT/year CO_2e per service population for project level threshold
- 4.1 MT/year CO_2e per service population for plan level threshold
- Incorporate Sustainable Communities and Climate Protection Act of 2008 or SB 375 regional targets.
- Tier 5: Off-site mitigation for life of project (30 years), if this threshold is to be used, GHG emissions must be mitigated to less than the Tier 3 screening significance threshold. The SCAQMD clarified that offsets should have a 30-year project life, should be real, quantifiable, verifiable, and surplus and will be considered in the following prioritized manner:
  - Project design feature/on-site reduction measures;
  - Off site within neighborhood;
  - Off site within district;
  - Off site within state;
  - Off site out of state; and
  - Substitution allowed via enforceable commitment (e.g., when an offset project ends prematurely).

If the Project cannot meet any of the Tiers, it is presumed to be significant for GHG emissions.

The Tier 4 percent emissions reduction target is based on a percent reduction target that is based on consistency with AB 32. This is because the Tier 4 percent emissions reduction target is based on the same numeric reductions calculated in the Scoping Plan to reach 1990 levels by 2020.

The Working Group has not convened since the fall of 2010. As of April 2017, the proposal has not been considered or approved for use by the SCAQMD Board. In the meantime, no GHG significance thresholds are approved for use in the Basin.

Criteria Pollutant Regulations. The SCAQMD administers a plethora of air quality regulations that control the emission of criteria pollutants and maintain or seek to achieve air quality standards for criteria pollutant and TACs set by the federal and state Clean Air Acts. The goal of reducing criteria and TAC pollutants can sometimes have the co-benefit of reducing GHG emissions, for example through zero emission technologies. However, some methods of reducing criteria and TAC pollutants may in fact increase the amount of GHG emissions because the technologies increase energy use. The SCAQMD is the regional agency who weighs and balances the sometimes competing interests and makes the policy decisions as to prioritizing air quality reductions.

Local

Riverside County General Plan and Climate Action Plan

The current Riverside County General Plan was adopted in October 2003 and includes a number of policies regarding the reduction of GHG impacts. An update to the County's General Plan was adopted in 2008. In addition to the 2008 General Plan Update, the County prepared a CAP, adopted in December 2015, which sets County-wide GHG emissions targets consistent with state reduction goals in AB 32. The CAP is not part of the General Plan per se; rather, it is a separate document that provides another implementation tool of the General Plan to guide development in the County. The CAP identifies actions necessary to reduce GHGs across a variety of sectors, and includes:

- An analysis of GHG emissions and sources attributable to Riverside County.
- Estimates on how those emissions are expected to increase.
- Recommended policies and actions that can reduce GHG emissions to meet state, federal, and international targets.
- A timeline of implementation.
- A defined tracking and reporting mechanism that will measure progress toward the goals.

The CAP establishes that community-wide GHG emissions for the County in 2008 were approximately 7,012,938 MT CO_2e. In order for the County to meet the reduction goals of AB 32, they established a reduction target of 15% below 2008 levels by 2020. The County is expected to

reduce its GHG emissions to 5,534,113 MT CO_2e, which is below the 5,960,998 MT CO_2e level, thus meeting their reduction target after implementation of reduction measures.

The County released the CAP, General Plan Amendment No. 960 incorporating the CAP into the General Plan, and a Draft EIR analyzing the impact of adopting the CAP in February 2015 (County of Riverside 2015a). Public comments were received and responses prepared by the County. The Board of Supervisors formally adopted the CAP on December 8, 2015.

The CAP includes screening tables which provide guidance in measuring the reduction of GHG emissions attributable to certain design and construction measures incorporated into development projects. The CAP screening tables assign points for each option incorporated into a project as mitigation or a project design feature. Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the County's GHG Technical Report. As such, those projects that garner a total of 100 points or greater would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions.

March JPA General Plan

The Noise/Air Quality Element of the adopted March JPA General Plan (1999) includes goals and policies that will be applied to the Project related to GHG emissions. The following goals and policies from the March JPA General Plan apply to the Project. Consistency with these goals and policies are discussed in Section 4.9, Land Use and Planning.

Goal 3: Reduce air pollution through proper land use, transportation, and energy use planning.

Policy 3.4: Encourage ride share programs.

Goal 6: Reduce emissions associated with vehicle/engine use.

Policy 6.1: Reduce idling emissions by increasing traffic flow through synchronized traffic signals.

Policy 6.2: Work with Riverside Transit Agency (RTA) to develop a local transit system and facilitate connections of the local transit system with regional transit systems.

Policy 6.3: Encourage diversion of peak hour truck traffic, whenever feasible, to off-peak periods to reduce roadway congestion and associated emissions.

Policy 6.4: Work with Caltrans [California Department of Transportation] and traffic engineers to ensure that roadways and freeway on-ramps that are heavily utilized by trucks are designed to safely accommodate trucks.

Policy 6.5: Encourage trucks operating within March JPA Planning Area to maintain safety equipment and operate at safe speeds so as to reduce the potential for accidents which create congestion and related emissions.

Policy 6.6: Reduce vehicle emissions through improved parking design and management that provide for safe pedestrian access to and from various facilities.

Policy 6.8: Encourage the use of compressed natural gas, clean diesel and/or alternative fuels in engines.

Goal 7: Reduce emissions associated with energy consumption.

Policy 7.1: Support the use of energy-efficient equipment and design in the March JPA Planning Area for facilities and infrastructure.

Policy 7.2: Encourage incorporation of energy conservation features in development.

Policy 7.3: Support passive solar design in new construction.

Policy 7.4: Support recycling programs which reduce emissions associated with manufacturing and waste disposal.

Policy 7.5: Support drought-resistant vegetation in landscaping areas to reduce energy needed to pump water.

4.6.3 Thresholds of Significance

The Office of Planning and Research's Technical Advisory titled *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act (CEQA) Review* (2008) states that "public agencies are encouraged but not required to adopt thresholds of significance for environmental impacts. Even in the absence of clearly defined thresholds for GHG emissions, the law requires that such emissions from CEQA projects must be disclosed and mitigated to the extent feasible whenever the lead agency determines that the project contributes to "a significant, cumulative climate change impact." Furthermore, the advisory document indicates that "in the absence of regulatory standards for GHG emissions or other scientific data to clearly define what constitutes a 'significant impact,' individual lead agencies may undertake a project-by-project analysis, consistent with available guidance and current CEQA practice" (OPR 2008).

The CNRA adopted amendments to the CEQA Guidelines on December 30, 2009, which became effective on March 18, 2010. With respect to GHG emissions, the amended CEQA Guidelines state in Section 15064.4(a) that lead agencies should "make a good faith effort, to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions. The CEQA Guidelines

note that an agency may identify emissions by either selecting a "model or methodology" to quantify the emissions or by relying on "qualitative analysis or other performance based standards" (14 CCR 15000 et seq.). Section 15064.4(b) provides that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions (14 CCR 15064.4(b)).

In addition, Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR 15064.7(c)). Similarly, the revisions to Appendix G, Environmental Checklist Form, which is often used as a basis for lead agencies' selection of significance thresholds, do not prescribe specific thresholds. Section 15064.4 (b) of the CEQA Guidelines specifies that "[a] lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment: ….(3) The extent to which the project complies with regulations or requirements adopted to implement a…local plan for the reduction or mitigation of greenhouse gases. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions." As discussed above, the County of Riverside's CAP is an applicable local plan developed specifically for the reduction of GHGs, adopted through a public review process.

March JPA's 2015 Local CEQA Guidelines Form J provides guidance for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A) and March JPA's 2015 Local CEQA Guidelines Form J, the Project could have a significant impact on GHGs if the Project would:

- **GHG-1**: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
- **GHG-2**: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Notably, global climate change is a cumulative impact; a project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. There are currently no established thresholds for assessing whether the GHG emissions of a project in the South Coast Air Basin, such as the proposed Project, would be considered a cumulatively considerable contribution to global climate change; however, all reasonable efforts should be made to minimize a project's contribution to global climate change.

While the Project would result in emissions of GHGs during construction and operation, , it is generally believed that an individual project is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory since scientific uncertainty regarding the significance of a project's individual and cumulative effects on global climate change remains.

Thus, GHG impacts are recognized exclusively as cumulative impacts; there are no noncumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). This approach is consistent with that recommended by the CNRA, which noted the impact of GHG emissions should be considered in the context of a cumulative impact rather than a project-level impact (CNRA 2009b). Similarly, the *Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB 97* (CNRA 2009b) confirm that an EIR or other environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable.

Riverside County Climate Action Plan

The Riverside County CAP includes a series of implementation measures that may be used by new development proposals to demonstrate consistency with the CAP, and by extension, with AB 32 (County of Riverside 2015b). A Riverside County GHG Screening Table containing a menu of GHG reduction options which projects can implement is included as Appendix F to the CAP. If a project can obtain 100 points from the screening tables, the mitigated project will implement pertinent reduction measures to meet the CAP GHG reduction goals, and a "less than significant" finding can be made under CEQA (County of Riverside 2015b).

4.6.4 Approach and Methodology

Significance of GHG impacts included in this analysis is based on three different methodologies, with each approach a separate and independent ground for the significance conclusion:

1. Consistency with AB 32 was assessed through evaluating the Project's consistency and compliance with applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32.

2. The County of Riverside CAP was developed using AB 32 so this analysis also assesses if the Project is consistent with the CAP as an AB 32 compliance pathway (County of Riverside 2015b), using the CAP screening tables.
3. The Project's consistency with SB 375 was evaluated based on the growth assumptions of SCAG 2016 RTP/SCS.

Threshold GHG-1 Analysis Methodology

The determination of whether the Project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment (Threshold GHG-1) is based on the following evaluations: (a) Project compliance with the CAP screening tables. The quantification of GHG emissions is presented for informational purposes only.

Project Compliance with CAP. A Riverside County GHG Screening Table containing a menu of GHG reduction options which projects can implement is included as Appendix F to the CAP. This screening table is required to be used if Project's exceed 3,000 MT CO_2e per year. Projects that meet or exceed a total of 100 points after incorporating a variety of GHG reduction measures (as mitigation or project features) would be determined to have a less than significant impact for GHG emissions. This assessment is included in Section 4.6.5, Impacts Analysis, in the analysis and discussion for Threshold GHG-1.

- **Construction:** Construction emissions were based on the Project construction assumptions described in Section 4.2.4, Approach and Methodology, in Section 4.2, Air Quality, and Appendix F of the CAP.
- **Area Sources:** Includes emissions from operation of landscape maintenance equipment, based on default CalEEMod assumptions for emissions estimation, such as OFFROAD2011 equipment emission factors and usage hours.
- **Energy Use:** Emissions reductions associated with implementing 33% Renewable Portfolio Standard were quantified for Project 2020. Energy mitigation also includes incorporation of Energy Star lighting, solar PV, and on- and off-site EV charging stations.
- **Water Supply, Treatment, and Distribution (Title 24):** The Project assumes water usage with the 20% reduction in indoor and outdoor water usage due to the California Green Building Code requirements and that the GHG emissions related to the water and wastewater conveyance are based on utility emission factors consistent 33% Renewable Portfolio Standard.
- **Mobile Sources:** Emissions associated with daily traffic were estimated for the Project scenario using trip-generation rates and vehicle fleet mixes from the Traffic Impact Analysis (TIA) report (Appendix R). According to the TIA report, the Project would

generate 5,873 average daily trips. Default CalEEMod trip lengths were used with the exception of commercial-nonwork (C-NW) for haul trucks, which was assumed to be 60 miles based on an anticipated haul truck usage similar to recent distribution centers in the region (Appendix J). For the fleet mix detailed in Appendix J, default CalEEMod assumptions were used for the unrefrigerated warehouse land use fleet mix was calculated based on the vehicle trip rates provided in Appendix R. The mobile source emissions analysis for the Project includes reductions from regulatory programs including LCFS and the Advanced Clean Cars program. EMFAC2017's default emission factors include benefits from ACC and CARB's HDV GHG Emissions Reduction Measure Regulation.

- **Vegetation Changes:** The current site is vacant and has little to no vegetation. The sequestration of CO_2 from planting trees on site was quantified and included.

Threshold GHG-2 Analysis Methodology

The determination of whether the Project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs (Threshold GHG-2) is based on the following evaluations: (a) consistency with AB 32 through evaluating the Project's consistency and compliance with applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32, (b) the Project's consistency with SB 375, and (c) Project compliance with the CAP screening tables.

4.6.5 Impacts Analysis

Threshold GHG-1. Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Construction

As discussed in the GHG Technical Report (Appendix J), on-site construction of the K4 Parcel is anticipated to occur across five phases in 2019 and 2020. Construction for the Cactus Channel improvements would occur contemporaneously with the K4 Parcel or separately depending on permitting and timing, however it is conservatively assumed that construction associated with Cactus Channel would occur at the same time as the K4 Parcel construction in 2019 and 2020. The total emissions from construction are summarized in Table 4.6-2. Total GHG emissions from all proposed Project construction phases for off-road and on-road emissions are 458 and 1,656 MT CO_2e, respectively. Total GHG emissions from the construction activities are 2,114 MT CO_2e. When amortized over 30-year project lifetime, the construction GHG emissions are 70 MT CO_2e/year (Appendix J).

Table 4.6-2
Construction Greenhouse Gas Emissions

Construction Phase	MT CO_2e Emissions[a]		
	Equipment	*Vehicles*	*Total*
Project Site	289	1,373	1,661
Cactus Channel	170	283	453
Total	**458**	**1,656**	**2,114**
		30-year Amortized[b]	**70**

Notes: MT = metric tons; CO_2e = carbon dioxide equivalent.
See Appendix J for detailed results.
[a] Emissions estimated with California Emissions Estimator Model (CalEEMod) version 2016.3.2.
[b] One-time emissions from construction were amortized over a 30-year period.

Operations

Operational emissions are emissions that would occur after build-out of the Project. This analysis identifies operational emissions for source categories including direct emissions from area and mobile sources and indirect emissions from energy use, water/wastewater, and waste management. Vehicle miles traveled (VMT) is the unit used to measure Project emission estimates for mobile sources presented in the air quality and GHG inventories account for truck trips to and from the facility. Refer to Table 15 in the Greenhouse Gas Technical Report (Appendix J) for Project-related passenger car and truck VMT estimates.

There is no operational activity associated with the Cactus Channel, hence operational emissions are zero. As explained in Section 4.6.2, Relevant Plans, Policies, and Ordinances, the determination of whether the Project would generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment is also based on Project compliance with the County of Riverside CAP.

Project Compliance with CAP

As shown in Appendix J's Table C-1 Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities, the Project's operational GHG emissions exceed 3,000 MT CO_2e per year and thus the screening tables apply. A project that would implement a total of 100 points worth of reduction measures in the Riverside County GHG Screening Table would assist in achieving attainment of the CAP's goals for the region as a whole and therefore would not conflict with the CAP. The completed Riverside County GHG Screening Table for the Project is included in Appendix J to this EIR. The Project's points are shown in Table 4.6-3, which shows that the Project would earn 656 points based on implementing the following GHG reduction measures:

- **Insulation:** Walls will have a minimum of R-13 insulation and the roof will have R-38 insulation for all office space associated with the Project, as required by 2016 Title 24. (0 points)

- **Windows:** All windows will have modestly enhanced window insulation. (0 points)
- **Cool Roofs:** Modest cool roof will be constructed (12 points).
- **Space Heating/Cooling Equipment:** Those areas that are cooled and heated will have HVAC equipment of 14 Seasonal Energy Efficiency Ratio or higher (7 points).
- **Water Heaters:** The water heaters installed will be of 0.92 energy factor or higher (19 points).
- **Daylighting:** All rooms will have some form of daylighting be it skylights or windows (5 points).
- **Artificial Lighting:** 50% of in unit fixtures will be high efficacy (12 points).
- **Photovoltaic:** 2016 Title 24 requires that nonresidential solar ready requirements apply to hotel/motel occupancies with 10 habitable stories or fewer, high-rise multifamily buildings with 10 stories or fewer, and all other nonresidential buildings with three habitable stories or fewer. In addition to meeting this requirement, the Project will install solar photovoltaic panels to generate electricity equal to 100% of the power needs of the project (62 points).
- **Water Efficient Landscaping:** No turf; only drought tolerant plants (4 points).
- **Water Efficient Irrigation Systems:** Smart irrigation controllers only (5 points).
- **Signal Improvements:** At least one traffic signal along a nearby arterial will be synchronized (3 points).
- **Sidewalks:** Sidewalks are on both sides of the street (1 point).
- **Employee Bicycle/Pedestrian Programs:** The Project will provide plentiful short- and long-term bicycle parking facilities to meet peak season maximum demand (one bile rack space per 20 vehicle/employee parking spaces) and "end-of-trip" facilities including showers, lockers, and charging stations (3 points).
- **Parking:** 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for carpools and vanpools (1 point)
- **Electric Vehicle Recharging:** 2013 CALGreen (Title 24, Part 11) requires circuit and capacity for electric vehicle charging in non-residential areas where the total number of parking spaces is >50. The Project will additionally install 11 on-site and 54 off-site EV charging stations (520 points).
- **Commercial Vehicle Idling Restriction:** All commercial vehicles are restricted to 5-minutes or less per trip on site and at loading docks (2 points).

Table 4.6-3
Screening Table Points for K4 Parcel Scenario

Questionnaire Points	Number of Points
Commercial	656
Total	**656**
Threshold Requirements	100
Meets Requirement?	**Yes**

Since the Project's reduction strategies would garner 656 points, in excess of the minimum 100 points required to demonstrate consistency with the County's CAP, the Project's GHG emissions and associated impacts are considered **less than significant**.

Threshold GHG-2. Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

As explained in Section 4.6.4, Approach and Methodology, the determination of whether the Project would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs is based on the following evaluations:

a. Project consistency with AB 32 through evaluating the Project's consistency and compliance with applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32,

b. Project consistency with SB 375, and

c. Project compliance with the CAP screening tables.

The SCAQMD has not adopted any GHG reduction measures that would apply to the GHG emissions associated with the Project. The Air Quality Element of the General Plan of the March JPA (March JPA 1999) establishes goals and policies related to the reduction of GHG emissions. Consistency with these goals and policies is discussed in Section 4.9. The following analyses summarize the GHG impact discussions detailed in Appendix J, based on the methodologies described in Section 4.6.4.

Consistency with AB 32 and the March JPA General Plan Noise/Air Quality Element Regulatory Programs

The Project is consistent and compliant with applicable statewide regulatory programs designed to reduce GHG emissions consistent with AB 32, as described in Table 4.6-4.

Table 4.6-4
Consistency with Assembly Bill 32 Regulatory Programs

Regulatory Program	Project Level Evaluation
Construction	
CARB In-Use Off-Road Regulation	Off-road equipment used for construction of the Project will utilize Tier 3 or Tier 4 certified engines.
Mobile Sources	
California Assembly Bill 1493 (Pavley Standards)	This regulatory program applies to vehicle manufacturers, and not directly to land use development. That being said, the vehicles operated by future occupants of and visitors to the Project would benefit from and be consistent with this regulatory program in the form of reduced GHG emissions from the vehicle fleet for model years 2017 through 2025.
Advanced Clean Cars Program	This regulatory program applies to vehicle manufacturers, and not directly to land use development. That being said, the vehicles operated by future occupants of and visitors to the Project would benefit from and be consistent with this regulatory program in the form of reduced GHG emissions from the vehicle fleet for model years 2017 through 2025.
Low Carbon Fuel Standard Regulation	This regulatory program applies to fuel suppliers, and not directly to land use development. That being said, the vehicles operated by future occupants of and visitors to the Project would benefit from and be consistent with this regulatory program in the form of reduced GHG emissions from the vehicle fleet.
Heavy-Duty Vehicle GHG Emission Reduction Regulation	This regulatory program is intended to reduce fuel use and GHG emissions from medium- and heavy-duty vehicles, semi-trucks, pickup trucks and vans, and all types and sizes of work trucks and buses in between. The Project construction and operational analysis includes the benefit of reductions from these programs.
CARB In-Use On-Road Heavy-Duty Diesel Vehicles Regulation	This regulatory program applies to vehicle manufacturers, and not directly to land use development. That being said, the vehicles operated during Project construction and operations would benefit from and be consistent with this regulatory program in the form of reduced GHG emissions from the vehicle fleet.
Energy Use	
California Title 20 Standards Appliance Energy Efficiency Standards	The Project would result in new land use development that would be outfitted with appliances that accord to the CEC's Title 20 standards to the extent required by law.
California Title 24, Part 6 Standards Building Energy Efficiency Standards	The Project will design and construct buildings that accord to the CEC's 2016 Title 24 standards to the extent required by law.
California Title 24, Part 11 Standards Green Building Standards Code	The development facilitated by the Project would comply with CALGreen as a matter of law.
California Senate Bill X1-2 Renewable Portfolio Standards	This regulatory program applies to investor-owned utilities, electric service providers and community choice aggregators, and not directly to land use development. That being said, the Project would benefit from and be consistent with this regulatory program in the form of reduced GHG emissions from building energy consumption. The Project will purchase electricity from Southern California Edison, which is required to procure 20% and 33% of retail sales from renewable energy resources by 2013 and 2020, respectively.

Table 4.6-4
Consistency with Assembly Bill 32 Regulatory Programs

Regulatory Program	Project Level Evaluation
Water Supply, Treatment and Distribution	
Senate Bill X7-7 Water Use Efficiency Program	This regulatory program is implemented through the California Department of Water Resources and urban water suppliers, not land use developers. The Project would accord to water conservation objectives through use of the latest water-efficiency technologies, including those relating to water-conserving plumbing fixtures, weather-sensitive irrigation controls, drought-tolerant landscaping palettes, and the use of recycled water for irrigation purposes.
Executive Order B-29-15	Mandatory water reductions are implemented via Executive Order B-29-15 and a regulatory framework developed by the State Water Resources Control Board. These regulatory programs apply to urban water suppliers, not land use developers. The Project would accord to water conservation objectives through use of the latest water-efficiency technologies, including those relating to water-conserving plumbing fixtures, weather-sensitive irrigation controls, drought-tolerant landscaping palettes, and the use of recycled water for irrigation purposes.
California Title 24, Part 11 Standards Green Building Standards Code	The Project would comply with CALGreen as a matter of law. The use of water saving design elements (such as water-efficient toilets/urinals and faucets) will allow the Project to comply with required 20% reduction in indoor potable water use.
County of Riverside Ordinance No. 859	The Project will incorporate drought tolerant landscaping, smart irrigation controls, and a non-potable water system that meets "purple pipe" standards and provides the entirety of outdoor water demand.
Solid Waste	
California Assembly Bill 341 Mandatory Commercial Recycling	This regulatory program applies to commercial businesses and local land use jurisdictions, not land use developers. That being said, any businesses located in the Project would be required to comply with the program to the extent required by law; the Project would not hinder implementation of the program.
General	
California Cap-and-Trade Regulation	This regulatory program does not classify land use development as a covered entity. That being said, implementation of the regulatory program serves to reduce emissions at sources that are indirectly related to land use development (e.g., transportation fuel refineries).

Source: Appendix J.
Notes: CARB = California Air Resources Board; GHG = greenhouse gas; CEC = California Energy Commission; CALGreen = California Green Building Standards.

The Project is also consistent and compliant with applicable local regulatory programs, specifically the March JPA General Plan Noise/Air Quality Element policies designed to reduce GHG emissions, as described in Table 4.6-5.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Goal 3	Reduce air pollution through proper land use, transportation, and energy use planning.	The Project would be constructed on approximately 35.4 acres located immediately adjacent to existing industrial and warehouse development. The uses would be concentrated with similar land uses, and the major roadways connecting the Project site to the existing roadway network are, for the most part, already constructed. Additionally, the Project would include solar panels to result in energy efficiency.	The Project would be consistent with this goal.
Policy 3.1	Locate ancillary uses within businesses and employment centers to reduce the number of vehicle trips and lessen vehicle miles traveled.	The Project site is located in the Business Park zone (refer to Figure 2-2, March JPA General Plan Land Use Designations, in Chapter 2, Project Description). Adjacent to the north of the proposed site, across Cactus Avenue, is an industrial and commercial center. To the east, the proposed warehouse site is bounded by vacant land and an electrical substation. To the south, the proposed warehouse site is bordered by March Air Reserve Base and to the west the proposed warehouse site is bordered by a vacant lot and March Air Reserve Base.	Given the site's location within the Business Park zone, there are limitations in the types of uses that can be located on the Project site, thereby limiting the ability to collocate ancillary uses on the Project site in an effort to minimize vehicle miles traveled by employees. However, the Project is located close to a commercial center which would provide ancillary services within a close proximity. The Project would be consistent with this policy.
Policy 3.4	Encourage ride share programs.	As required by mitigation measure **MM-AQ-5**: Commute Trip Reduction, 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools to encourage ride share programs.	The Project would be consistent with this policy.
Goal 4	Pursue reduced emissions for stationary and mobile sources through the use and implementation of new and advancing technologies.	The following Project Design Features (included in Appendix B, K4 Warehouse Rendering) would reduce energy consumption associated with Project facilities: • The Project will install duct installation to a minimum level of R-6 and modestly enhanced window insulation; as required by 2016 Title 24 (conservatively not quantified).	The Project would be consistent with this goal with incorporation of project design features and implementation of **MM-AQ-1** through **MM-AQ-6**.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		• For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks (EPA 2016b) (conservatively not quantified). • The Project will use Energy Star certified light bulb and lighting fixtures (conservatively not quantified). • The Project will include the following design elements: construction of modest cool roof; defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance, use of HVAC equipment with a Seasonal Energy Efficiency Ratio rating of 14 or higher; installation of water heaters with an energy factor of 0.92 or higher; all rooms will have some form of daylighting (i.e., skylights or windows); at least 50% of artificial lighting fixtures will be high efficiency; waterless urinals and high efficiency toilets will be used throughout the Project; water efficient faucets will be used throughout the Project (conservatively not quantified). The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers (included in emissions analysis). Additionally, as required by mitigation measures **MM-AQ-1** through **MM-AQ-6**, and detailed in Section 4.2, Air Quality, further	

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		requirements imposed on the Project would reduce emissions for stationary and mobile sources through the use and implementation of new and advancing technologies.	
Policy 4.1	Pursue the use of equipment with reduced or zero emissions for stationary and mobile source equipment.	See Goal 4 for Project consistency analysis.	The Project would be consistent with this policy with incorporation of project design features and implementation of **MM-AQ-1** through **MM-AQ-6**.
Policy 4.4	Promote for all development and encourage end-users to employ emission reducing or zero source equipment and processes.	See Goal 4 for Project consistency analysis.	The Project would be consistent with this policy with implementation of **MM-AQ-1** through **MM-AQ-6**.
Policy 5.5	Review development project to determine potential air quality impacts and provide appropriate mitigation, where necessary.	A comprehensive air quality analysis for the proposed Project is included within Section 4.2, Air Quality, of the EIR, and applicable mitigation measures can be found in the Executive Summary and in Section 4.2.6 Mitigation Measures, of the EIR.	The Project would be consistent with this policy.
Goal 6	Reduce emissions associated with vehicle/engine use.	The existing bus routes provided within the Project area by RTA are shown on Exhibit 3-11 in the TIA (refer to Appendix R). RTA Route 11 could potentially serve the Project, as it currently operates along Cactus to the north of the Project site. In addition, the following Project Design Features (included in Appendix J) would reduce energy consumption associated with Project facilities: • For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks (EPA 2016c). Additionally, per **MM-AQ-1**, during the Project construction, all off-road diesel-powered construction equipment greater than 50 horsepower, shall	The Project would be consistent with this goal with implementation of **MM-AQ-1, MM-AQ-5** and **MM-AQ-6.**

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the U.S. Environmental Protection Agency (EPA). The Project is committed to utilize up to 50% Tier 4 construction equipment. Per **MM-AQ-5**, the Project shall incorporate measures to encourage alternative modes of transportation and reduce commute trips. Per **MM-AQ-6**, the Project shall incorporate measures to minimize on-road mobile source criteria air pollutant emissions. Refer to Section 4.2, Air Quality, for further discussions.	
Policy 6.1	Reduce idling emissions by increasing traffic flow through synchronized traffic signals.	The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of transportation uniform mitigation fee in accordance with County Policy C 2.5. These fees shall be collected by the March JPA, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. The Project would identify opportunities to modify streets to better serve the safety and needs of pedestrians and cyclists. Street modifications would serve to slow or reduce automobile traffic and make walking and cycling more safe and viable, reducing idling emissions. These may include adequate sidewalk width, pedestrian crossing time, “count down” signals, and universal access signal features at all signalized crosswalks.	The Project would be consistent with this policy.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 6.2	Work with Riverside Transit Agency (RTA) to develop a local transit system and facilitate connections.	The existing bus routes provided within the Project area by RTA are shown on Exhibit 3-11 in the TIA (refer to Appendix R). RTA Route 11 could potentially serve the Project, as it currently operates along Cactus to the north of the Project site.	The Project would be consistent with this policy.
Policy 6.3	Encourage diversion of peak hour truck traffic, whenever feasible, to off-peak periods to reduce roadway congestion and associated emissions.	The Project Applicant shall pay all the necessary development and fair share fees associated with development of the Project. While payment of fees would be completed as part of Project approval, the use of these fees to implement programs and street system improvements cannot be guaranteed by the Project itself.	The Project would be consistent with this policy; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.
Policy 6.4	Work with Caltrans and traffic engineers to insure that roadways and freeway on-ramps that are heavily utilized by trucks are designed to safely accommodate trucks.	The freeway on-ramps and roadways already exist and are designed to safely accommodate trucks. The extension of Cactus Avenue and the construction of a new cul-de-sac roadway immediately south of the mixed use area would be reviewed by March JPA to ensure that the roadway is designed to safely accommodate trucks.	The Project would be consistent with this policy.
Policy 6.5	Encourage trucks operating within March JPA Planning Area to maintain safety equipment and operate at safe speeds so as to reduce the potential for accidents which create congestion and related emissions.	All trucks operating within the March JPA Planning Area are to maintain safety equipment and operate at safe speeds. The Project is designed to minimize potential conflicts between truck and vehicular traffic, and reduce the potential for accidents.	The Project would be consistent with this policy.
Policy 6.6	Reduce vehicle emissions through improved parking design and management that provide for safe pedestrian access to and from various facilities.	See Goal 6 for Project consistency analysis.	The Project would be consistent with this policy.
Policy 6.8	Encourage the use of compressed natural gas, clean diesel, and/or alternative fuels in engines.	Per **MM-AQ-1**, during the Project construction, all off-road diesel-powered construction equipment greater than 50 horsepower, shall	The Project would be consistent with this policy with implementation of **MM-AQ-1,**

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the EPA. In addition, the Project is committed to utilize 50% Tier 4 construction equipment, based on the number of pieces of construction equipment. With implementation of **MM-AQ-4**, the Project will include improved energy efficiency by providing circuitry and capacity for installation of electric vehicle charging stations consistent with the Climate Action Plan criteria. The Project will provide electrical outlets at building exterior areas. The project shall develop 11 on-site and 26 off-site electric vehicle charging stations. Per **MM-AQ-5**, the Project shall incorporate measures to encourage alternative modes of transportation and reduce commute trips including preferential parking spaces to be offered to car pools and van pools. Per **MM-AQ-6**, the Project shall incorporate measures to minimize on-road mobile source criteria air pollutant emissions. Refer to Section 4.2, Air Quality, for further discussions. In addition, the following Project Design Features (included in Appendix J) would reduce energy consumption associated with Project facilities: • For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks (EPA 2016c).	**MM-AQ-4, MM-AQ-5,** and **MM-AQ-6**.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Goal 7	Reduce emissions associated with energy consumption.	See Policy 6.8 for Project consistency analysis.	The Project would be consistent with this goal with implementation of **MM-AQ-**1, **MM-AQ-4**, **MM-AQ-5**, and **MM-AQ-6**.
Policy 7.1	Support the use of energy-efficient equipment and design in the March JPA Planning Area for facilities and infrastructure.	See Policy 6.8 for Project consistency analysis.	The Project would be consistent with this policy with implementation **MM-AQ-1**, **MM-AQ-4**, **MM-AQ-5**, and **MM-AQ-6**.
Policy 7.2	Encourage incorporation of energy conservation features in development.	See Policy 6.8 for Project consistency analysis.	The Project would be consistent with this policy with implementation of **MM-AQ-1**, **MM-AQ-4**, **MM-AQ-5**, and **MM-AQ-6**.
Policy 7.3	Support passive solar design in new construction.	The Project will include the following design elements: construction of modest cool roof; defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance, use of HVAC equipment with a Seasonal Energy Efficiency Ratio rating of 14 or higher; installation of water heaters with an energy factor of 0.92 or higher; all rooms will have some form of daylighting (i.e., skylights or windows); at least 50% of artificial lighting fixtures will be high efficiency; waterless urinals and high efficiency toilets will be used throughout the Project; water efficient faucets will be used throughout the Project (conservatively not quantified).	The Project would be consistent with this policy.
Policy 7.4	Support recycling programs which reduce emissions associated with manufacturing and waste disposal.	As discussed in Section 4.13, Utilities and Service Systems, of the EIR, **MM-UTL-2** and **MM-UTL-3** would ensure the preparation of a waste recycling plan and approval from the Riverside County Waste Management Department. The plan would specify where and how the recyclable materials will be stored on the site.	The Project would be consistent with this policy with implementation of **MM-UTL-2** and **MM-UTL-3**.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 7.5	Support drought-resistant vegetation in landscaping areas to reduce energy needed to pump water.	The Project would be designed to comply with March JPA's policy on drought-tolerant landscaping.	The Project would be consistent with this policy.
Goal 8	Reduce air pollution emissions and impacts through siting and building design.	See Policy 6.8 for Project consistency analysis.	The Project would be consistent with this goal with implementation of **MM-AQ-**1, **MM-AQ-4**, **MM-AQ-5**, and **MM-AQ-6**.
Policy 8.1	Support the use of low polluting construction materials and coatings.	See Policy 6.8 for Project consistency analysis.	The Project would be consistent with this policy with implementation of **MM-AQ-1 through MM-AQ-6** and compliance with SCAQMD Rule 403 and Rule 1113.
Policy 8.2	Encourage the separation of sensitive receptors, such as schools and hospitals, from sources of toxic emissions.	At buildout of the Project, the highest average daily trips at an intersection would be approximately 228,500 at the Trautwein Road/Alessandro Boulevard intersection, which is below the daily traffic volumes that would be expected to generate carbon monoxide (CO) exceedances as evaluated in the 2003 Air Quality Management Plan. This daily trip estimate is based on the average daily traffic rate conditions of the intersection. There is no reason unique to the South Coast Air Basin meteorology to conclude that the CO concentrations at the Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard intersection would exceed the 1-hour CO standard if modeled in detail, based on the studies undertaken for the 2003 Air Quality Management Plan. As such, localized CO impacts would be less than significant. As analyzed in Section 4.2.5, Impact Analysis, of the EIR, the excess lifetime cancer risk and chronic HI for a resident at the off-site maximally exposed individual resident location	The Project would be consistent with this policy.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		due to operational emissions would be 1.3 in a million and 0.004, respectively, which would not exceed the applicable SCAQMD cancer and noncancer risk thresholds. Health risk impacts associated with long-term operations of the Project would be less than significant. Refer to Section 4.2, Air Quality, for further discussions.	
Policy 8.3	Encourage the separation of sensitive receptors from potential carbon monoxide hotspots.	See Policy 8.2 for Project consistency analysis.	The Project would be consistent with this policy.
Goal 9	Reduce fugitive dust and particulate matter emissions.	To account for dust control measures to comply with SCAQMD Rule 403 in the calculations, it was assumed that the active sites would be watered twice times daily, or as needed depending on weather conditions, resulting in a 55% reduction in fugitive dust as implemented by the CalEEMod.	The Project would be consistent with this goal.
Policy 9.1	Require all feasible fugitive dust reduction techniques to be utilized during construction activities.	Standard construction practices that would be employed to reduce fugitive dust emissions include watering the active sites twice times daily, as needed, depending on weather conditions.	The Project would be consistent with this policy.
Policy 9.3	Support land division design which minimizes grading and maintains the natural topography to the maximum extent feasible.	Recommendations included within the Project's Geotechnical Investigation are incorporated via **MM-GEO-1** to ensure that site preparation; over-excavation and recompaction; fill placement and compaction; import and export of fill soil; rippability and over-sized material; alluvium soil removal; temporary excavations; and trench backfill are completed where the site is prepared for the development of the Project components while maintaining the natural topography to the maximum extent feasible.	The Project would be consistent with this policy with implementation of **MM-GEO-1**.

Table 4.6-5
Consistency with March Joint Powers Authority General Plan
Noise/Air Quality Element

Applicable Goal or Policy/ Recommendation Number	Applicable Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		Prior to construction, a licensed geotechnical engineer shall review the site and grading plans when available and comment further on the geotechnical aspects of the Project. Geotechnical observation and testing shall be conducted during excavation and all phases of grading operations.	

Notes: EIR = environmental impact report; RTA =Riverside Transportation Authority; TIA = Traffic Impact Analysis; Caltrans = California Department of Transportation; JPA = Joint Powers Authority; CRRC = Cool Roof Rating Council; CalEEMod = California Emissions Estimator Model.

In summary, since the Project would comply with statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32, this impact would be **less than significant**.

Consistency Evaluation with SB 375 (SCAG RTP/SCS)

SCAG's 2016 RTP/SCS is a regional growth-management strategy that targets per capita GHG reduction from passenger vehicles and light-duty trucks in the Southern California region. The SCS will integrate land use and transportation strategies that will achieve GHG emissions reduction targets that are forecasted to achieve reduction in GHG emissions to achieve the state's 2035 and 2040 GHG reduction goals.

The Project lies entirely within Traffic Analysis Zone 43268200. The 2016 RTP/SCS projects that within Traffic Analysis Zone 43268200, there will be a total of 8,755 jobs by 2020 and 22,196 by 2045.[3] As of 2016, there are 4,531 jobs in the March JPA jurisdiction. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Adding jobs consistent with 2016 RTP/SCS projections supports SCAG's achievement of Air Reserve Base emissions reductions targets.

The SCS also indicates that this is a jobs poor area so providing more jobs will actually reduce GHG emissions and reduce VMT as it will provide local jobs to achieve a more favorable jobs-housing balance.

[3] Jobs data provided by March JPA.

Additionally, the March JPA Draft General Plan (March JPA 1999) discusses the need to create more jobs, including the following examples:

- March JPA has a stated goal of providing 38,000 jobs, through development of its Planning Area, to the western Riverside County area thereby creating a much-needed job center. The creation of a job center is important to reduce the existing jobs/housing imbalance that exists in this region such that it can help reduce traffic congestion, pollution, fossil fuel dependence and improve the overall quality of life for the residents of western Riverside County. (p. 1–11)
- March JPA has a mission to replace regional economic benefit that was lost with the realignment of the active duty March Air Force Base into a Reserve Base in April 1996. The quantified benefits are the creation of at least 38,000 jobs, and more than $500 million annual economic contribution to the Riverside County region. (p. 5–4)

The Project is expected to generate 900 jobs. This is approximately 21% of the projected job growth in Traffic Analysis Zone 43268300 in 2020 as compared to 2016, and approximately 5.1% of projected job growth in 2045 as compared to 2016. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Since the jobs created by the Project are within the job growth projections in the 2016 RTP/SCS, will not impair the region's ability to achieve the GHG reductions from Project related mobile sources as required by SB 375 because the land use development pattern proposed by the Project results in jobs within the total number of jobs projected by SCAG's 2016 RTP/SCS, and is consistent with the underlying assumptions upon which SCAG's 2016 RTP/SCS was based. Thus, the Project is consistent with the principles of the 2016 RTP/SCS and the Project would have a **less than significant** impact.

Consistency with County of Riverside CAP

The County's CAP identifies a series of GHG reduction measures which projects could implement in order to reduce GHG emissions if the projects' GHG emissions exceed 3,000 MT CO_2e per year. The point values for each GHG reduction measure correspond to the minimum emissions reduction expected from each feature. Possible features within the screening table allow maximum flexibility and options for how projects can implement the GHG reduction measures. A project that would implement a total of 100 points worth of reduction measures would assist in achieving attainment of the CAP's goals for the region as a whole and therefore would not conflict with the CAP. Most of the reduction measures focus on energy efficiency, renewable energy, water use and waste reduction, and transportation. As previously discussed under Threshold GHG-1, the Project would implement GHG-reducing elements garnering 656-points from the CAP's screening tables. Therefore, the Project would not conflict with the County's CAP and this impact would be **less than significant**.

4.6.6 Mitigation Measures

CEQA Guidelines Section 15126.4 requires EIRs to describe feasible measures that can minimize significant adverse impacts. Although no significant impact was identified in Section 4.6.5, the following mitigation measures identified in Section 4.2 have been evaluated for feasibility and are incorporated herein to reduce potentially significant impacts related to GHG emissions.

MM-GHG-1 Air Quality Mitigation Measures. The applicant shall incorporate MM-AQ-1 (Construction Equipment Emissions Standards), MM-AQ-3 (Construction Relations Officer), MM-AQ-4 (Improved Energy Efficiency and Water Reduction), MM-AQ-5 (Commute Trip Reduction), and MM-AQ-6 (Haul Truck Requirements).

Notably, the mitigation measure discussed above reflects the requirements from the Riverside CAP screening analysis. As a conservative approach, the reductions from MM-AQ-3, MM-AQ-5, MM-AQ-6 and MM-AQ-7 were not quantified. As discussed in Appendix J, a portion of MM-AQ-4 was quantified. Incorporating GHG reductions from these mitigation measures would further reduce the Project's emissions.

4.6.7 Level of Significance After Mitigation

As the Project had a less than significant impact prior to mitigation, it would also have a less than significant impact with mitigation.

4.6.8 Informational Analysis of Updated Scoping Plan (Service Population)

The SCAQMD has not adopted recommended numeric CEQA significance thresholds for GHG emissions for lead agencies to use in assessing GHG impacts of non-industrial projects. In October 2008, SCAQMD presented to the Governing Board the *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold* (SCAQMD 2008b). The guidance document was not adopted or approved by the Governing Board. This document, which builds on the previous guidance prepared by CAPCOA (discussed previously), explored various approaches for establishing a significance threshold for GHG emissions.

For informational purposes, an additional comparison to a service population target is provided, because no numeric threshold for determining the significance of construction or operational GHG emissions from a residential/commercial development project has been adopted by the lead agency or by SCAQMD. The SCAQMD's draft 2020 target for project-level analysis is 4.8 $MTCO_2e$ per year per service population (land use employment only). The Tier 4 efficiency metric is based on a percent reduction target that is based on consistency with AB 32. This is because the Tier 4

percent emission reduction target is based on the same numeric reductions calculated in the Scoping Plan to reach 1990 levels by 2020.

The service population estimate for the Project is 900 employees on an annual average basis. Non-peak period service population is estimated to be two-thirds of the peak period based on Project specific estimates.

Project-Generated Construction Emissions. Construction of the Project would result in GHG emissions that are primarily associated with use of off-road construction equipment and on-road construction and worker vehicles. CalEEMod was used to calculate the annual GHG emissions based on the construction scenario described in Section 4.2.4 in Section 4.2 and Appendix J. SCAQMD methodology recommends that "construction emissions be amortized over a 30-year project lifetime, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies" (SCAQMD 2008b). On-site sources of GHG emissions include off-road equipment. Off-site sources include hauling and vendor (delivery) trucks and worker vehicles. Emissions from on-site and off-site sources are combined for the purposes of this analysis. A breakdown of emissions by source is provided in Appendix J. Table 4.6-2 presents the Project-generated construction emissions.

As shown in Table 4.6-2, the estimated total GHG emissions during Project construction would be approximately 2,114 MT CO_2e, which equates to 70 MT CO_2e when amortized over 30 years. Because GHG emissions are cumulative in nature, amortized construction GHG emissions were added to operational emissions in Table 4.6-6 in order to present total annual emissions. Additional details regarding these calculations are provided in Appendix J.

Project-Generated Operational Emissions. Operation of the Project would result in GHG emissions through energy use (natural gas and generation of electricity consumed by the Project); motor vehicle trips to and from the Project; generation of electricity associated with water supply, treatment, and distribution and wastewater treatment; and solid waste disposal. Annual GHG emissions from these sources were estimated using CalEEMod for the year 2020. The Project would primarily generate GHG emissions through vehicular traffic generated by employees and delivery trucks. Table 4.6-6 presents estimated GHG emissions from area sources, energy sources, motor vehicles, solid waste generation, water consumption, and wastewater treatment. Emissions reductions from measures incorporated as part of County CAP compliance were not quantified or included in the Unmitigated Project 2020 scenario. Table 4.6-6 presents estimated GHG emissions from area sources, energy sources, motor vehicles, solid waste generation, water consumption, and wastewater treatment. Emissions reductions from measures incorporated as part of County CAP compliance were not quantified or included in the Unmitigated Project 2020 scenario.

Where it was possible to quantify emissions reductions from CAP compliance, those measures were incorporated as mitigation. For several measures, substantial evidence to support quantification was not available and thus emissions reductions were excluded from the analysis. Additional details regarding these calculations are provided in Appendix J.

Table 4.6-6
Summary of Greenhouse Gas Emissions

Category	Unmitigated Project 2020	Mitigated Project 2020
	MT CO_2e/year	
Area	0.04	0.04
Energy (natural gas and electricity)	497	-1,342
Water supply and wastewater	18	18
Solid waste	123	123
On-road Traffic (with trucks)	17,298	16,856
On-road Traffic (without trucks)	6,992	6,551
Construction (amortized over 30 years)	70	70
Vegetation	0	-5
Total (with trucks)	**18,007**	**15,721**
Total (without trucks)	**7,701**	**5,416**
Service Population	**900**	
Total Emissions per Service Population with trucks (MT CO_2e/SP/yr)	**20.0**	**17.5**
Total Emissions per Service Population without trucks (MT CO_2e/SP/yr)	**8.56**	**6.02**

Notes: MT = metric tons; CO_2e = carbon dioxide equivalent; SP = Service Population; yr = year.
See Appendix J for detailed results. The Unmitigated Project 2020 scenarios both include greenhouse gas (GHG) reductions due to improvements in Renewable Portfolio Standards, Title 24 building energy standards, solid waste disposal rates, water conservation, and mobile source tailpipe emissions. The Mitigated Project 2020 scenario includes application of mitigation measure MM-GHG-1.

The Project's unmitigated efficiency metric is estimated to be 20.0 MT CO_2e per year per service population (18,007 MT CO_2e per year / 900 people), which is above the draft threshold. The Project's mitigated efficiency metric is estimated to be 17.5 MT CO_2e per year per service population (15,721 MT CO_2e per year / 900 people), which is also above the draft threshold, however, this is based on a comparison that does not fairly compare the Project emissions inventory to the associated service population. In this case, the trucks associated with Project operation are the predominant emissions source, however, those drivers are not considered in the SCAQMD's service population since they are not included in the employment for the Project land use (SCAQMD 2010b). With the analysis in Appendix J, the emissions from these trucks are included in the total emissions, but the drivers are excluded from the service population.

Further, this analysis also evaluates the Project's GHG emissions utilizing a modified emissions inventory to compare against the efficiency target because the District's draft definition of "service population" leads to a negative bias for projects with emissions not related to the residents or workers of the project. The modified emissions inventory used in this analysis evaluates the emissions associated with the defined service population – the workers at the project site and not the truck workers and the truck emissions; as such, mobile source emissions associated with the operational trucks are excluded from the emissions total. In this analysis, shown in Appendix J, the Project's mitigated efficiency metric without truck emissions is estimated to be 6.02 MT CO_2e per year per service population, which is above the draft threshold. This analysis is included for informational purposes only.

4.6.9 References

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4.7 HAZARDS AND HAZARDOUS MATERIALS

This section describes the existing hazardous materials within the vicinity of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the Project. The Initial Study (Appendix A, Initial Study and Notice of Preparation) concluded that potential impacts related to creating a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; creating a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; emitting hazardous emissions within one-quarter of an existing school; locating the Project on a site listed as a hazardous materials site creating a significant hazard to the public or environment; and being located within an airport land use plan or within two miles of a public airport were found to be potentially significant and are therefore discussed further in this Environmental Impact Report (EIR).

In addition to other documents listed in Section 4.7.7, References, the following resources were used in the preparation of this section of the EIR:

- Phase I and Limited Phase II Environmental Site Assessment Proposed Industrial Warehouse Site K4 (Appendix K)
- Phase I Environmental Site Assessment Former March Air Force Base K4 Parcel and Cactus Channel (Appendix L)
- Geotechnical Exploration Proposed Industrial Warehouse Site K4 Cactus Avenue (Appendix I1)
- Geotechnical Addendum Report K4 Moreno Valley Storm Drain Cactus Avenue (Appendix I2)

As mentioned in Chapter 2, Project Description, of this EIR, the proposed Project involves the development of the K4 Parcel with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use, and improvements to the Cactus Avenue Drainage Channel (Cactus Channel) at the Cactus Channel Improvement Site. The Project includes the following components for Project approval:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March Joint Powers Authority (JPA) General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.

- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.7.1 Existing Conditions

The proposed Project collectively consists of a proposed warehouse building on the K4 Parcel and improvements within the Cactus Channel. The approximately 35.4-acre K4 Parcel is located on the south side of Cactus Avenue and extends from the terminus of Veterans Way at Cactus Avenue on the west to the terminus of Frederick Street at Cactus Avenue on the east. The K4 Parcel is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location). The K4 Parcel is located within the former boundaries of the March Air Force Base (AFB) (now known as the March Air Reserve Base (ARB)), in the northern area.

The surrounding area consists of vacant land, commercial and industrial properties and the March ARB. Adjacent to the north of the K4 Parcel and Cactus Channel, across Cactus Avenue, is an industrial and commercial center. To the east, the K4 Parcel is bounded by vacant land and an electrical substation. To the south, the K4 Parcel is bordered by March ARB and to the west the K4 Parcel is bordered by a vacant lot and March ARB. The Cactus Channel component of the Project, is located within proximity of Harvest Time Christian School, located at 14420 Elsworth Street, Moreno Valley, California 92553, and is approximately 0.2 miles northwest of the Cactus Channel component of the Project site.

Topographically, the K4 Parcel is relatively flat, draining gently in a southeastern direction. The K4 Parcel is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. The K4 Parcel consists of Quaternary age alluvial soils and surface soils in the vicinity of the K4 Parcel consist of younger aged alluvium consisting of sand, gravel and clay of valley areas covered with soil (Appendix I1). There is an approximately 152,000-square-foot area with stockpiled soil in the southern portion of the site, adjacent to the transformer station. No buildings or structures are located on site; the southeastern perimeter of the K4 Parcel wraps around an electrical substation that is not included as part of the subject site. The substation has two paved entrances on the east that are accessible by Chanute Avenue, these entrances and Chanute Avenue are part of the K4 Parcel. The Cactus Channel is earthen and flows within the channel drain to the east.

Hazardous Materials

K4 Parcel

According to the Phase I Environmental Site Assessment (ESA) prepared for the proposed Project, a review of historic aerial photographs show that the K4 Parcel has been vacant since 1901; prior to 1901 it is unknown whether or not the K4 Parcel was developed. The Phase I ESA Report also states that no hazardous substances, chemical containers, or aboveground and underground storage tanks were observed on the K4 Parcel. Evidence of pesticide use was not observed on the K4 Parcel. One pad-mounted transformer was observed on the eastern portion of the K4 Parcel, adjacent to the large, off-site electrical substation located near the eastern boundary of the K4 Parcel. The transformer appeared in good condition with no evidence of staining or leakage was observed. The soils appeared to be clean and locally derived (Appendix K).

The K4 Parcel is located in the northern area of the former boundaries of the March AFB, which was reported on various hazard-identifying databases. According to the Environmental Data Resources (EDR) radius map report the former March AFB was originally used to train pilots during World War I, and by 1938, it became the central location for west-coast bombing and gunnery training. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. By November 1989, March AFB was added to the National Priorities List (NPL) due to the contamination of the groundwater. According to the EDR radius map report, the March ARB, formerly March AFB, facilities status is "currently on the Final NPL." There were numerous contaminants of concern detected in the groundwater at the operational units, including trichloroethylene, perchloroethylene, vinyl chloride, and fuel. The area that required groundwater remediation includes the southern and eastern boundary of March ARB and extends 1,500 feet south of the March ARB, and does not include the K4 Parcel or Cactus Channel boundary.

Based on the results of Phase I ESA, organochlorine pesticides (OCPs) and arsenic were not detected in the undocumented soil at concentrations exceeding the U.S. Environmental Protection Agency (EPA) residential Regional Screening Levels or the Department of Toxic Substance Control (DTSC) Human Health Risk Assessment Note 3 screening levels for OCPs, or the DTSC recognized Southern California background arsenic concentration of 12 mg/kg. Additionally, based on the past use of the K4 Parcel as part of a military base for over 50 years, future development of the K4 Parcel, including grading activities have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, unexploded ordnance (UXO), and contaminated media, including soil, soil vapor/gas, and or groundwater (Appendix L).

Cactus Channel

According to research conducted for the Phase I ESA, historic U.S. Army Corps of Engineers maps from 1943 and 1944 indicate that a levee was located along the northern portion of March AFB, suggesting the presence of a storm drain channel along the present day Cactus Channel. The Cactus Channel, which appeared as an earthen storm drain channel, was first evident in historical aerial photographs from the late 1940s and is similar to conditions in the present day. Per the Phase I ESA, a few empty one-quart motor oil containers were observed along the north side of the Cactus Channel and south side of Cactus Avenue, with no other containers of hazardous materials or wastes observed.

Airport Land Use Plan

March ARB prepared the Air Installation Compatible Use Zone (AICUZ) Study evaluating the aircraft noise and accident potential related to Air Force flying operations and is designed to aid in the development of local planning mechanisms which will protect the public safety and health, as well as preserve the operational capabilities of March ARB. The March ARB AICUZ identifies Accident Potential Zones (APZs) and defines noise contours around the air base. Neither the K4 Parcel nor the Cactus Channel Improvement Site are located within a designated Accident Potential Zone.

The K4 Parcel component of the proposed Project is located within the March ARB Land Use Plan (Mead & Hunt 2014), in the C1 Primary Approach/Departure Zone and would ultimately require approval from the ALUC due to the site's proximity to the March Inland Port Airport (approximately 4,500 feet from the north end of the runway). The C1 zone is subject to moderate to high noise and moderate accidental potential risk (Mead & Hunt 2014). Uses prohibited within Zone C1 include children's schools, day care centers, libraries, hospitals, congregate care facilities, places of assembly, noise-sensitive outdoor nonresidential uses, and hazards to flight.

4.7.2 Relevant Plans, Policies, and Ordinances

Federal

Federal Aviation Administration

The Federal Aviation Administration (FAA) requires that any structure that is located within proximity to an airport or other criteria per Code of Federal Regulations Title 14, Part 77.9, file with the FAA (FAA 2014). Because the Project is located in close proximity to the March ARB/IP, and specifically within one mile of the airport, the Project applicant has filed Form FAA 7460-1, Notice of Proposed Construction or Alteration, with the FAA.

FAA Advisory Circular 150/5200-33B

In 2007, FAA issued an Advisory Circular (AC) No. 150/5200-33B (FAA 2007) providing guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. The AC also discusses airport development projects, including airport construction, expansion and renovation, affecting aircraft movement near hazardous wildlife attractants. Hazardous wildlife is defined as any species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other wildlife that pose a strike hazard. Included within the AC are minimum separation criteria for land-use practices that attract hazardous wildlife to the vicinity of airports. Separation distances are based on flight patterns, altitude at which most strikes happen, and National Transportation Safety Board recommendations. Land use practices discussed within the AC associated with wildlife hazards directly applicable to the proposed Project include the placement and design of new stormwater management facilities, which must drain within 48 hours after a storm event.

Department of Defense

The Department of Defense has developed the AICUZ program to ensure that development is compatible with aviation operations in areas on and adjacent to military airfields. The AICUZ land use recommendations are based on land use compatibility with exposure to aircraft noise, and safety considerations. Recommended compatible land uses are derived from data on noise contours (noise zones) and safety zones (clear zones and accident potential zones).

Federal Toxic Substances Control Act and Resource Conservation and Recovery Act

The Federal Toxic Substances Control Act of 1976 (15 USC 2601 et seq.) and the Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.) established a program administered by the EPA for regulation of the generation, transportation, treatment, storage, and disposal of hazardous waste. The RCRA was amended in 1984 by the Hazardous and Solid Waste Act (PL 98-616), which affirmed and extended the "cradle-to-grave" system of regulating hazardous wastes. The use of certain techniques for the disposal of some hazardous wastes was specifically prohibited by the Hazardous and Solid Waste Act. Under the authority of RCRA, the regulatory framework for managing hazardous waste, including requirements for entities that generate, store, transport, treat, and dispose of hazardous waste, is found in Title 40 of the Code of Federal Regulations, Parts 260–299.

Hazardous Materials Transportation Act

The U.S. Department of Transportation regulates hazardous materials transportation under Title 49 of the United States Code. State agencies with primary responsibility for enforcing federal and

state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation. These agencies also govern permitting for hazardous materials transportation. Title 49 of the Code of Federal Regulations, part 100 et seq., reflects laws passed by Congress as of January 2, 2006.

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC 9601 et seq.), commonly known as "Superfund," was enacted by Congress on December 11, 1980. This law provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established requirements concerning closed and abandoned hazardous waste sites, provided for liability of persons responsible for releases of hazardous waste at these sites, and established a trust fund to provide for cleanup when no responsible party could be identified. CERCLA also enabled the revision of the National Contingency Plan. The National Contingency Plan provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants.

State

California Occupational Safety and Health Administration

California OSHA is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. California OSHA standards are generally more stringent than federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR 330 et seq.). The regulations specify requirements for employee training, availability of safety equipment, accident prevention programs, and hazardous substance exposure warnings.

California Hazardous Waste Control Act

The California DTSC is responsible for the enforcement of the Hazardous Waste Control Act (California Health and Safety Code, Section 25100 et seq.), which creates the framework under which hazardous wastes are managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA cradle-to-grave waste management system in California. It also provides for the designation of California-only hazardous waste and development of standards that are equal to or, in some cases, more stringent than federal requirements. Although the Hazardous Waste Control Act is generally more stringent than RCRA, until EPA approves the California hazardous waste control program (which is charged with regulating the generation, treatment, storage, and disposal of hazardous waste), both the state and federal laws apply in California. The Hazardous Waste

Control Act lists 791 chemicals and approximately 300 common materials that may be hazardous; establishes criteria for identifying, packaging, and labeling hazardous wastes; prescribes management controls; establishes permit requirements for treatment, storage, disposal, and transportation; and identifies some wastes that cannot be disposed of in landfills.

According to 22 CCR 66261 et seq., substances having a characteristic of toxicity, ignitability, corrosivity, or reactivity are considered hazardous waste. Hazardous wastes are hazardous substances that no longer have a practical use, such as material that has been abandoned, discarded, spilled, or contaminated, or that is being stored prior to proper disposal.

Toxic substances may cause short-term or long-lasting health effects ranging from temporary effects to permanent disability or death. For example, toxic substances can cause eye or skin irritation, disorientation, headache, nausea, allergic reactions, acute poisoning, chronic illness, or other adverse health effects if human exposure exceeds certain levels (the level depends on the substance involved). Carcinogens (substances known to cause cancer) are a special class of toxic substances. Examples of toxic substances include most heavy metals, pesticides, and benzene (a carcinogenic component of gasoline). Ignitable substances (e.g., gasoline, hexane, and natural gas) are hazardous because of their flammable properties. Corrosive substances (e.g., strong acids and bases such as sulfuric (battery) acid or lye) are chemically active and can damage other materials or cause severe burns upon contact. Reactive substances (e.g., explosives, pressurized canisters, and pure sodium metal, which react violently with water) may cause explosions or generate gases or fumes.

California State Aeronautics Act

The purpose of the California State Aeronautics Act pursuant to Public Utilities Code (PUC) Section 21001 et seq., administered by the California Department of Transportation, Division of Aeronautics, is "to protect the public interest in aeronautics and aeronautical progress." Under State Aeronautics Act, Airport Land Use Commissions are required, per Article 3.5 of PUC Sections 21670-21679.5, and airports must create Airport Land Use Compatibility Plans, pursuant to Article 3.5 of PUC Sections 21674.5 and 21674.7. Consistent with these provisions, Riverside County Airport Land Use Commission has been assigned airport land use authority for all public and military airports in the County, including March ARB/ IP, and the airport has created an Airport Land Use Compatibility Plan. Each of these are discussed in greater detail under applicable local regulations.

California Accidental Release Prevention Program

Similar to the EPA Risk Management Program, the California Accidental Release Prevention (CalARP) Program (19 CCR 2735.1 et seq.) regulates facilities that use or store regulated substances, such as toxic or flammable chemicals, in quantities that exceed established thresholds. The overall purpose of the CalARP Program is to prevent accidental releases of regulated

substances and reduce the severity of releases that may occur. The CalARP Program meets the requirements of the EPA Risk Management Program, which was established pursuant to the Clean Air Act Amendments.

California Government Code Section 51014.6

Section 51014.6 of the California Government Code states, "(a) Effective January 1, 1987, no person, other than the pipeline operator, shall do any of the following with respect to any pipeline easement: (1) Build, erect, or create a structure or improvement within the pipeline easement or permit the building, erection, or creation thereof. (2) Build, erect, or create a structure, fence, wall, or obstruction adjacent to any pipeline easement which would prevent complete and unimpaired surface access to the easement, or permit the building, erection, or creation thereof. (3) No shrubbery or shielding shall be installed on the pipeline easement which would impair aerial observation of the pipeline easement. This subdivision does not prevent the revegetation of any landscape disturbed within a pipeline easement as a result of constructing the pipeline and does not prevent the holder of the underlying fee interest or the holder's tenant from planting and harvesting seasonal agricultural crops on a pipeline easement. (4) This section does not prohibit a pipeline operator from performing any necessary activities within a pipeline easement, including, but not limited to, the construction, replacement, relocation, repair, or operation of the pipeline.

It is the position of the State Fire Marshal that nothing shall encroach into or upon the pipeline easement, which would impede the pipeline operator from complete and unobstructed surface access along the pipeline right-of-way. Nor shall there be any obstructions, which would shield the pipeline right-of-way from observation. In the interest of public safety and the protection of the environment, it is imperative that the pipeline operator visually assesses the conditions along the easement to ensure the integrity of the pipeline.

It is the responsibility of the pipeline operator to ensure they have unimpeded surface access and to be able to physically observe all portions of their pipeline rights-of-way. In cases where this is not possible, the pipeline operator shall inform the State Fire Marshal. The State Fire Marshal shall, in collaboration with the pipeline operator, resolve the issue.

California Health and Safety Code

In California, the handling and storage of hazardous materials is regulated by Division 20, Chapter 6.95, of the California Health and Safety Code (Section 25500 et seq.). Under Sections 25500–25543.3, facilities handling hazardous materials are required to prepare a hazardous materials business plan. Hazardous materials business plans contain basic information about the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of in the state.

Chapter 6.95 of the California Health and Safety Code establishes minimum statewide standards for Hazardous Materials Business Plans. Each business shall prepare a Hazardous Materials Business Plan if that business uses, handles, or stores a hazardous material (including hazardous waste) or an extremely hazardous material in disclosable quantities greater than or equal to the following:

- 500 pounds of a solid substance
- 55 gallons of a liquid
- 200 cubic feet of compressed gas
- A hazardous compressed gas in any amount (highly toxic with a Threshold Limit Value of 10 parts per million or less)
- Extremely hazardous substances in threshold planning quantities (California Health and Safety Code, Section 25503.5)

In addition, in the event that a facility stores quantities of specific acutely hazardous materials above the thresholds set forth by California code, facilities are also required to prepare a risk management plan consistent with the CalARP program. The risk management plan provides information about the potential impact zone of a worst-case release, and require plans and programs designed to minimize the probability of a release and to mitigate potential impacts.

Local

March ARB AICUZ

In February 2018, March ARB released an update of the March ARB AICUZ Study dated 2005. This update was initiated because of the bed-down of new aircraft, operational changes and the introduction of new flight tracks. It is a reevaluation of aircraft noise and accident potential related to Air Force flying operations and is designed to aid in the development of local planning mechanisms which will protect the public safety and health, as well as preserve the operational capabilities of March ARB. The AICUZ program is a means to protect public health, safety, and general welfare in areas surrounding base while seeking development compatible with the defense flying mission. The Project site is not located within any AICUZ noise zones, as identified in Figure 4-2 of the March ARB AICUZ.

Riverside County Airport Land Use Commission

In accordance with provisions of the California State Aeronautics Act (PUC Section 21670 et seq.) as discussed above, the Riverside County ALUC has been assigned lead responsibility for airport land use compatibility planning around each of the public-use and military airports in Riverside County. The Project site is located within the March ARB/IP airport influence area within unincorporated Riverside County and therefore is subject to review and approval by the Riverside County ALUC.

March ARB/IP ALUCP

The March ARB/IP ALUCP was prepared for and adopted by the Riverside County ALUC on November 13, 2014. The March ARB/Inland Port Airport is located approximately 0.7 miles southwest of the Project site. The purpose of the March ARB/Inland Port ALUCP is to promote compatibility between the March ARB/Inland Port and the land uses that surround the joint-use airport, to the extent such areas are not already devoted to incompatible uses. The March ARB/Inland Port ALUCP regulates future development of new residential dwellings, commercial structures, and other noise- or risk-sensitive uses within the Airport Influence Area based on factors enumerated in the ALUCP, including but not limited to noise, overflight, safety, and airspace protection. The Riverside County ALUCP Policy Document includes the policies for determining the land use compatibility of the Project since it is located within 2 miles of an airport runway. As mentioned above, the Project site is located in Zone C1 (Mead & Hunt 2014). Zone C1 encompasses areas of moderate to high noise impact and moderate accident potential beneath or adjacent to low altitude overflight corridors.

Policy 4.1.5, Noise Exposure for Other Land Uses of the Riverside County ALUCP requires that land uses, such as the Industrial land use of the Project site, demonstrate compatibility with the acceptable noise levels as shown on Table 4.7-1. Table 4.7-1 indicates that clearly compatible business park land uses experience exterior noise levels below 55 A-weighted decibels (dBA) Community Noise Equivalent Level (CNEL), which industrial land uses experience clearly compatible exterior noise levels below 60 dBA CNEL. Normally acceptable noise levels for Industrial land uses range from 60 to 65 dBA CNEL. Marginally acceptable noise levels at Industrial land uses range from 65 to 70 dBA CNEL. For marginally acceptable noise levels, the indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.

Table 4.7-1
Riverside County Airport Land Use Compatibility Criteria: Noise

Land Use Category	CNEL (dB) 50–55	55–60	60–65	65–70	70–75
Residential *					
single-family, nursing homes, mobile homes	++	o	–	– –	– –
multi-family, apartments, condominiums	++	+	o	– –	– –
Public					
schools, libraries, hospitals	+	o	–	– –	– –
churches, auditoriums, concert halls	+	o	o	–	– –
transportation, parking, cemeteries	++	++	++	+	o
Commercial and Industrial					
offices, retail trade	++	+	o	o	–
service commercial, wholesale trade, warehousing, light industrial	++	++	+	o	o
general manufacturing, utilities, extractive industry	++	++	++	+	+
Agricultural and Recreational					
cropland	++	++	++	++	+
livestock breeding	++	+	o	o	–
parks, playgrounds, zoos	++	+	+	o	–
golf courses, riding stables, water recreation	++	++	+	o	o
outdoor spectator sports	++	+	+	o	–
amphitheaters	+	o	–	– –	– –

Land Use Acceptability		Interpretation/Comments
++	*Clearly Acceptable*	The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.
+	*Normally Acceptable*	Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.
o	*Marginally Acceptable*	The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.
–	*Normally Unacceptable*	Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.
– –	*Clearly Unacceptable*	Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.

* Subtract 5 dB for low-activity outlying airports (Chiriaco Summit and Desert Center)

Source: County of Riverside 2015.

March JPA General Plan

The Land Use Element and Safety/Risk Management Element of the March JPA General Plan (March JPA 1999) include policies related to safety risks for people residing or working in the Project area that will be applied to the Project. The following policies from the March JPA General Plan apply to the Project. Consistency with these policies is discussed in Section 4.9, Land Use and Planning.

Land Use Element

Policy 1.9: Plan for compatible land uses within the aircraft noise impact contours depicted in the Air Installation AICUZ Report for the airfield use.

Policy 6.2: Plan for compatible land uses within the Clear one, Accident Potential Zones I and II, as depicted in the AICUZ Report for the airfield use.

Policy 6.4: Ensure that plans and development do no conflict with the long term needs of the Air Force Reserve in terms of encroachment, noise, accident zone, constraints, etc.

Policy 7.2: Ensure development and use of property within the vicinity of the airfield complies with appropriate building standards and codes, including height restrictions, restrictions on use, setbacks, population densities, insulation and materials, as contained within an approved Comprehensive Land Use Plan and appropriate AICUZ.

Safety and Risk Management Element

Goal 5: Reduce the potential for hazardous material exposure or contamination in the Planning Area

Policy 5.1: Comply with the enforcement of disclosure laws that require all users, producers, and transporters of hazardous materials and wastes to clearly identify such materials at the site, and to notify the appropriate County, State and/or Federal agencies in the event of a violation.

Policy 5.3: Ensure the storage, use and transportation of any hazardous material complies with the standards set forth within the errata sheets published for each substance.

4.7.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the Initial Study prepared for the Project (Appendix A) and the newly adopted California Environmental Quality Act Guidelines

Appendix G (December 2018), the Project could have a significant impact on hazards and hazardous materials if:

- **HAZ-1**: Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- **HAZ-2**: Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- **HAZ-3**: Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.
- **HAZ-4**: Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as result, would it create a significant hazard to the public or the environment.
- **HAZ-5**: For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area.

The Initial Study prepared for the proposed Project determined that impacts related to vicinity to a private air strip, interference with an adopted emergency response and/or evacuation plan, and risk from wildland fires would either result in no impacts or less than significant impacts. For further details, please see the Initial Study included Appendix A. As such, these thresholds are not included in the following impact analysis.

4.7.4 Impacts Analysis

Threshold HAZ-1. Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Construction

The proposed Project would include construction of a 718,000-square-foot building on an approximately 35.4-acre site (K4 Parcel). Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Channel drainage ditch that runs along the Cactus Channel Improvement Site. A variety of hazardous materials would be transported to, stored, and used during construction activities. These would include fuels for equipment and vehicles, new and used motor oils, cleaning solvents, paints, and storage containers and applicators containing such materials. If not transported, used, or disposed of in a safe manner, hazardous materials used during construction could represent a potential threat to the public and the

environment. However, these materials would be transported, used, and disposed of in accordance with all federal, state, and local laws regulating the management and use of hazardous materials. For example, hazardous materials would not be disposed of or released onto the ground or into the underlying groundwater or any surface water during construction of the proposed Project, and completely enclosed containment would be provided for all refuse generated in the planning area. Additionally, all construction waste, including trash, litter, garbage, solid waste, petroleum products, and any other potentially hazardous materials, would be removed and transported to a permitted waste facility for treatment, storage, or disposal. Use of these materials during construction for their intended purpose would not pose a significant risk to the public or the environment. Consistent with federal, state, and local requirements, transport, removal, and disposal of hazardous materials would be conducted by a permitted and licensed service provider. Any handling, transport, use, or disposal would comply with all applicable federal, state, and local agencies and regulations, including the EPA, the California DTSC, the California Occupational Safety and Health Administration, California Department of Transportation, the RCRA, and the Department of Environmental Health (the Certified Unified Program Agency (CUPA) for Riverside County). Further, during construction, if aggregate aboveground oil/fuel storage capacity is greater than 1,320 gallons (or completely buried 42,000 gallons) and there is a reasonable expectation of an oil discharge into or upon navigable waters of the United States or adjoining shorelines a Spill Prevention, Control and Countermeasure (SPCC) plan would be required (or, for smaller quantities, a spill prevention and response plan).

Given the former uses within the Project vicinity, site conditions observed, and the findings reported in the Phase I ESA, there is a possibility that soil on the K4 Parcel could be potentially impacted by hazardous materials. Other subsurface areas of the site may be impacted by hazardous materials and/or wastes (such as asbestos-containing pipe), buried trash and debris, UXO, and utilities (including high pressure gas lines). As such, construction activities have the potential to result in significant impacts through the transport, use, or disposal of hazardous materials, and mitigation measures are required.

In order to reduce potentially significant impacts associated with accidental release of chemicals from the Project site during construction, **MM-HAZ-1,** which requires the development of a SPCC plan, shall be implemented. Additionally, as required by **MM-HAZ-2**, implementation of a Hazardous Materials Contingency Plan during construction shall be required to address any unexpected hazardous materials encountered throughout Project construction. While it is unlikely that UXOs are present on the K4 Parcel, in an abundance of caution, a UXO survey shall be performed prior to construction activities, as detailed in **MM-HAZ-3**. With implementation of mitigation measures **MM-HAZ-1** through **MM-HAZ-3**, potentially significant hazards and hazardous materials impacts associated with Project construction would be reduced to **less than significant** levels.

Operation

The proposed Project would include a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use on the K4 Parcel and improvements to the existing Cactus Channel. Depending on the activities involved with the proposed warehouse and industrial uses, hazardous materials could be used. The March ARB/IP Land Use Compatibility Plan (Mead & Hunt 2014) imposes restrictions and limitations on the types and quantities of uses and hazardous materials that can be stored on Project sites.

Within the C1 zone, the following restrictions apply:

- A maximum of three dwelling units per acre are permitted.
- An average of 100 people per acre and 250 people in the most concentrated acre can occupy the Project site.
- Prohibited uses include children's school, day care centers, libraries, hospitals, congregate care facilities, and places of assembly.
- In Zones B2 and C1, aboveground storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged.
- Noise sensitive outdoor nonresidential uses are prohibited, examples of which include major spectator-oriented sports stadiums, amphitheaters, concert halls and drive-in theaters. Caution should be exercised with respect to uses such as poultry farms and nature preserves.
- Hazards to flight, which include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations, land use development that may cause the attraction of birds are prohibited. Man-made features must be designed to avoid heightened attraction of birds. In Zones A, B1, and B2, flood control facilities should be designed to hold water for no more than 48 hours following a storm and be completely dry between storms (see FAA AC 150/5200-33B). Additionally, certain farm crops and farming practices that tend to attract birds are strongly discouraged. These include: certain crops (e.g., rice, barley, oats, wheat – particularly durum – corn, sunflower, clover, berries, cherries, grapes, and apples); farming activities (e.g., tilling and harvesting); confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg-laying operations); and various farming practices (e.g., livestock feed, water, and manure). Fish production (i.e., catfish, trout) conducted outside of fully enclosed buildings may require mitigation measures (e.g., netting of outdoor ponds, providing covered structures) to prevent bird attraction.

Despite restrictions put in place on the Project site due to proximity to the March ARB/IP, Project operations do have the potential to result in significant hazards and hazardous materials impacts

through the routine transport, use, or disposal of hazardous materials. However, with implementation of mitigation, and specifically, **MM-HAZ-1**, which requires preparation of a SPCC plan or spill prevention and response plan, and **MM-HAZ-4** which requires preparation and submittal of a Hazardous Materials Business Plan within 30 days of K4 Parcel operations, potentially significant impacts can be reduced to **less than significant** levels.

Threshold HAZ-2. Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Construction

The proposed Project would include construction of a 718,000-square-foot building on an approximately 35.4-acre K4 Parcel and improvements to the existing Cactus Channel. As discussed in the Phase I ESA prepared for the proposed Project, no recognized environmental conditions (RECs), controlled RECs or historical RECs were identified for the collective proposed Project site. Additionally, no off-site RECs, controlled RECs or historical RECs were identified that would negatively impact the Project site. However, given the proximity to the March ARB and based on the past use of the K4 Parcel as part of a military base for over 50 years, future development of the K4 Parcel, including grading activities have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, UXO, and contaminated media, including soil, soil vapor/gas, and/or groundwater. As such, further observation may be necessary to identify possible contamination such as, but not limited to, the presence of underground facilities, buried debris, waste drums, and tanks, stained soil or odorous soils. With implementation of a Hazardous Materials Contingency Plan during construction, as required by mitigation measure **MM-HAZ-2**, and development and implementation of a plan to manage UXO as required by mitigation measure **MM-HAZ-3**, potentially significant hazards impacts during construction could be mitigated to **less than significant** levels.

Operation

Operation of the K4 Parcel would include industrial uses, specifically an e-commerce/fulfillment center. Depending on the activities involved with the proposed warehouse and industrial uses, hazardous materials could be used. Within the C1 zone (imposed by the March ARB/IP Land Use Compatibility Plan), aboveground storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged. Additionally, Senate Bill 483 amended the California Health and Safety Code to require businesses that use 55 gallons (liquid) or 500 pounds (solid) of hazardous materials to submit a Hazardous Materials Business Plan within 30 days of beginning operations. Any handling, transport, use, or disposal would comply with all applicable federal, state, and local agencies and regulations, including the EPA, the California DTSC, the California

Occupational Safety and Health Administration, California Department of Transportation, the RCRA, and the Department of Environmental Health (the CUPA for Riverside County). If aggregate aboveground oil/fuel storage capacity is greater than 1,320 gallons (or completely buried 42,000 gallons) and there is a reasonable expectation of an oil discharge into or upon navigable waters of the United States or adjoining shorelines a SPCC plan would be required (or, for smaller quantities, a spill prevention and response plan). Also, if necessary, the K4 Parcel may need to register with the State of California as a hazardous waste generator and implement requirements for management of hazardous wastes pursuant to Title 22 CCR Section 66260. In order to further reduce potentially significant impacts associated with accidental release of chemicals from the K4 Parcel during operation, **MM-HAZ-1,** which requires the development of a SPCC plan, shall be implemented. The SPCC plan (or spill prevention and response plan) shall identify best management practices (BMPs) for spill and release prevention and provide procedures for cleaning up and disposing of any spills or releases. Additionally, if operations of the K4 Parcel use 55 gallons (liquid) or 500 pounds (solid) of hazardous materials **MM-HAZ-4** would be implemented; requiring the preparation and submittal of a Hazardous Materials Business Plan within 30 days of Project operations. Operation or the Cactus Channel would not result in a potential foreseeable upset and accident release of hazardous materials. Therefore, with compliance with local, state, and federal regulations, along with implementation of **MM-HAZ-1** and **MM-HAZ-4** operations of the proposed Project would not create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials. With implementation of mitigation measures, impacts would be **less than significant**.

Threshold HAZ-3. Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Construction

The proposed Project include the construction of a 718,000-square-foot building on an approximately 35.4-acre site known as the K4 Parcel, located south of Cactus Avenue, east and north of portions of the March ARB, and west of vacant land formerly part of the March ARB. Additionally, the Project involves improvements within the existing Cactus Channel. There is the potential for proposed Project construction activities, to handle hazardous materials within one-quarter mile of one elementary school, Harvest Time Christian School, located approximately 0.2 mile northwest of the proposed Project site.

According to research conducted for the Phase I ESA, historic US Army Corps of Engineers maps from 1943 and 1944 indicate that a levee was located along the northern portion of March AFB, suggesting the presence of a storm drain channel along the present day Cactus Channel.

The Cactus Channel, which appeared as an earthen storm drain channel, was first evident in historical aerial photographs from the late 1940s and is similar to conditions in the present day. Per the Phase I ESA, a few empty one-quart motor oil containers were observed along the north side of the Cactus Channel and south side of Cactus Avenue, with no other containers of hazardous materials or wastes observed.

As discussed in Section 4.7.2, Relevant Plan, Policies, and Ordinances, regulations such as the Federal Toxic Substances Control Act of 1976 (15 USC 2601 et seq.) and the RCRA, Hazardous Material Transportation Act, and the March JPA General Plan are in place regarding the handling of hazardous materials. These regulations would require the use of certain techniques for the disposal and transport of hazardous wastes. Adherence to the construction specifications included in these federal and local regulations regarding hazardous materials and hazardous waste, including disposal, would reduce hazards to the public or the environment. However, to further minimize potential significant impacts resulting from hazardous emissions or handling of hazardous materials from Project construction, **MM-HAZ-1** through **MM-HAZ-3** would be implemented. Therefore, with implementation of mitigation measures, Project construction would result in a **less than significant impact** relative to hazardous emissions or hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Operation

Operation of the Cactus Channel would not include the use, transport, or disposal of hazardous or acutely hazardous materials, substances, or waste because the Cactus Channel would operate as an underground box culvert that transports stormwater runoff to the Heacock Channel as part of the Riverside County Flood Control and Water Conservation District's services. Surface flows drain to the northeast into an existing stormwater collection basin that connects to an existing storm drain pipe. Conflicts with water quality standards are addressed in Section 4.8, Hydrology and Water Quality. Therefore the Cactus Channel improvements would not result in a significant impact related to hazardous materials within a quarter mile of an existing or proposed school. As previously discussed, upon completion of construction the proposed Project would involve operation of the proposed an e-commerce/fulfillment center on the K4 Parcel. Operation of the K4 Parcel will comply with the enforcement of disclosure laws that require all users, producers, and transporters of hazardous materials and wastes to clearly identify such materials at the site, and to notify the appropriate county, state and/or federal agencies in the event of a violation. As such, any handling, transport, use, or disposal of hazardous materials, which would be limited given the C1 zone, would comply with all applicable federal, state, and local agencies and regulations, including the EPA, the California DTSC, the California Occupational Safety and Health Administration, California Department of Transportation, the RCRA, and the Department of Environmental Health (the CUPA for Riverside County). **MM-HAZ-4** would require the preparation and submittal of a Hazardous Materials Business Plan within 30 days of Project

operations. Therefore, with compliance with local, state, and federal regulations, along with implementation of **MM-HAZ-4** operations of the proposed Project would result in a **less than significant impact** related to hazardous emissions or hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Threshold HAZ-4. Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as result, would it create a significant hazard to the public or the environment?

California Government Code Section 65962.5 combines several regulatory lists of sites that have the potential to pose a hazard related to known hazardous materials or substances. The DTSC's EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. As discussed in Section 4.7.1, Existing Conditions, a search of selected government databases was conducted by Leighton using the EDR Radius Report environmental database report system (Appendix K). According to the EDR radius map report, March ARB was reported on various hazard-identifying databases. The former March AFB was originally used to train pilots during World War I, and by 1938, it became the central location for west-coast bombing and gunnery training. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. By November 1989, March AFB was added to the NPL due to the contamination of the groundwater. According to the EDR radius map report, the March ARB facilities status is "currently on the Final NPL."

Based on the past use of the K4 Parcel as part of a military base for over 50 years, the subsurface soils on site may contain hazardous materials and/or wastes, buried trash and debris, UXO, and contaminated medial, including soil, soil vapor/gas, and or groundwater. Operations of the K4 Parcel and the Cactus Channel improvements would not include activities such as trenching or grading that would potentially encounter any potential subsurface hazardous materials. Construction activities such as grading and trenching associated with the K4 Parcel and Cactus Channel improvements would have the potential to encounter hazardous materials and thus create a hazard to the environment. However, according to the Phase I ESA, there were no RECs, controlled RECs or historical RECs identified for the Project site. Additionally, no off-site RECs, controlled RECs or historical RECs were identified in the Project vicinity that would negatively impact the Project site. OCPs and arsenic were not detected in the undocumented soil at concentrations exceeding the EPA residential Regional Screening Level or the DTSC Human Health Risk Assessment Note 3 screening levels for OCPs, or the DTSC recognized Southern California background arsenic concentration of 12 mg/kg (Appendix K). Because no RECs, controlled RECs, or historical RECs were identified on or near the Project site, the potential for

impacts associated with past use of the K4 Parcel is unlikely. With implementation of a Hazardous Materials Contingency Plan during construction, as required by mitigation measure **MM-HAZ-2**, and development and implementation of a plan to manage UXO as required by mitigation measure **MM-HAZ-3**, potentially significant hazards impacts during construction could be mitigated to **less than significant** levels.

Threshold HAZ-5. ***For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?***

The Project site is located approximately 4,500 feet from the March ARB/IP Airport and is included as part of the March ARB/IP Airport ALUCP and the 2018 March ARB AICUZ Study area. As depicted in the March ARB/Inland Port Airport JLUS and March ARB/Inland Port Airport ALUCP, the Project site is located within the C1 compatibility zone (Mead & Hunt 2014). Land use restrictions within the C1 zone are described above under the analysis within Threshold HAZ-1. In order to further minimize safety hazards for people residing or working in the Project area, in addition to the above restrictions in place for the portions of the Project site within zone C1, the following additional conditions would apply. Per the Riverside County Airport Land Use Plan (Mead & Hunt 2014), conditions imposed within the C1 zone include:

- Critical community infrastructure facilities are discouraged, including power plants, electrical substations, and public communications facilities. These uses would generally not be permitted unless no other feasible alternatives are available.
- Aboveground bulk storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged and would generally not be permitted unless no feasible alternatives are available.
- Sound attenuation shall be incorporated, as necessary, to meet interior noise level criteria. All new residences, schools, libraries, museums, hotels and motels, hospitals and nursing homes, places of worship, and other noise-sensitive uses must have sound attenuation features incorporated into the structures sufficient to reduce interior noise levels from exterior aviation-related sources to no more than CNEL 40 dB. This requirement is intended to reduce the disruptiveness of loud individual aircraft noise events upon uses in this zone and represents a higher standard than the CNEL 45 dB standard set by state and local regulations and countywide ALUC policy. Office space must have sound attenuation features sufficient to reduce the exterior aviation-related noise level to no more than CNEL 45 dB. To ensure compliance with these criteria, an acoustical study shall be required to be completed for any development proposed to be situated where the aviation-related noise exposure is more than 20 dB above the interior standard (e.g., within the CNEL 60 dB contour where the interior

standard is CNEL 40 dB). Standard building construction is presumed to provide adequate sound attenuation where the difference between the exterior noise exposure and the interior standard is 20 dB or less. See Section 4.10, Noise, for additional discussion and evaluation regarding the potential noise impacts associated with the Project.

- Generally, an airspace review required for objects greater than 70 feet in height. Airspace review requirements are determined on a site-specific basis in accordance with Part 77 of the Federal Aviation Regulations. Shorter objects normally will not be airspace obstructions unless situated at a ground elevation well above that of the airport. Taller objects may be acceptable if determined not to be obstructions. The FAA or California Department of Transportation Division of Aeronautics may require marking and/or lighting of certain objects.
- March ARB must be notified of any land use having an electromagnetic radiation component to assess whether a potential conflict with Air Base radio communications could result. Sources of electromagnetic radiation include microwave transmission in conjunction with a cellular tower, radio wave transmission in conjunction with remote equipment inclusive of irrigation controllers and other similar EMR emissions.

The proposed Project also may include a solar photovoltaic (PV) system on the building rooftop. Solar, or PV panels are known to create glare and potentially hazardous reflections into pilots' eyes, and within immediate proximity of an airport and within the flight path of air traffic, this glare could result in potentially significant safety impacts. Minimization of glare from PV systems can be obtained through the use of non-reflective components on PV system panels. Emerging technologies shall be used, such as diffusion coatings and nanotechnological innovations to effectively reduce the refractive index of solar cells and protective glass. These technological advances are intended to make the solar panels more efficient with respect to converting incident sunlight into electrical power, but have the tertiary effect of reducing the amount of light that escapes into the atmosphere in the form of reflected light, a potential source of glare and spectral highlighting. As such, with implementation of **MM-HAZ-5**, requiring the use of non-reflective materials on all PV panels at the Project site, impacts associated with glare from solar panels could be reduced to less than significant.

Similar to potential sight obstructions to pilots caused by PV panels, smoke and steam emitted into the atmosphere from buildings and taller stacks can also obstruct line of sight for pilots. In the event that end user proposes to construct stacks and/or a building that would emit smoke or steam, there would be the potential for significant safety impacts. With implementation of **MM-HAZ-6**, requiring written approval from March ARB and March Inland Port Airport officials, impacts associated with visual obstruction from smoke and/or steam could be reduced to less than significant.

Given the Project site's proximity to an active runway, there is the potential that standing water, including detention basins, could be an attractant to animals, and in particular birds, which could pose a safety risk to aircraft in flight. If standing water associated with the Project were to attract birds, this would result in a potentially significant safety impact. However, with the placement of Cactus Channel, which is currently open and earthen, within a box culvert, this would reduce the potential for standing water within the Channel. Nonetheless, for any planned detention basins associated with the Project, these would be located underground so as to minimize the attraction of water fowl. As such, with implementation of **MM-HAZ-7**, which requires compliance with FAA AC 150/5200-33B and that all standing water, including within detention basins, shall drain within 48 hours following a storm event, this potentially significant impact could be reduced to a less than significant level.

In addition to the potential for ponding water to attract birds, tall trees with masts and trees that are used for roosting also pose as potential safety hazards to the adjacent airport. As such, in order to minimize the potential to attract birds to the Project site, mitigation measure **MM-HAZ-8** restricting the planting of tree species that have masts and/or provide for roosting shall be implemented.

As discussed in Section 4.7.2, Policy 4.1.5 of the Riverside County ALUCP requires that land uses, such as the industrial land use of the proposed Project, demonstrate compatibility with the acceptable noise levels shown in Table 4.7-1. The Project site is partially located within the 60 to 65 dBA CNEL noise level contour boundaries of March ARB/IPA. Based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. Therefore, construction and operational noise impacts associated with exposing people residing or working within the vicinity of a public airport would be considered less than significant.

With the aforementioned development restrictions in place, and with implementation of the required mitigation measures and conditions as outlined above, all of which are intended to avoid safety hazards for people residing or working in the vicinity of an active airport, Project implementation would not result in significant safety hazards, excessive noise, or impacts for people residing or working in the Project area. Impacts would be **less than significant** with implementation of mitigation.

4.7.5 Mitigation Measures

California Environmental Quality Act Guidelines Section 15126.4 requires EIRs to describe feasible measures that can minimize significant adverse impacts. The following mitigation measures have been evaluated for feasibility and are incorporated in order to reduce potentially significant impacts related to hazards and hazardous materials for people working at the Project site.

MM-HAZ-1 **Hazardous Materials Transport.** Aboveground bulk storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged in Zone C1, and would generally not be permitted unless no feasible alternatives are available. Any aggregate aboveground oil/fuel storage containers in Zone C1 greater than 1,320 gallons (or completely buried 42,000 gallons) shall include preparation and implementation of a Spill Prevention, Control and Containment (SPCC) plan pursuant to 40 C.F.R. 112 (or, for small quantities, a spill prevention and response plan) during construction, and if applicable, during site operations. The SPCC plan (or spill prevention and response plan) shall identify best management practices for spill and release prevention and provide procedures for cleaning up and disposing of any spills or releases.

MM-HAZ-2 **Hazardous Materials Contingency Plan.** A Hazardous Materials Contingency Plan shall be prepared by a qualified environmental consultant and implemented during demolition, excavation, and construction activities for the Project. The Hazardous Materials Contingency Plan shall include, at a minimum, the following:

- Identification of known areas with hazardous waste and hazardous materials of concern
- Procedures for temporary cessation of construction activity and evaluation of the level of environmental concern
- Procedures for limiting access for properly trained personnel to the contaminated area
- Procedures for notification and reporting, including internal management and local agencies (e.g., local fire department, county Certified Unified Program Agency (CUPA)), as needed
- Health and safety measures for removal and excavation of contaminated soil
- Procedures for characterizing and managing excavated soils
- Procedures for certification of completion of remediation

The Hazardous Materials Contingency Plan shall be submitted to March JPA for approval no less than 30 days prior to the initiation of construction activities at the site.

MM-HAZ-3 **UXO Identification, Training, and Reporting Plan.** Prior to commencement of construction activities, a UXO Identification, Training, and Reporting Plan to properly train all site workers in the recognition, avoidance, and reporting of

military waste debris and ordnance shall be prepared by a qualified environmental consultant. The plan shall contain, at a minimum, the following:

- A description of the training program outline and materials, and the qualifications of the trainers;
- Identification of available trained experts that will respond to notification of discovery of any suspected ordnance (unexploded or not);
- Procedures to stop work immediately in the vicinity of suspected UXO and to notify the Riverside County Sherriff's Department, Certified Unified Program Agency (CUPA) and the U.S. Army Corps of Engineers;
- A work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near-surface or buried ordnance in all proposed land disturbance areas;
- Documentation of all surveys and investigations performed to evaluate and remove discovered ordnance.

The UXO Identification, Training, and Reporting Plan shall be submitted to March JPA for approval no less than 30 days prior to the initiation of construction activities at the site. The results of geophysical surveys shall be submitted to March JPA within 30 days of completion of the surveys.

MM-HAZ-4 **Hazardous Materials Business Plan.** Businesses that use 55 gallons (liquid) or 500 pounds (solid) of hazardous materials are required to submit a Hazardous Materials Business Plan (pursuant to California Health and Safety Code Section 25500) within 30 days of beginning operations. The Hazardous Materials Business Plan shall contain information on hazardous materials inventory, inspections, training, record keeping, and reporting. The Hazardous Materials Business Plan shall be submitted online through the California Environmental Reporting System website. Further information can be found on the County of Riverside Department of Environmental Health website (http://www.rivcoeh.org/HazMat/hmbp).

MM-HAZ-5 **Solar Voltaic System Approval.** In the event the Project Applicant chooses to include solar photovoltaic system(s) as part of the Project, the system shall be reviewed and approved by the Air Force prior to the issuance of building permits. The Project Applicant shall demonstrate that the solar panels and hardware are designed to minimize glare and spectral highlighting. Emerging technologies shall

be used, such as diffusion coatings and nanotechnological innovations to effectively reduce the refractive index of the solar cells and protective glass.

MM-HAZ-6 **Emittance of Steam/Smoke.** In the event the Project Applicant decides to include system(s) that would result in the emittance of steam and/or smoke as part of the Project, written approval shall be granted by March Air Reserve Base and March Inland Port airport officials prior to the issuance of building permits.

MM-HAZ-7 **Compliance with FAA Advisory Circular 150/5200-33B.** In order to ensure proper functioning of the Project drain system to avoid potential hazards to March Air Reserve Base flights, an additional best management practice (BMP) shall be added to the Project Water Quality Management Plan, which shall require that the applicant enter into a covenant and agreement with the March Joint Powers Authority (JPA) similar to the Water Quality Management Plan and Urban Runoff Best Management Practice Transfer, Access and Maintenance Agreement between March JPA and Sun Life Assurance Company of Canada (Document No. 2014-0030862), which shall be recorded prior to issuance of a certificate of occupancy. A copy of the recorded agreement and BMP shall be provided to the Riverside County Airport Land Use Commission. The BMP shall include the following:

a. The property owner or its designated representative shall monitor the conditions of the detention basins and promptly inspect such basins following completion of each "significant" rain event and the 48-hour period thereafter.

b. The Project includes an underground stormwater detention design so as to minimize the attraction of birds. However, if any standing water remains in a basin that is not beneath a rock, gravel, or other layer following the completion of the "significant" rain event and the 48-hour period thereafter, the property owner or its designated representative shall arrange to have such standing water either removed or covered within the next 2 business days following the conclusion of the 48-hour period.

c. In the event that the standing water situation recurs on a regular basis following the 48-hour detention period, the detention basin may no longer be draining as originally designed to prevent standing water from rising above a rock, gravel, or other layer (for example, due to a rise in groundwater levels or other circumstance beyond the property owner's ability to control). In that situation, the property owner or its designated representative shall promptly engage a licensed civil engineer to prepare a design plan to ensure that such condition does not persist for more than 48 hours following the conclusion of a "significant" rain event. The required engineering design solution shall be implemented promptly, but no later

than 180 days following its approval by all applicable authorities, providing that, until such time as the engineered design solution is implemented, the property owner or its designated representative will maintain the detention basins such that after 48 hours following a significant rain event, the water levels are below a rock, gravel, or other layer.

MM-HAZ-8 **Tree Planting Restrictions.** Trees species with masts and tree species that are suitable for roosting shall not be planted on the Project site. Prior to issuance of a grading permit, the plant palette for the proposed Project shall be reviewed and approved by the March Joint Powers Authority.

4.7.6 Level of Significance After Mitigation

Impacts related to hazards and hazardous materials can be mitigated to less-than-significant levels through the incorporation of mitigation measures **MM-HAZ-1** through **MM-HAZ-8**, as described in Section 4.7.5, Mitigation Measures, into the Project. Therefore, no significant adverse impacts would remain after implementation of mitigation.

4.7.7 References

FAA (Federal Aviation Administration). 2007. "AC 150/5200-33B - Hazardous Wildlife Attractants On or Near Airports." Accessed April 4, 2019. https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5200-33.

FAA. 2014. "Notice Criteria Tool – Obstruction Evaluation/Airport Airspace Evaluation." Accessed April 4, 2019. https://oeaaa.faa.gov/oeaaa/external/gisTools/gisAction.jsp.

March JPA (Joint Powers Authority). 1999. *General Plan of the March Joint Powers Authority*. Accessed April 2019. http://www.marchjpa.com/docs_forms/planning_generalplan.pdf. March JPA. 1999.

Mead & Hunt. 2014. *March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan.* Adopted November 13, 2014. Accessed December 18, 2018. http://www.rcaluc.org/filemanager/plan/new//17%20%20Vol.%201%20 March %20Air%20Reserve%20 Base%20Final.pdf.

4.8 HYDROLOGY AND WATER QUALITY

This section describes the existing hydrology and water quality of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. The Initial Study concluded that potential impacts related to placing housing or structures within a 100-year flood hazard area; exposing people or structures to a significant risk of loss, injury, or death involving flooding; and inundation by seiche, tsunami, or mudflow would either have no impact or less-than-significant impact and are therefore not discussed further in this Environmental Impact Report (EIR) (Appendix A, Initial Study and Notice of Preparation). The information in this section is based on the following reports:

- *K4 Warehouse and Cactus Channel Improvements Project Jurisdictional Delineation Report* (Appendix F)
- *Geotechnical Exploration Proposed Industrial Warehouse Site K4 Cactus Avenue* (Appendix I1)
- *Geotechnical Addendum Report K4 Moreno Valley Storm Drain Cactus Avenue* (Appendix I2)
- *Hydrology Study for Cactus Avenue K-4 Parcel Industrial* (Appendix M)
- *Hydrology Study for Cactus Avenue Channel* (Appendix N)
- *Project Specific Water Quality Management Plan* (Appendix O)
- *Water Supply Assessment K4 Industrial Project* (Appendix P)

As mentioned in Chapter 2, Project Description, of this EIR, the proposed Project involves the development of the K4 Parcel with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use, and improvements to the Cactus Avenue Drainage Channel (Cactus Channel) between Elsworth Street on the west and Heacock Street on the east. The Project includes the following components for Project approval:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.

- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into one 35.4-acre parcel.

4.8.1 Existing Conditions

Hydrology

The proposed Project site, collectively consisting of the K4 Parcel and the Cactus Channel, is generally located within the March JPA Planning Area within an unincorporated area of the County of Riverside. The Project site is within the San Jacinto Hydrologic Unit Code (HUC) 8(18070202), the Lower San Jacinto River HUC 10(1807020203), and the Perris Reservoir HUC 12(180702020305), as shown on Figure 4.8-1, Watershed Map. The proposed Project site is primarily flat with a west-east trending channel that runs parallel to Cactus Avenue (Cactus Channel). The Project site is underlain by dense older alluvium with surficial and local younger/recent sediments, with low expansion potential (Appendix I2). The Cactus Channel collects flows discharging from the storm drains along Elsworth Street, Frederick Street, and Graham Street. Cactus Channel also receives relatively small runoff from Cactus Avenue via public catch basins that discharge at various locations downstream along the channel. Known hydrologic sources for the Cactus Channel include several culverted storm drain outlets (which collect and convey runoff from the commercial area north of the channel) sheet flows from the adjacent March Air Reserve Base, and direct precipitation. The Cactus Channel flows east until the intersection of Cactus Avenue and Heacock Street where flows are diverted south into a drainage ditch along Heacock Street which drains into the Perris Valley storm drain system. Flows continue into the San Jacinto River and ultimately Lake Elsinore. On-site delineations prepared by Rocks Biological Consulting identified that sections of the Cactus Channel meet the parameters for jurisdictional wetland hydrology (Appendix F). As shown on Figure 4.8-2, FEMA Flood Map, the proposed Project site is located in Zone D, which indicates that flood hazards are undetermined, but possible.

The K4 Parcel contains approximately 35.4 acres of natural open brush. Generally, surface flows on the K4 Parcel drain in a southeast direction, onto the March Air Reserve Base, eventually entering the Heacock Channel, located approximately 1.5 miles to the southeast (Appendix M). Table 4.8-1, Existing Average and Annual Precipitation describes the estimated monthly total and average precipitation for the Project area between 2007 and 2018.

Table 4.8-1
Existing Average and Annual Precipitation

Monthly Total Precipitation (inches) for March AFB, CA (NOAA)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2007	M	M	M	M	M	M	M	M	M	M	M	M	M
2008	M	M	M	M	M	M	M	M	M	M	M	M	M
2009	M	M	M	M	M	M	M	T	0.42	T	0.07	1.43	M
2010	5.78	1.95	0.16	0.39	0.02	0	T	T	0.06	0.61	0.53	7.7	17.2
2011	0.33	2.6	1.51	0.37	0.26	0	0.19	0.01	0.03	0.15	1.29	0.34	7.08
2012	0.31	0.46	0.95	0.79	0.01	0	0.07	2.32	0.1	0.03	0.26	1.99	7.29
2013	0.57	0.78	0.72	T	0.28	0	0.02	0.4	T	0.43	0.46	0.36	4.02
2014	T	1.19	0.68	0.49	0	0	T	0.57	0.05	T	0.18	2.91	6.07
2015	0.6	0.33	0.13	0.14	0.61	T	1.39	T	0.45	0.31	0.05	0.3	4.31
2016	2.24	0.12	0.56	0.96	0.28	T	T	0	0.06	0.32	0.7	3.11	8.35
2017	3.78	1.91	0.01	T	0.02	T	0.01	0.59	T	T	T	T	6.32
2018	1.44	0.23	M	T	0.08	0	T	M	M	M	M	M	M
Mean	1.67	1.06	0.59	0.35	0.17	T	0.19	0.43	0.13	0.21	0.39	2.02	7.58

Note: trace precipitation/snowfall/snow depth amounts are treated as zero in sums, means, and frequency counts. Annual average temperatures are the average of the twelve-monthly values. Values of 'M' indicate missing data and 'T' indicates a trace."
Source: Appendix F.

Groundwater

As shown in Figure 4.8-3, Regional Geology Map, the site is underlain by Quaternary Older Alluvial deposits consisting primarily of medium dense to very dense silty to clayey sand. Neither surface water nor groundwater were observed on site during field exploration conducted by DRC Engineering (Appendix O). However, geotechnical exploration identified groundwater at a depth of approximately 19 feet below ground surface (bgs) and 23 feet bgs. Historic groundwater data, as reported by Department of Water Resource data for Well 338995N1171958W001 located approximately 5 miles east of the Project site, reflect a groundwater elevation of 1,470 feet (about 82 feet bgs) in April 2017 (Appendix O). Leighton Consulting conducted a geotechnical investigation for the Project site in 2018; groundwater was encountered at approximately 19 to 23 bgs (Appendix K, Phase I and Limited Phase II Environmental Site Assessment, Proposed Industrial Warehouse Site K4). Due to the soil type and density within the Project site, infiltration is relatively impermeable due to the geologic formation within the depth explored (Appendix O).

Water Quality

Water quality is affected by sedimentation caused by erosion, runoff carrying contaminants, and direct discharge of pollutants (point-source pollution). As land is developed, the new impervious surfaces can send an increased volume of runoff containing oils, heavy metals, pesticides, fertilizers, and other contaminants (non-point-source pollution) into adjacent watersheds.

Stormwater that accumulates on impervious surfaces, such as parking lots, rooftops, and streets drains directly and indirectly to waters of the United States. As identified in the Preliminary Water Quality Management Plan (WQMP) (Appendix O), the Project's primary pollutants of concern include metals, nutrients, trash and debris, and oil and grease. Construction-related pollutants typically include sediments, concrete, paints and solvents, and hazardous materials associated with operation and maintenance of heavy equipment such as fuels and oils.

Surface water quality on the Project site is regulated by the Santa Ana Regional Water Quality Control Board (RWQCB) (Region 8). The Santa Ana RWQCB Basin Plan establishes water quality standards for all the groundwater and surface water in the region. The Santa Ana Region includes the upper and lower Santa Ana River watersheds, the San Jacinto watershed, and several other small drainage areas.

Under Section 303(d) and 305(b) of the Clean Water Act (CWA), the State Water Resources Control Board (SWRCB) is required to develop a list of water quality limited segments for jurisdictional waters of the United States and prepare an integrated report on the current statewide status of water quality every two years. The waters on the list do not meet water quality standards, and therefore, the RWQCB was required to establish priority rankings and develop action plans, called Total Maximum Daily Loads, to improve water quality. The U.S. Environmental Protection Agency (EPA) approved the Santa Ana RWQCB's 303(d)/305(b) integrated report on water quality in July 2015 (SWRCB 2016). The list includes pollutants causing impairment to receiving waters or, in some cases, the condition leading to impairment. As previously stated, surface flows from the Project site are discharged through the municipal stormwater drainage system to the San Jacinto River. The terminal reservoirs for the San Jacinto River (i.e., Lake Elsinore) have CWA Section 303(d) impairment listings for nutrients and pathogens (SWRCB 2016).

4.8.2 Relevant Plans, Policies, and Ordinances

Federal

Clean Water Act

The CWA (33 USC 1251 et seq.), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and

maintain the chemical, physical, and biological integrity of the Nation's waters." Key sections of the act are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines. Under Section 303(d) of the CWA, the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives and establish TMDLs for each pollutant/stressor. The water quality impairments relevant to the Project are discussed above in the Setting.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity which may result in a discharge to waters of the United States, to obtain certification from the state that the discharge will comply with other provisions of the act. The Project area supports jurisdictional wetlands and non-wetland waters of the United States/State and will require a Section 401 water quality certification. Effects of the Project on jurisdictional waters are addressed in Section 4.3, Biological Resources.
- Section 402 establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and the nine RWQCBs, who have several programs that implement individual and general permits related to construction activities, stormwater runoff quality, and various kinds of non-stormwater discharges. The Project will be in compliance with CWA Section 402, as discussed in the impact analysis below.
- Section 404 establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the U.S. Army Corps of Engineers and the EPA. Effects of the Project on jurisdictional waters are addressed in Section 4.3.

Numerous agencies have responsibilities for administration and enforcement of the CWA. At the federal level this includes the EPA and the U.S. Army Corps of Engineers. At the state level, with the exception of tribal lands, the California EPA and its sub-agencies, including the SWRCB, have been delegated primary responsibility for administering and enforcing the CWA in California.

State

Porter–Cologne Water Quality Control Act

The Porter–Cologne Act (codified in the California Water Code, Section 13000 et seq.) is the primary water quality control law for California. Whereas the CWA applies to all waters of the United States,

the Porter–Cologne Act applies to waters of the state,[1] which includes isolated wetlands and groundwater in addition to federal waters. It is implemented by the SWRCB and the nine RWQCBs. In addition to other regulatory responsibilities, the RWQCBs have the authority to conduct, order, and oversee investigation and cleanup where discharges or threatened discharges of waste to waters of the state could cause pollution or nuisance, including impacts to public health and the environment.

The act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. California Water Code Section 13260 subdivision (a) requires that any person discharging waste or proposing to discharge waste, other than to a community sewer system, that could affect the quality of the waters of the state, to file a Report of Waste Discharge with the applicable RWQCB. For discharges directly to surface water (waters of the United States), an NPDES permit is required, which is issued under both state and federal law; for other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (such as groundwater and isolated wetlands), Waste Discharge Requirements (WDRs) are required and are issued exclusively under state law. WDRs typically require many of the same best management practices (BMPs) and pollution control technologies as required by NPDES-derived permits.

Basin Planning

The nine RWQCBs throughout California adopt and implement Basin Plans that recognize the unique characteristics of each region with regard to natural water quality, actual and potential beneficial uses, and water quality problems. The Santa Ana RWQCB is responsible for the protection of the beneficial uses of waters within the watershed of the Santa Ana River, including the Project area.

The *Water Quality Control Plan for the Santa Ana River Basin* designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan (California Water Code Sections 13240–13247) (Santa Ana RWQCB 2016). The Santa Ana RWQCB basin plan must conform to the policies set forth in the Porter-Cologne Act as established by the SWRCB in its state water policy. The Porter-Cologne Act also provides the RWQCBs with authority to include within their basin plan water discharge prohibitions applicable to particular conditions, areas, or types of waste. The Water Quality Control Plan for the Santa Ana River Basin is continually being updated to include amendments related to implementation of TMDLs, revisions of programs and policies within the Santa Ana RWQCB region, and changes to beneficial use designations and associate water quality objectives.

[1] "Waters of the state" are defined in the Porter–Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050(e)).

NPDES and WDR Permits

The NPDES and WDR programs regulate construction, municipal, and industrial stormwater and non-stormwater discharges under the requirements of the CWA and the Porter–Cologne Water Quality Control Act. The industrial and construction stormwater programs are administered by the SWRCB, while the municipal stormwater program and other WDRs are administered by the Santa Ana RWQCB. Relevant permits are discussed below.

Construction General Permit (SWRCB Order 2012-0006-DWQ, as amended)

For stormwater discharges associated with construction activity in the State of California, the SWRCB has adopted the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit) to avoid and minimize water quality impacts attributable to such activities (SWRCB 2012). The Construction General Permit applies to all projects in which construction activity disturbs 1 acre or more of soil. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling and excavation. The Construction General Permit requires the development and implementation of a stormwater pollution prevention plan (SWPPP), which would include and specify water quality BMPs designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving off site into receiving waters. Routine inspection of all BMPs is required under the provisions of the Construction General Permit, and the SWPPP must be prepared and implemented by qualified individuals as defined by the SWRCB.

Industrial General Permit (SWRCB Order No. 2014-0057-DWQ, as Amended)

Depending on the type of facility constructed on the site, compliance with the *NPDES General Permit for Stormwater Discharges Associated with Industrial Activities* (i.e., the Industrial General Permit, or IGP) could be required. Warehouse distribution facilities are not a type of facility currently required to obtain coverage under the IGP, however, the end user has not yet been identified. Ultimately, it is possible that another facility consistent with the zoning designation of Industrial and subject to the IGP (e.g., warehouse with fuel dispensing facilities or vehicle maintenance facilities, food processing use or manufacturing use) could be constructed. Should the Project include a facility covered under the IGP, the Project Applicant would be required to implement management measures that would achieve the performance standard of best available technology economically achievable and best conventional pollutant control technology.

The IGP requires stormwater dischargers to eliminate unauthorized non-stormwater discharges; develop and implement an industrial SWPPP; implement feasible and effective BMPs; conduct monitoring; compare monitoring results to numeric action levels; perform appropriate exceedance response actions when numeric action levels are exceeded; and certify and submit all permit registration documents electronically via the SWRCB's Storm Water Multiple Application and Report Tracking System.

General Waste Discharge Requirements for Recycled Water Use (SWRCB Order No. 2014-0090-DWQ)

The SWRCB adopted general WDRs for non-potable uses of recycled water. The general WDRs are intended to conserve availability of local potable water supplies by streamlining permitting for recycled water use that typically presents a relatively low threat to water quality. It relieves new recycled water end users from the requirements to apply for individual WDRs, and provides coverage for recycled water uses not otherwise covered by general orders or existing permits. Uses that may be covered under this general permit include irrigation, impoundments, cooling/industrial uses, and construction uses such as dust control and soil hydration. Recycled water purveyors must submit a water recycling program for review and approval by the RWQCB, a Title 22 engineering report to Division of Drinking Water, and other submittals as specified in the order to have coverage under this permit. The water purveyor for the proposed Project is Western Municipal Water District (WMWD), which has recycled water available and is authorized by the SWRCB to provide recycled water for non-potable uses to its customers.

Local

NPDES – New Development & Redevelopment Guidelines for Projects Under the March JPA

The NPDES – New Development & Redevelopment Guidelines for Projects Under the March JPA (March JPA 2008) is a document prepared to provide March JPA with guidance, procedures, and a format to implement the regional NPDES land development requirements (hereafter referred to as the March JPA NDPES Guidelines). Additionally, this document is intended to help March JPA establish consistency with other agencies (e.g., the U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, Santa Ana RWQCB, Riverside County) that all help protect natural resources. The March JPA is not a co-permittee of the Riverside County Municipal Separate Storm Sewer System (MS4) Permit but has the legal authority and responsibility to control the quality of stormwater system discharges under NPDES land development regulations. The March JPA has chosen to meet the intent of the Riverside County MS4 Permit concerning new development and redevelopment by establishing submittal requirements, including design guidelines for BMPs and WQMPs, for projects under its authority. Approval of a project-specific Preliminary WQMP requires that the WQMP include site design BMPs, applicable source control BMPs, and treatment control BMPs. It is required under the NPDES, that implementation of a new development project shall conform with all recommendations in the associated WQMP and WQMP Conditions of Approval.

The reduction of pollutants in urban stormwater discharge to the maximum extent practicable through the use of structural and nonstructural BMPs is one of the primary objectives of the water quality regulations for MS4s. BMPs typically used to manage runoff water quality include controlling roadway and parking lot contaminants by installing filters with oil and grease

absorbents at storm drain inlets, cleaning parking lots on a regular basis, incorporating peak-flow reduction and infiltration features (such as grass swales, infiltration trenches, and grass filter strips) into landscaping, and implementing educational programs.

The March JPA has the authority to ministerially withhold certificates or permits if BMPs or specifically designed features needed to properly manage potential pollutants are not implemented into a complete project. The March JPA uses the most recent guidance, handbooks and templates adopted by the Riverside County Flood Control and Water Conservation District (and other MS4 co-permittees) as the standard for adequacy when reviewing WQMPs for projects under its authority.

Landscape Ordinances

Jurisdictional authorities that have established landscape ordinances are the County of Riverside Water Efficient Landscape Requirements (Ordinance No. 859), and March JPA *Water Efficient Landscape Ordinance (Ordinance No. JPA 16-03).* The Project Applicant will be required to plan and install water-efficient devices and landscaping in accordance with applicable ordinances. The subject Project may be served by WMWD's existing recycled water distribution infrastructure. Accordingly, landscaped areas for the Project including all piping, controls, and related appurtenances must be designed and installed to accommodate potential recycled water use.

March JPA General Plan

The Safety and Risk Management Element of the March JPA General Plan includes goals and policies related to flood hazards and stormwater runoff that would be applied to the Project (March JPA 1999). The following policies from the March JPA General Plan apply to the Project. Consistency with these policies is discussed in Section 4.9, Land Use and Planning.

Goal 3: Minimize injury, loss of life, property damage, and economic and social disruption caused by flood hazards.

Policy 3.3: Ensure all development within identified flood hazard areas complies with Floodplain Management Regulations.

Policy 3.4: Ensure that development does not divert storm water runoff onto adjacent properties, or cause alterations of natural drainage courses that cannot be adequately handled by existing drainage facilities or the flood control improvements proposed with the development.

Policy 3.5: Require the installation and maintenance of storm drains by property owners.

Policy 3.6: Assess potential environmental drainage impacts of new construction, including the necessity and impact of District drains and privately-owned and operated storm drains adjacent to slopes and stream-bed areas.

Policy 3.7: Utilize and support storm drain maintenance efforts to prevent localized flooding and mud and debris flows from overtaxed storm drains during strong storms.

4.8.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the Initial Study prepared for the Project (Appendix A) and the newly adopted California Environmental Quality Act Guidelines Appendix G (December 2018), the Project could have a significant impact on hydrology and water quality if the Project would:

- **HYD-1**: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- **HYD-2**: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
- **HYD-3**: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    - result in substantial erosion or siltation on or off site;
    - substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;
    - create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or
    - impede or redirect flood flows.

4.8.4 Impacts Analysis

Threshold HYD-1. Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Construction

The proposed Project would collectively include construction of a 718,000-square-foot building on the approximately 35.4-acre K4 Parcel and the conversion of the existing drainage ditch into a box culvert within the Cactus Channel. In addition to the proposed building, a total of 598 automobile parking stalls, 242 truck trailer parking stalls, and 105 loading dock positions would be provided on the K4 Parcel. Vehicles would access the site via new driveways aligned with the termination of Veterans Way on the west end of the K4 Parcel and the terminus of Frederick Street towards the eastern end of the Project site. An additional designated truck route would provide truck access to the K4 Parcel. The Project would also include improvements to the Cactus Channel drainage that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. A box culvert would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box.

During construction of the Project, grading would occur, bare soils would be exposed, and soil and material stockpiles would be established. Fuels, lubricants, and solid and liquid wastes would be stored within active construction areas. If the construction areas are not properly managed to contain loose soils and liquid and solid contaminants, short-term water quality impacts could occur due to sediment and contaminant runoff from the construction zone. Potential impacts to water quality could also result from the improper handling and disposal of construction waste materials and oil and grease leakage from vehicles and equipment.

Because the Project is greater than one acre in size, the Project Applicant and/or its qualified contractor would be required to submit a Notice of Intent to the SWRCB in order to obtain approval to carry out construction activities under the NPDES Construction General Permit. This permit would include a number of design, management, and monitoring requirements for the protection of water quality and the reduction of construction phase impacts related to stormwater (and some non-stormwater) discharges. Compliance with the Construction General Permit requires a SWPPP be developed and implemented by qualified individuals with appropriate credentials and training (i.e., qualified SWPPP developer/qualified SWPPP practitioner), as defined by the SWRCB. The SWPPP includes BMPs for preventing water quality degradation, identification of stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project site. The BMPs ensure that water quality standards are met

and that stormwater runoff from the construction work areas does not cause degradation of water quality in receiving water bodies.

The exact type and location of construction site BMPs in the SWPPP would be based on site-specific conditions and receiving water risk. However, minimum BMPs include erosion controls (e.g., mulches, soil binders, erosion control blankets/mats, outlet projection/energy dissipation devices), sediment controls (e.g., silt fences, fiber rolls, gravel bags), tracking controls (e.g., stabilized construction entrance/exit, entrance/outlet tire wash), wind erosion controls, non-stormwater management, and materials and water management (cleanup and containment of trash and debris, stockpile management, spill prevention and control, hazardous waste management). Other examples of BMPs that could be used during Project construction include, but are not limited to, sandbag barriers, geotextiles, storm drain inlet protection, sediment traps, riprap, and soil stabilizers/hydro seeding. Implementation of these BMPs included in the SWPPP would minimize effects on water quality from construction-induced erosion and sedimentation on the Project site. The SWPPP would also include hazardous materials BMPs necessary to prevent or contain spills or leaks associated with construction equipment and materials.

Although construction activities have the potential to adversely affect water quality, required coverage under the Statewide General Construction Permit would be adequate to ensure potential construction-related impacts on water quality are avoided or substantially minimized, and do not violate any SWRCB/RWQCB water quality standards or WDRs. For these reasons, the Project's construction-phase would not violate water quality standards or WDRs and would result in a **less than significant** impact.

Operations

The proposed Project would result in the development and operations of a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The proposed Project would also include paved parking areas, drive aisles, storm drains, utilities, and associated landscaping areas. The Project site would drain to three separate underground detention systems. The Project would also include improvements to the Cactus Channel drainage which would install an undergrounded box culvert that would run approximately 7,900 linear feet parallel to Cactus Avenue. An increase in pollutant levels in the runoff conveyed to the storm drain system, if uncontrolled, could violate water quality standards. The Project's primary pollutants of concern include metals, nutrients, trash and debris, and oil and grease (Appendix O). These pollutants may be sourced from fertilizers used on landscaped areas; vehicular fluids, including antifreeze, motor oil, brake fluid, gasoline, and transmission fluid emanating from paved areas and parking areas on the site. An increase in pollutant levels in the runoff conveyed to the storm drain system, if uncontrolled, could violate water quality standards and the WDR of the CWA or the Porter-Cologne Water Quality Control Act. As previously discussed, the Preliminary Project Specific WQMP (Appendix O) describes and illustrates, in broad outline, how the drainage for the entire Project will comply with the WQMP requirements. Source control BMPs would be incorporated into the Project design. These BMPs may include structural

features such as roofs over and berms around trash and recycling areas, and operational features such as regular sweeping of the site by the site's occupant or user (Appendix O). Compliance with the March JPA NPDES Guidelines requires that pollutants of concern be treated by a California Stormwater Quality Association-approved treatment BMP with medium to high removal rates. In order to minimize pollutant levels in the runoff conveyed to the storm drain system, several permanent water quality BMPs have been proposed in the WQMP to address the proposed access roadways for each parcel. Operational source control BMPs may include but are not limited to the following:

- Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
- Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.
- Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.
- Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.
- Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris.
- Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Based on geotechnical testing and soil reports, the proposed Project site has poor percolation test results (less than 0.01 inches per hour) and therefore is not suitable for on-site infiltration (Appendix I2). In addition, there are not enough adjacent pervious areas to disperse runoff from rest of the proposed development area. Therefore, all stormwater will be treated by two proposed Modular Wetland Biofiltration Systems (MWSs) prior to leaving the K4 Parcel. MWSs are stormwater systems that utilize horizontal biofiltration, replicating the natural processes to remove pollutants from stormwater runoff. Pervious surface area is proposed to the maximum extent practicable while still allowing for other impervious site design requirements (i.e., amount of parking stalls) (Appendix O).

As stated in Section 4.8.2, Relevant Plans, Policies, and Ordinances, the March JPA has chosen to meet the intent of the Riverside County MS4 Permit concerning new development and redevelopment by establishing submittal requirements, including design guidelines for BMPs and WQMPs, for projects under its authority. The NPDES – New Development & Redevelopment Guidelines for Projects Under the March JPA (NPDES) is a document prepared to provide March JPA with guidance, procedures, and a format to implement the regional NPDES land development requirements. As such, the March JPA requires the approval of the WQMP (Appendix O) by the March JPA Engineer.

As stated earlier in this section, approval of a project-specific Preliminary WQMP requires that the WQMP include site design BMPs, applicable source control BMPs, and treatment control BMPs. It is required under the NPDES, that implementation of a new development project shall conform with all recommendations in the associated WQMP and WQMP Conditions of Approval. The WQMP shall meet the March JPA minimum standards in order to be approved by the March JPA. Once the Final WQMP is approved, the Project is required to implement all BMPs and conditions of approval identified in the WQMP. The implementation of current BMP requirements would result in an improvement to water quality on and off site compared to existing conditions because of the more stringent requirements for development in place today. Considering the Project site is underlain with dense older alluvium soils that have slow infiltration rates, the existing site conditions have poor percolation and is not suitable for on-site infiltration. In addition the proposed Project would implement BMP requirements that result in water quality improvements, thus Project-related water quality impacts would be **less than significant**.

Threshold HYD-2. Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

As stated in Section 4.8.1, Existing Conditions, neither surface water nor groundwater were observed on site; however, geotechnical exploration identified groundwater at a depth of approximately 19 to 23 feet bgs. On the K4 Parcel, construction activities would include rough grading, utility relocation/installation, and building construction. Rough grading and utility installation would last approximately 25 days, and building construction, including pad/site-specific grading activities, would occur over approximately 11 months. Construction activities on the K4 Parcel are not anticipated to require dewatering of groundwater due to the depth of the groundwater, and any dust control actions would utilize water imported via water trucks. Construction activities for the Cactus Channel improvements component of the proposed Project are also not anticipated to include dewatering of groundwater, as the depth of the groundwater exceeds any proposed excavations, and any dust control actions would utilize water imported via water trucks. As identified in Appendix O, under proposed Project conditions, the total proposed impervious footprint would be 1,389,000 square feet. The proposed Project design maximizes pervious areas to the maximum extent practicable while still allowing for other impervious site design requirements (i.e., amount of parking stalls). The increase in impervious area contributes to larger quantities of runoff. However, the proposed Project is required by the Riverside Santa Ana Region Municipal MS4 Permit to include low impact development and infiltration BMPs, such as stormwater design features and biotreatment (Appendix O). The proposed Project also includes pervious areas in the southeastern and northwestern corners of the site which would encourage on-site infiltration of stormwater runoff which would provide groundwater recharge. However, because there are not enough adjacent pervious areas to disperse runoff from rest of the proposed development area, stormwater would eventually be treated by two proposed MWSs to prior leaving the Project site.

Under proposed Project conditions, the drainage pattern for the both the K4 Parcel and the Cactus Channel would be consistent with the existing drainage pattern. The existing K4 Parcel is approximately 35.4 acres of mass graded land with surface flows draining in the northeast direction into an existing stormwater collection basin that connect to an existing storm drain pipe (Appendix O). The proposed Project would include the operations of a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. The proposed Project would also include paved parking areas, drive aisles, storm drains, utilities, and associated landscaping areas. No wells or direct connections to the underlying aquifers are proposed under Project conditions. Potable water would be supplied by WMWD. WMWD relies on three existing water sources: groundwater, imported water, and recycled water to meet its wholesale and retail demands, with imported water sources being the primary water source. WMWD purchases both Colorado River and the State Water Project, but also receives recycled water and supplemental water obtained from the cities of Corona and Riverside and other local projects (Appendix P). WMWD is able to convey groundwater obtained from Elsinore Valley Municipal Water District's groundwater rights which is delivered via Riverside Public Utilities via the existing Mockingbird Canyon Pump Station and Whitegates Reservoir. WMWD instead utilizes up to 4,208 acre-feet per year of Elsinore Valley Municipal Water District's groundwater rights produced from the Bunker Hill Basin and the Colton and Riverside Basins (WMWD 2016). Total groundwater storage capacity for the Bunker Hill Basin is approximately 5,976,000 acre-feet. Because those water supplies will be from adjudicated and highly managed groundwater basins, the amounts are categorized as reliable sources in normal, single-dry year, and multiple-dry year conditions (Appendix P).

Considering construction and operation of the proposed Project would not directly draw groundwater from the underlying aquifer, and that WMWD receives approximately 9% of their water supply from groundwater, the proposed Project would not substantially effect water demand from WMWD that appreciably deplete their overall groundwater supplies (WMWD 2016). Additionally, the proposed Project would use recycled water for non-potable uses (Appendix O). For these reasons, the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. As such, impacts to groundwater and groundwater recharge would be **less than significant**.

Threshold HYD-3. Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

(i) result in substantial erosion or siltation on or off site;

(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;

(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

(iv) impede or redirect flood flows.

As discussed in Section 4.8.1, the proposed K4 Parcel is primarily flat with Cactus Channel located north of the site and running west to east, parallel to and south of Cactus Avenue. Surface flows on the K4 Parcel drain in a southeast direction, onto the March Air Reserve Base, eventually entering the Heacock Channel, located approximately 1.5 miles to the southeast. The existing K4 Parcel is approximately 35.4 acres of mass graded land with surface flows draining in the northeast direction into an existing storm water collection basin that connect to an existing storm drain pipe (Appendix O). The site is underlain by Quaternary Older Alluvial deposits consisting primarily of medium dense to very dense silty to clayey sand, which causes site infiltration to be relatively impermeable (Appendix O).

Construction

Construction of the proposed Project would include the development of a 718,000-square-foot building, paved parking areas, drive aisles, storm drains, utilities, and associated landscaping areas on the approximately 35.4-acre K4 Parcel. Construction activities on the K4 Parcel would include rough grading, utility relocation/installation, and building construction. These activities would have the potential to generate water-borne pollutants such as silt, debris, chemicals, paints, and other solvents with the potential to affect water quality. In the absence of protective and avoidance measures construction of the Project has the potential to result in short-term impacts to water quality. The Cactus Channel improvements include the installation of a box culvert which would require trenching through the existing swale, relocation of some utilities, and removal of some existing roadway culverts and extending storm drain connections to the earth swale. Similarly, these construction activities would have the potential to generate water-borne pollutants with the potential to affect water quality.

Pursuant to the requirements of the Santa Ana RWQCB, prior to commencement of construction activities, the proposed Project (collectively, the K4 Warehouse and Cactus Channel improvements) would be required to obtain coverage under the State of California NPDES General Construction Permit. The NPDES permit is required for all projects that include construction activities, such as clearing, soil stockpiling, grading, and/or excavation that disturb at least 1 acre of total land area. Compliance with the NPDES permit involves the preparation and implementation of a SWPPP for construction related activities. The SWPPP will specify the BMPs that the Project would be required to implement during construction activities to ensure that all potential pollutants of concern, including sediment, are prevented, minimized, and/or otherwise appropriately treated prior to being discharged from the property. Examples of BMPs that could be used during Project construction include, but are not limited to, sandbag barriers, geotextiles, storm drain inlet protection, sediment traps, riprap, and soil stabilizers/hydro seeding. Mandatory compliance with the SWPPP would ensure that the Project does not result in substantial erosion or siltation on site or off site during short-term construction activities. Thus, water quality impacts associated with short-term construction activities would be **less than significant** and no mitigation would be required. Mandatory compliance with the SWPPP would ensure that the Project does not result in substantial erosion or flooding on site or off site during short-term construction activities.

Operations

To meet the requirements of the County's NPDES permit and in accordance with the Riverside County Ordinance No. 754, the Project is required to prepare and implement a WQMP. The WQMP is a site specific, post-construction water quality management program designed to minimize the release of potential waterborne pollutants, including pollutants of concern for downstream receiving waters, under long-term conditions with BMPs. Implementation of the WQMP ensures on-going, long-term protection of the watershed basin. Compliance with the WQMP would be required as a condition of approval for the Project including long-term maintenance of on-site water quality features to ensure their long-term effectiveness. A Preliminary Project Specific WQMP has been prepared for the Project (Appendix O). The Preliminary Project Specific WQMP describes and illustrates how the drainage for the entire Project would comply with the WQMP requirements. As stated earlier in this section, approval of a project-specific Preliminary WQMP requires that the WQMP include site design BMPs, applicable source control BMPs, and treatment control BMPs. It is required under the NPDES, that implementation of a new development project shall conform with all recommendations in the associated WQMP and WQMP Conditions of Approval. The WQMP shall meet the March JPA minimum standards in order to be approved by the March JPA. Once the Final WQMP is approved, the Project is required to implement all BMPs and conditions of approval identified in the WQMP.

Under proposed Project conditions, the drainage pattern for the K4 Parcel would be consistent with the existing drainage pattern. As previously discussed, the proposed Project site has poor percolation test results (less than 0.01 inches per hour) and therefore is not suitable for on-site infiltration. Therefore,

BMPs such as biotreatment were selected as the most appropriate treatment BMPs. The site would drain to three separate underground detention systems. The westerly 14.8 acres of the K4 Parcel would drain to underground detention system 'A'. The central 15.37 acres of the K4 Parcel would drain to underground detention system 'B'. The easterly 2.47 acres of the K4 Parcel would drain to underground detention system 'C'. The proposed improvements to the Cactus Channel would maintain flows in their current west-east orientation. The existing hydrology of the Cactus Channel is considered the same as the future condition for Cactus Channel, based on the fact that the watershed is almost fully developed and most flood control facilities upstream and downstream of Cactus Avenue have been developed (Appendix N). Since few areas are still in the process of being developed, all assumptions in the development of the hydrologic model assumed full development. The proposed design for Cactus Channel features underground reinforced concrete boxes that would carry flow to Heacock Channel at a slope of 0.18%. The proposed Cactus Channel improvements were designed to take the place of the existing earthen Cactus Channel and carry the cumulative maximum flow relative to the junctions upstream. The design also includes a proposed 30-foot easement for Riverside County Flood Control District. Cactus Channel Improvement Plans are included in Appendix N.

Under proposed Project conditions, the drainage pattern for the Project site (collectively the K4 Parcel and Cactus Channel) would be consistent with the existing drainage pattern. The southeasterly off-site flows would be intercepted and conveyed through three separate underground detention systems. The two-year storm flow rates were calculated, as shown in Appendix M, using the Riverside County unit hydrograph dividing the K4 Parcel roughly into three portions. For the two-year storm event, the flow rate increases in the proposed conditions from 0.76 cfs to 6.23 cfs. Under the proposed Project, three underground detention systems consisting of a series of parallel 42-inch storm drain pipes would be constructed that would reduce the peak discharge rate under this storm event. The 100-year storm flow rates increase from 14.85 cfs to 16.37 cfs. The three underground detention systems, consisting of a series of parallel 42-inch storm drain pipes, would reduce the peak discharge rate under the 100-year storm event. The Cactus Channel improvements would include installation of a box culvert, in replacement of the existing earthen channel. Additionally, the Project would contain low impact development and preventative measures (i.e., overflow containment structures and dead-end sumps) to control the peak flows to ensure there would be no adverse effect on downstream facilities (Appendix O). Therefore, the existing hydrology of the Cactus Channel is considered the same as future conditions, however, designed to carry the cumulative maximum flow relative to the junctions upstream.

As discussed under above, the proposed design for Cactus Channel would include an underground reinforced concrete box carrying flows to Heacock Channel at a slope of 0.18%. The proposed Cactus Channel improvements would take the place of the existing earthen channel and carry the cumulative maximum flow relative to the junctions upstream. The three underground detention systems would reduce the peak discharge rate under the 100-year storm event. The Project would contain low impact development and preventative measures to control the peak flows to ensure

there would be no adverse effect on downstream facilities (Appendix M). Because there are not enough adjacent pervious areas to disperse runoff from rest of the proposed development area, stormwater would eventually be treated by two proposed MWSs to prior leaving the Project site.

Mandatory compliance with the Preliminary Site Specific WQMP and the Final Site Specific WQMP[2] would ensure that the Project does not result in additional sources of polluted runoff, substantial erosion, or siltation on site or off site during long-term operations. Thus, impacts associated with stormwater drainage capacity, and erosion and siltation on site or off site would be **less than significant**, and no mitigation would be required. In addition, considering the proposed Project would not substantially alter the existing drainage pattern of the K4 Parcel, that the installed box culvert within the existing Cactus Channel would continue to convey the same flows, and compliance with the SWPPP would ensure that the Project does not result in substantial erosion or flooding on site, construction and operations impacts associated with flooding on or off site would be **less than significant**.

4.8.5 Mitigation Measures

The proposed Project would result in less than significant impacts to drainage, hydrology, and water quality with implementation of required SWPPP and WQMPs. As a result, no mitigation measures are required.

4.8.6 Level of Significance After Mitigation

The proposed Project would have less than significant impacts related to drainage, hydrology, and water quality with compliance with existing regulations and mitigation measures are not required.

4.8.7 References

March JPA (Joint Powers Authority). 1999. *General Plan of the March Joint Powers Authority*. Accessed March 20, 2015. http://www.marchjpa.com/docs_forms/planning_generalplan.pdf. March JPA. 1999.

March JPA. 2008. *National Pollutant Discharge Elimination System – New Development & Redevelopment Guidelines for Projects Under the March Joint Powers Authorit*y. January 9, 2008.

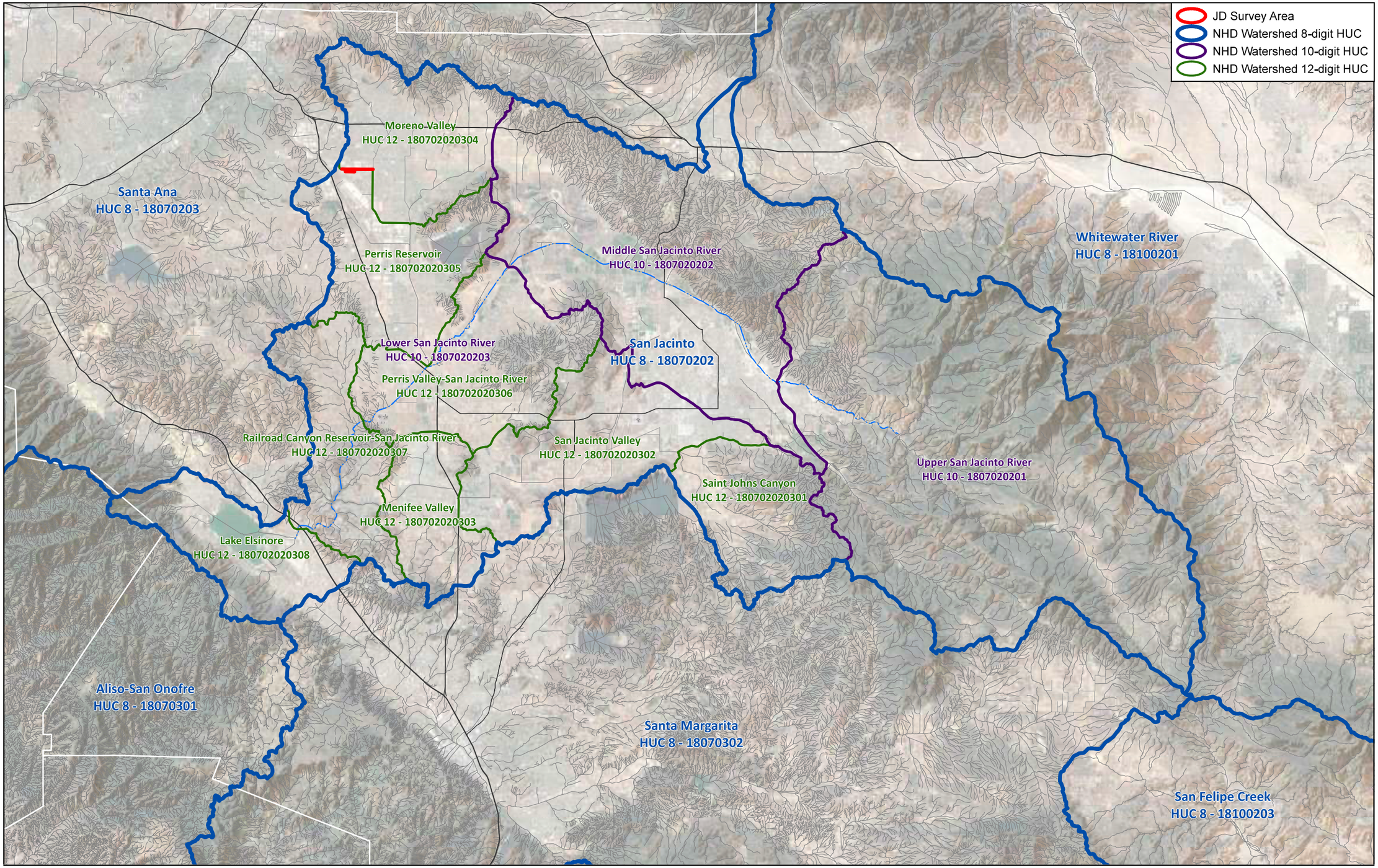
Santa Ana RWQCB (Regional Water Quality Control Board). 2016. *1995 Water Quality Control Plan for the Santa Ana River Basin (Region 8).* As amended through February 2016.

[2] The Final Site Specific WQMP would incorporate recommendations from the Preliminary Site Specific WQMP and would be reviewed by a qualified March JPA Engineer.

SWRCB (State Water Resources Control Board). 2012. Order Nos. 2009-0009-DWQ, 2010-00140DWQ, 2012-0006-DWQ. National Pollutant Discharge Elimination System General Permit No. CAS000002, Waste Discharge Requirements for Discharge of Storm Water Runoff Associations with Construction and Land Disturbance Activities. Adopted September 2, 2009. Accessed December 19, 2018. http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo2009_0009_dwq.pdf.

SWRCB. 2016. "2012 Integrated Report on Water Quality with Web-Based Interactive Map." Accessed July 14, 2016. http://www.swrcb.ca.gov/water_issues/programs/tmdl/integrated2012.shtml.

WMWD (Western Municipal Water District). 2016. 2015 Urban Water Management Plan Update. Final Report. Prepared by RMC Water and Environment. June 2016.



SOURCE: Rocks Biological Consulting 2018

FIGURE 4.8-1

Watershed Map

K4 Warehouse and Cactus Channel Improvements Project EIR

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NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum was** NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

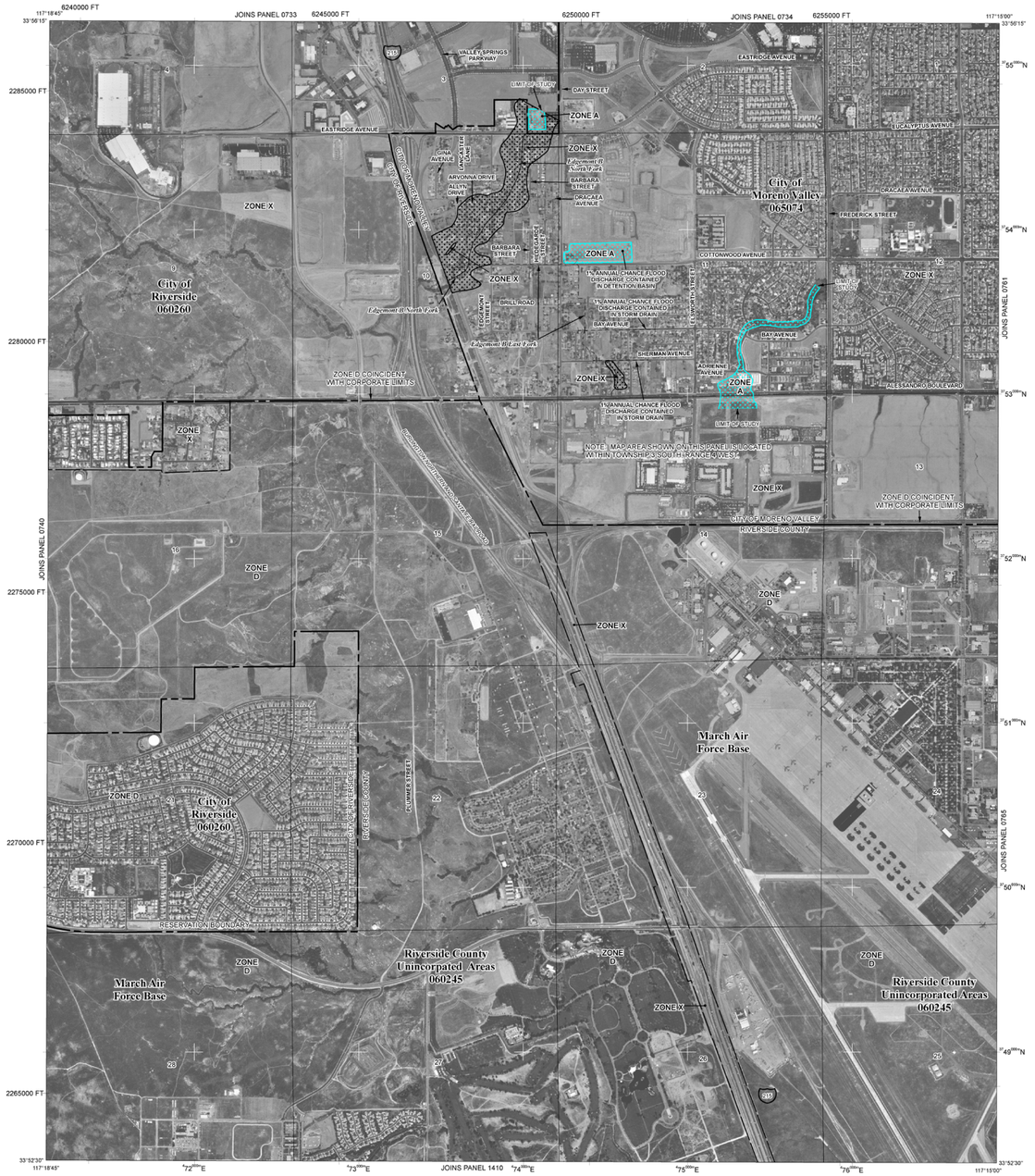
This map may reflect more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513 (EL 987)	Base Flood Elevation line and value; elevation in feet*
	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
B — B	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4376000mN	1000-meter Universal Transverse Mercator grid values, zone 11N
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
●M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
August 28, 2008

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0745G

FIRM
FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 745 OF 3805
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MORENO VALLEY, CITY OF	065074	0745	G
RIVERSIDE COUNTY	060245	0745	G
RIVERSIDE, CITY OF	060260	0745	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C0745G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

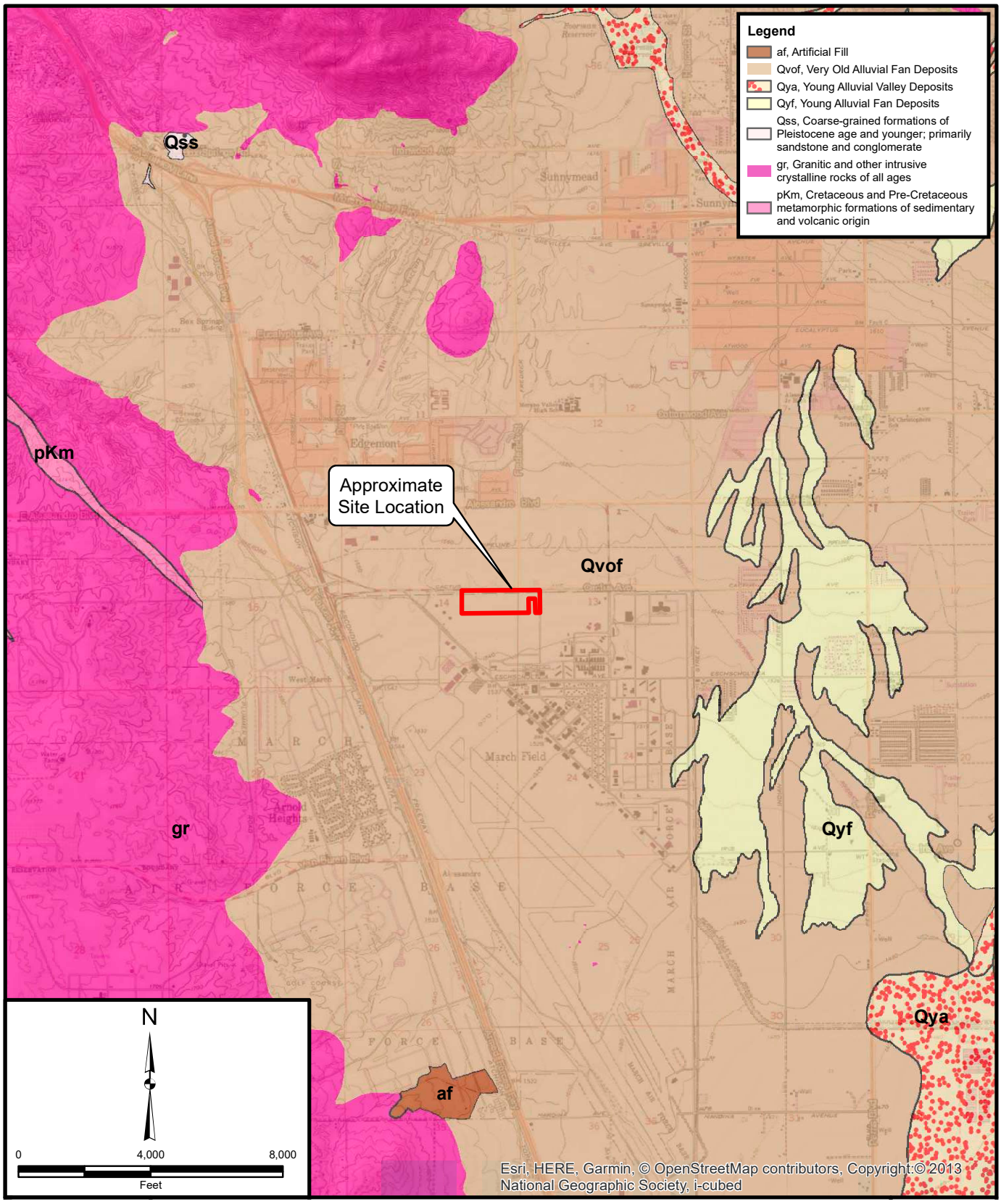
SOURCE: FEMA 2008

FIGURE 4.8-2
FEMA Flood Map
K4 Warehouse and Cactus Channel Improvements Project EIR

DUDEK

Path: Z:\Projects\110\4\MAP\DOCS\ER\Hydro

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SOURCE: Leighton 2018

FIGURE 4.8-3

Regional Geology Map

K4 Warehouse and Cactus Channel Improvements Project EIR

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4.9 LAND USE AND PLANNING

This section describes the existing land use and planning setting of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. This section analyzes the potential impacts of the proposed Project relative to potential conflicts with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the General Plan and/or Zoning Code) resulting from implementation of the proposed Project. In addition to other documents, the following references were used in the preparation of this section of the EIR:

- *General Plan of the March Joint Powers Authority* (JPA) (March JPA 1999a)
- *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA 1999b)

As mentioned in Chapter 2 of this EIR, the Project includes the development of the five parcels on approximately 35.4-acre site (K4 Parcel) with a 718,000-square-foot building conservatively assumed to be occupied by e-commerce/fulfillment center use. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Drainage Channel (Cactus Channel) that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel (Cactus Channel Improvement Site). The proposed Project includes the following components:

- **General Plan Amendment:** The K4 Parcel has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the K4 Parcel has not previously been given a zoning designation, the proposed Project is pursuing a zoning designation of Industrial for the 35.4-acre site in order to be consistent with the requested General Plan land use designation of Industrial.
- **Plot Plan:** A plot plan approval is required to construct the 718,000-square-foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Parcel Merger:** A parcel merger is required to merge the five separate parcels on the K4 Parcel into a 35.4-acre parcel.

4.9.1 Existing Conditions

The proposed K4 Warehouse component of the Project would be located on approximately 35.4-acres located on the south side of Cactus Avenue extending from where Veterans Way terminates at Cactus Avenue on the west to where Fredrick Street terminates at Cactus Avenue on the east. The proposed Cactus Channel improvements would be located within Cactus Channel extending from Elsworth Street on the west to Heacock Channel on the east. The Project site is located within the March JPA jurisdiction, which is within unincorporated Riverside County, California (Figure 2-1, Project Location).

General Plan and Zoning

According to the March JPA General Plan Land Use Plan, the K4 Parcel's land use designation is Business Park, as shown in Figure 2-2, March JPA General Plan Land Use Designations. The K4 Parcel has not previously been given a zoning designation per the official March JPA Zoning Map, as shown in Figure 2-3, March JPA Zoning Designations.

Previous On-Site Land Uses

According to the August 2018 Phase I and Limited Phase II Environmental Site Assessment (ESA) (Appendix K), prepared by Leighton Consulting Inc., the Project site where the warehouse is proposed was observed to be the northern portion of March Air Force Base (AFB) in 1949. In 1967, the site consisted of vacant land, cleared of the previously observed structures and vehicles. The northern adjacent property was observed to be vacant land. The western adjacent property was observed to contain three large aboveground storage tanks. In 1994, additional structures were observed within the southern adjacent property. After 1994, significant land use changes were not observed on the site, with the exception of a larger commercial building observed in the northern adjacent property. The Cactus Channel, located along the southern side of Cactus Avenue, has been utilized as a drainage channel since the late 1940s (Appendix L, Phase I Environmental Site Assessment Former March Air Force Base K4 Parcel and Cactus Channel).

Current On-Site Land Uses

The K4 Parcel, where the warehouse is proposed, is currently vacant with the exception of an area with soil piles on the eastern portion of the site. No buildings or structures are located on site; the southeastern perimeter of the subject site wraps around an electrical substation that is not included as part of the subject site. The substation has two paved entrances on the east that are accessible by Chanute Avenue, these entrances and Chanute Avenue are part of the subject site. The Cactus Channel is currently a depressed, natural earthen drainage channel running along the south side of Cactus Avenue from the southeast corner of the intersection of Cactus Avenue and the March Air

Reserve Base (ARB) driveway across from Elsworth Street, to the southwest corner of the Cactus Avenue and Heacock Street, where the drainage turns south along Heacock Street.

Surrounding Land Uses

Adjacent to the north of the proposed K4 Parcel warehouse site, across Cactus Avenue, is an industrial and commercial center. To the east, the proposed warehouse site is bounded by vacant land and an electrical substation. To the south, the proposed warehouse site is bordered by March ARB and to the west the proposed warehouse site is bordered by a vacant lot and March ARB.

At a regional level, the City of Moreno Valley is to the north and east of the proposed Project. To the south and west of the Project site is the March ARB, which previously the March AFB. The March AFB was realigned as the March ARB in 1993, along with the substantial reduction in its military use. The March ARB currently has a presence of reservists, guardsmen, and active duty from all branches of the military. The March ARB contains a runway, approximately 0.7 mile southwest of the Project site. The uses nearest to the Project site include warehousing, internal services, and housing. Interstate (I) 215 is approximately 0.7 miles west of the Project site, which intersects the March ARB. Further west is the City of Riverside, along with unincorporated areas of Riverside County.

4.9.2 Relevant Plans, Policies, and Ordinances

Federal

Federal Aviation Administration

The Federal Aviation Administration (FAA) requires that any structure that is located within proximity to an airport or other criteria per Code of Federal Regulations Title 14, Part 77.9, requires filing with the FAA. Because the Project is located within proximity to the March ARB, which may impact the assurance of navigation signal reception, the Project Applicant will file Form FAA 7460-1, Notice of Proposed Construction or Alteration, with the FAA.

FAA Advisory Circular 150/5200-33B

In 2007, FAA issued an Advisory Circular (AC) No. 150/5200-33B (FAA 2007) providing guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. The AC also discusses airport development projects, including airport construction, expansion and renovation, affecting aircraft movement near hazardous wildlife attractants. Hazardous wildlife is defined as any species of wildlife (birds, mammals, reptiles), including feral animals and domesticated animals not under control, that are associated with aircraft strike problems, are capable of causing structural damage to airport facilities, or act as attractants to other

wildlife that pose a strike hazard. Included within the AC are minimum separation criteria for land-use practices that attract hazardous wildlife to the vicinity of airports. Separation distances are based on flight patterns, altitude at which most strikes happen, and National Transportation Safety Board recommendations. Land use practices discussed within the AC associated with wildlife hazards directly applicable to the proposed Project include the placement and design of new stormwater management facilities, which must drain within 48 hours after a storm event.

Department of Defense

The Department of Defense has developed the Air Installation Compatible Use Zone (AICUZ) program to minimize development that is incompatible with aviation operations in areas on and adjacent to military airfields. The AICUZ land use recommendations are based on (1) land use compatibility with exposure to aircraft noise and (2) safety considerations. Recommended compatible land uses are derived from data on noise contours (noise zones) and safety zones (clear zones and accident potential zones). An AICUZ was prepared for March ARB (described below) that describes height limitations for airspace protection, accident potential zones, and noise.

State

There are no land use and planning state regulations applicable to the Project.

Local

March ARB AICUZ

The 2018 March ARB AICUZ Study is an update of the AICUZ study dated 2005. The update is a reevaluation of aircraft noise and accident potential related to Air Force flying operations and is designed to aid in the development of local planning mechanisms which will protect the public safety and health, as well as preserve the operational capabilities of March ARB. The update also provides noise contours based upon the Community Noise Equivalent Level metric and utilizes a planning noise contour. The Project site is not located within a Noise Contour Level, (Figure 4-2 of the March ARB 2018 AICUZ). The Project site is located within the Primary Approach/Departure Zone (Figure 6-2 of the March ARB 2018 AICUZ). Within this zone, the slope of the approach/departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation.

Riverside County Airport Land Use Commission

In accordance with provisions of the California State Aeronautics Act (Public Utilities Code Section 21670 et seq.), the Riverside County Airport Land Use Commission (ALUC) has been assigned the lead responsibility for airport land use compatibility planning around each of the public-use and military

airports in Riverside County. The Project site is located within the March ARB airport influence area in unincorporated Riverside County and therefore is subject to review and approval by the Riverside County ALUC. A Riverside County ALUC public hearing will be held for the Project. At the Riverside County ALUC public hearing, Project approval, subject to conditional consistency, will be considered.

March ARB/Inland Port Airport Land Use Compatibility Plan

The March ARB/Inland Port Airport Land Use Compatibility Plan (ALUCP) was prepared for and adopted by the Riverside County ALUC on November 13, 2014. The purpose of the March ARB/Inland Port ALUCP is to promote compatibility between March ARB/Inland Port and the land uses that surround the joint-use airport, to the extent such areas are not already devoted to incompatible uses. The March ARB/Inland Port ALUCP regulates future development of new residential dwellings, commercial structures, and other noise- or risk-sensitive uses within the Airport Influence Area based on factors enumerated in the ALUCP, including but not limited to noise, overflight, safety, and airspace protection. The Project site is located in Zone C1. Zone C1 represents the Primary Approach/Departure Zone. Zone C1 allows up to 100 people per acre, and does not allow places of assembly, noise-sensitive outdoor nonresidential uses, and hazards to flight. Within the C1 zone, the following restrictions apply (Riverside County ALUC 2014):

- A maximum of three dwelling units per acre are permitted.
- An average of 100 people per acre can occupy the Project site and the most concentrated acre may accommodate up to 250 individuals.
- Prohibited uses include children's school, day care centers, libraries, hospitals, congregate care facilities, and places of assembly.
- In Zones B2 and C1, aboveground storage of more than 6,000 gallons of hazardous or flammable materials per tank is discouraged.
- Noise sensitive outdoor nonresidential uses are prohibited, examples of which include major spectator-oriented sports stadiums, amphitheaters, concert halls and drive-in theaters. Caution should be exercised with respect to uses such as poultry farms and nature preserves.
- Hazards to flight, which include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations, land use development that may cause the attraction of birds are prohibited. Built features must be designed to avoid heightened attraction of birds.

March JPA General Plan

The March JPA General Plan is a long-range comprehensive plan designed to outline and delineate use and development of an area known formerly as March AFB, prior to the base realignment in April 1996

to the March ARB. The March AFB was first established as a military installation in 1918, and has operated almost continually since that time. In July 1993, March AFB was selected to be realigned, and subsequently converted from an active duty base to a Reserve Base, effective April 1, 1996. With the announcement of base realignment at March AFB, the adjacent jurisdictions immediately formed a JPA, known as March JPA. March JPA is a public entity, created for the purpose of addressing the use, reuse, and joint use of realigned the March AFB. The four individual public entities that cooperatively formed the JPA are the cities of Perris, Moreno Valley, and Riverside, and the County of Riverside. The JPA was created by separate resolutions of the four jurisdictions in September 1993 (March JPA 2018). The March JPA defines reuse and development opportunities of the area, while preserving the environmental quality. The March JPA General Plan is designed to implement the March AFB Master Reuse Plan, which includes the disposal and redevelopment of approximately 4,400 acres of the 6,500-acre former March ARB. The March JPA General Plan establishes goals and policies to reach long-term objectives, and establishes long-term policies for day-to-day decisions, based upon those objectives (March JPA 1999a). The March JPA certified the General Plan in 1999 and has published the Draft Vision 2030: March JPA General Plan. Because the 2030 March JPA General Plan is in draft form, the proposed Project shall be evaluated for consistency with the 1999 March JPA General Plan. The goals and policies relevant to the Project are contained within the March JPA General Plan Land Use Element, Transportation Element, Air Quality Element, Resource Management Element, and Safety/Risk Management Element, as described below.

Land Use Element

The Land Use Element is based upon the March AFB Master Reuse Plan preferred land use pattern. This element delineates the general location and distribution of land uses, extent of existing and proposed land uses for March JPA, and development criteria for development intensity. The goals and policies contained within the Land Use Element address the capitalization of the opportunities within the Planning Area, and the reuse and revitalization of existing facilities. The goals and policies contained in the Land Use Element focus on maintaining a balance between commerce, industry, and aviation uses, while promoting high quality development and minimizing land use conflicts. As previously mentioned, the Project includes a General Plan amendment that would change the existing Business Park land use designation to Industrial. The Project would comply with the 2018 March AICUZ Study and the March ARB/Inland Port ALUCP.

Circulation Element

The Circulation Element determines the way in which land use is ultimately distributed throughout the Planning Area and the subsequent resulting physical environment. The location, classification, capacity, and mode type play an important role in shaping air quality, noise impacts, natural habitat, development types, and general appearance of the Planning Area. The Transportation Plan includes a Truck Route Plan (as adopted by Resolution No. JPA 03-02), with truck restrictions prohibiting truck movements on westbound Alessandro and westbound Van Buren. Vehicles

would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. The extent of necessary facilities, adequacy of service levels, and transportation demand management measures, along with general location and infrastructure facilities, are described within this element of the General Plan.

Air Quality Element

The Air Quality Element addresses air quality due to the nexus of generators and significance to the General Plan and region. The Air Quality Element contains a discussion of local and regional air quality, stationary and mobile emission sources, and programs to reduce pollutant emissions generated.

Resource Management Element

The Resource Management Element provides for the conservation, development, and use of natural, historical, and cultural resources. The Resource Management Element also details plans and measures for the preservation of open space designed to promote the management of natural resources, outdoor recreation and public health and safety.

Safety and Risk Management Element

The Safety and Risk Management Element identifies and establishes standards and plans for the protection of the Planning Area from a variety of hazards including earthquakes, flooding, fire, geological, and airport compatibility conditions.

March JPA Development Code

The primary implementation mechanism for the Land Use Element is the March JPA Development Code, which provides for parcel-specific zone designations for all land within its jurisdiction and subdivision regulations. Title 9 of the March JPA's Municipal Code contains the Development Code for the March JPA, and includes regulations for site planning and development.

As previously mentioned, the K4 Parcel is currently unzoned within the March JPA Zoning Map. The proposed Project is pursuing a zoning designation of Industrial to the K4 Parcel, consistent with the General Plan designation of Industrial. The Project would be subject to Chapter 9.05, Industrial Districts of the March JPA Development Code.

Western Riverside Multiple Species Habitat Conservation Plan

The K4 Parcel and Cactus Channel improvement site occur within the boundaries of the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP), a comprehensive,

multijurisdictional habitat conservation plan focusing on conservation of species and their associated habitats in Western Riverside County. The MSHCP is one of several large, multijurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The MSHCP allows Riverside County and its Cities to better control local land-use decisions and maintain a strong economic climate in the region, while addressing the requirements of the state and federal Endangered Species Acts (CESA and FESA, respectively). The MSHCP serves as a habitat conservation plan pursuant to Section 10(a)(1)(b) of the FESA of 1973, as well as a Natural Communities Conservation Plan under the Natural Communities Conservation Plan Act of 2001; and allows the participating jurisdictions to authorize "take" of plant and wildlife species identified within the plan area.

Projects where the lead agency is a signatory to the MSHCP are covered under the MSHCP. However, the March JPA is the lead agency for the Project and is not a signatory to the MSHCP. As such, the Project is not subject to MSHCP regulations nor does it receive take authority granted under the MSHCP. However, if proposed Project implementation is anticipated to impact (would have a take) Covered Species addressed within the MSHCP, the March JPA may choose to participate in the MSHCP.

4.9.3 Thresholds of Significance

March JPA uses the California Environmental Quality Act Guidelines Appendix G for evaluating whether a development project may result in significant impacts. Based on the IS prepared for the Project (Appendix A, Initial Study and Notice of Preparation) and the newly adopted California Environmental Quality Act Guidelines Appendix G (December 2018), the Project could have a significant impact on land use and planning if the Project would:

- **LU-1**: Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.
- **LU-2**: Conflict with any applicable habitat conservation plan or natural community conservation plan.

4.9.4 Impacts Analysis

Threshold LU-1. ***Would the Project cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?***

The Project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project, including the March JPA General Plan, Development Code, March ARB/Inland Port Airport Joint Land Use Study, March ARB AICUZ, and the March ARB/Inland Port ALUCP.

As shown on Figure 2-2, the site's current land use designation is Business Park. The site is not yet zoned per the March JPA Zoning Map, as shown in Figure 2-3. The proposed Project would include the construction of a 718,000-square-foot warehouse building on the approximately 35.4-acre site. The site would also include automobile and truck trailer parking, loading dock positions, and improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue between Elsworth Street to the west and Heacock Channel to the east. To facilitate Project approval, a General Plan Amendment would be required to change the existing Business Park land use designation to Industrial on the K4 Parcel. In addition, because the K4 Parcel is not yet zoned, a Zone Designation would be required to allow for an Industrial zoning designation for the K4 Parcel.

The proposed Project is located in the C1 Primary Approach/Departure Zone for the March ARB. The C1 Zone is subject to a moderate to high noise impact, which may be disruptive to noise-sensitive land use activities. Zone C1 allows up to 100 people per acre, and does not allow places of assembly, noise-sensitive outdoor nonresidential uses, and hazards to flight. Within the C1 Zone, critical community infrastructure facilities and aboveground bulk storage of hazardous materials is discouraged. Sound attenuation shall be used as necessary to meet interior noise level criteria. Lastly, airspace review is required for objects greater than 70 feet tall. The constructed warehouse building would have a maximum building height of 46 feet and the maximum number of employees that would be located within the proposed warehouse on the K4 Parcel would be 900 employees, which is fewer than 100 people per acre given that the K4 Parcel is 35.4 acres in size. As such, an airspace review would not be required (Riverside County ALUC 2014). Therefore, the proposed Project is designed consistent with the applicable March ARB AICUZ and the March ARB/Inland Port ALUCP.

The 1999 March JPA General Plan is a long-range comprehensive plan designed to outline and delineate use and development of an area known formerly as March AFB, prior to the base realignment in April 1996 to the March ARB. The March JPA General Plan establishes goals and policies to reach long-term objectives, and establishes long-term policy for day-to-day decisions, based upon those objectives (March JPA 1999a). Table 4.9-1 demonstrates how the Project promotes consistency with the applicable goals and policies of the March JPA General Plan.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Land Use Element			
Goal 1	Land Use Plan provides for a balanced mix of land uses that contribute to the regional setting, and capitalize on the assets of the Planning Area, while insuring compatibility throughout the Planning Area and with regional plans.	The K4 Parcel is proposed to be developed with an industrial warehouse building that would be consistent with the GP land use designation of Industrial (IND) with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) to Assessor Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The K4 Parcel would develop a vacant, disturbed site and provide temporary jobs during short-term construction and up to 900 new permanent jobs during Project operations, thus contributing jobs to the region. The Cactus Channel improvements would occur within the existing Cactus Channel.	The Project would be consistent with this goal, assuming the approval of the proposed GP Amendment and Zoning Designation to Industrial (IND) to the Project site.
Policy 1.1	Provide for a mix of land uses which implement the Base Master Reuse Plan for March AFB; offer a variety of employment opportunities; and capitalizes, enhances and expands upon existing physical and economic assets of the Planning Area.	The proposed Project would include an industrial warehouse that would provide automobile and truck trailer parking, loading dock positions, and improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue. Additionally, the new development would be occupied by an e-commerce fulfillment center and would likely provide temporary jobs during short-term construction and up to 900 new permanent jobs during Project operations.	The Project would be consistent with this policy as it would create job opportunities and enhance the physical and economic assets of the Planning Area.
Policy 1.2	Develop and maintain a system of land use designations and zoning districts which will provide locations for commercial, business park, manufacturing, aviation, public, and open space uses, and which actuates compatible and synergistic land uses.	The Project proposes an industrial warehouse in a location that does not yet have a zoning designation. The Project proposes a land use designation change and General Plan Amendment to change the existing land use from Business Park to Industrial and would be compatible for industrial with the approval of the proposed zoning designation and GP Amendment. The proposed Project would include the operation of an e-commerce fulfillment center, which would be compatible with the surrounding commercial and industrial uses in the Project vicinity.	The Project would be consistent with this policy with the approval of the proposed GP Amendment and Zoning Designation from Business Park to Industrial (IND) for the Project site.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 1.3	Provide for patterns of land use which can be supported by existing and planned circulation, public facilities, and infrastructure system improvements in a manner that will preserve the March JPA's fiscal capacity.	The Project would be constructed along an existing roadway (Cactus Avenue), which is currently developed on the north side with industrial warehouse buildings and would then be developed on the south side through Project implementation. The Project would include roadway improvements that take into consideration all modes of transportation. New roadways and improvements to existing roadways would provide improved mobility and accessibility to regional destinations. The Project would also include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. Public services such as fire and police protection, which are provided to the neighboring industrial and business park and adjacent business, would be extended to serve the Project site and as part of standard development practices, Project plans would be reviewed by the appropriate public agencies to ensure facility capacity.	The Project would be consistent with this policy.
Policy 1.5	Provide for a variety of industrial uses, including heavy manufacturing, light manufacturing, warehousing, and distribution, transportation-related, and research and development.	The proposed Project includes a GP Amendment and Zoning Designation to APNs (297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0) to allow development of an approximately 718,000 square feet of industrial e-commerce/fulfillment center and the creation of 289 automobile parking stalls, 317 truck trailer parking, and 105 loading dock positions for trucks. While an end user has not yet been identified, it is assumed that the end use will be e-commerce/fulfilment center.	The Project would be consistent with this policy with the approval of the proposed GP Amendment and Zoning Designation to Industrial (IND).
Policy 1.6	Locate and group commercial and industrial uses which are oriented toward regional service/market areas to promote	The Project proposes an approximately 718,000 square feet of industrial e-commerce/fulfillment center and the creation of 289 automobile parking stalls, 317 truck trailer parking, and	The Project would be consistent with this policy with the approval of the proposed GP

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
	utilization of regional transportation facilities and development-supporting infrastructure.	105 loading dock positions for trucks with close proximity to the I-215 Freeway, a regional transportation facility. Existing commercial/service uses are located north of the Project site. Utilities are available to support the proposed Project and Project plans include enhancements to utilities yet no up-sizing of facilities would be required.	Amendment, Zoning Designation, Parcel Map and Master Plot Plan.
Policy 1.9	Plan for compatible land uses within the aircraft noise impact contours depicted in the Air Installation Compatible Use Zones (AICUZ) Report for the airfield use.	The Project site would be directly north of March ARB. Based on the Riverside County Airport Land Use Compatibility Plan (ALUCP) noise level contours of the March ARB/Inland Port Authority, the Project is partially located in the C1 Primary Approach/Departure Zone, which represents areas of moderate to high noise and moderate accidental potential risk. The Project site is partially located within the 60 to 65 dBA CNEL noise level contour boundaries of March ARB/IPA. Based on the Riverside County Airport Land Use Compatibility Plan Policy Document (RC ALUCP) noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the RC ALUCP compatibility criteria. Outdoor activities at the industrial land use within the Project site are expected to be minimal and include employees traveling to and from their vehicles to the industrial warehouse building. Additionally, the March JPA would review and approve plans and specifications of the proposed Project. Therefore, the Project would satisfy these Riverside County ALUCP compatibility criteria based on the noise level contour boundaries.	The Project would be consistent with this policy.
Goal 2	Locate land uses to minimize land use conflict or creating competing land uses, and achieve maximum land use compatibility while improving or maintaining the desired integrity of the Planning Area and subregion.	The Project proposes an approximately 718,000 square feet of industrial e-commerce/fulfillment center and the creation of 289 automobile parking stalls, 317 truck trailer parking, and 105 loading dock positions for trucks within close proximity to the I-215 Freeway, a regional transportation facility. Existing commercial and industrial	The Project would be consistent with this goal with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) for the Project site.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		uses are located north of the Project site. The Project includes a GP Amendment and Zoning Designation of Industrial (IND) for APNs 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The Project is planned adjacent to existing business park and industrial warehouse development, thereby continuing an existing development to the south.	
Policy 2.1	Avoid conflicts and incompatibilities between land uses through the use of landscaped setbacks and buffers, site design, site orientation, architectural features, walls or fences, density/intensity reductions, reduced hours of operation for commercial and industrial uses, shielding of lighting, and the like.	The Project would be developed in accordance with the March JPA Development Code that would ensure the Project meets the setback requirements, height restrictions, site and building design, and site orientation. Through the March JPA Development Code process, the Project would be compatible with adjacent and surrounding land uses. Furthermore, the proposed Project would be subject to compliance with Section 9.08.100, Lighting; light and glare performance standards established in Section 9.10.110, Light and Glare; and Chapter, 9.13, Landscape Requirements, of the March JPA Development Code.	The Project would be consistent with this policy.
Policy 2.2	Encourage and facilitate the transition of facility reuse and land uses to conforming land uses.	The Project proposes an approximately 718,000 square feet of industrial e-commerce/fulfillment center. The Project site is adjacent to existing commercial and industrial uses. The Project would contribute to the industrial warehouse visual character of existing development along Cactus Avenue and the I-215 corridor with the construction of similar uses displaying comparable bulk and scale. With the approval of a GP Amendment and Zoning Designation of Industrial (IND), the Project would be consistent with the existing March JPA GP. The Project site is bordered to the north by Cactus Avenue and an industrial and commercial center. To the east, the subject site is bounded by vacant	The Project would be consistent with this policy with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) for the Project site.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		land and an electrical substation. To the south and west, the subject site is bordered by March ARB. The Project would thereby continue an existing development pattern.	
Policy 2.3	Support land uses that provide a balanced land use pattern of the Planning Area, and discourage land uses that conflict or compete with the services and/or plans of adjoining jurisdictions.	See Policy 2.2.	The Project would be consistent with this policy with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) for the Project site.
Policy 2.4	Protect the interests of, and existing commitments to adjacent residents, property owners, and local jurisdictions in planning land uses.	There are no residential developments immediately adjacent to the Project site. The nearest residence is located 0.5 miles north of the Project site.The Project site is bordered to the north by Cactus Avenue and an industrial and commercial center. To the east, the subject site is bounded by vacant land and an electrical substation. To the south and west, the subject site is bordered by March ARB.The proposed Project, including the architectural renderings, would undergo staff review with the March JPA to ensure that the massing, height, siting, and design of the industrial development and landscape comply with the March JPA Development Code and building and construction code, and compatible with the surrounding area. The proposed Project would undergo staff review with the March JPA to ensure that the massing, height, siting, and design of the industrial warehouse development and landscape comply with the March JPA Development Code and building and construction code, and compatible with the surrounding area.	The Project would be consistent with this policy.
Goal 3	Manage growth and development to avoid adverse environmental and fiscal effects.	The Project would be developed in accordance with the March JPA Development Code, consistent with the anticipated buildout of the existing March JPA GP, which would be amended to include a GP Amendment for this site and designate an industrial use instead of business park use on the Project site.	The Project would be consistent with this goal with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) for the Project site.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 3.1	Manage growth so that its rate does not exceed the ability of March JPA or service districts to provide for an acceptable level of public facilities and services.	Public facilities and services are available to the Project site, and the Project would neither burden nor exceed the capacity of the service providers, as discussed in the Initial Study (Appendix A) and Section 4.13, Utilities and Service Systems. No upsizing of facilities would be required to serve the Project.	The Project would be consistent with this policy.
Policy 3.3	Use finance mechanisms such as benefit assessment districts, development fees, and maintenance districts to ensure new development within the Planning Area constructs the public facilities and fiscally supports the public services necessitated by the development.	The Project Applicant shall pay all the necessary development and fair share fees associated with development of the Project, including the appropriate development impacts fee (DIF). While payment of fees would be completed as part of Project approval, the use of these fees to implement programs and street system improvements cannot be guaranteed by the Project itself.	The Project would be consistent with this policy; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.
Goal 4	Develop an identity and foster quality development within the Planning Area.	The Project is planned immediately south of and adjacent to existing commercial and industrial warehouse developments, thereby continuing an existing development pattern to the south. Project implementation would be consistent with this existing character.	The Project would be consistent with this goal.
Policy 4.1	Develop and maintain a land use plan for the Planning Area which proposes compatible land uses to create distinct, identifiable historic, commercial, industrial, public, and aviation areas.	See Policy 2.2.	The Project would be consistent with this policy with the approval of the proposed GP Amendment and Zoning Designation of Industrial (IND) for the Project site.
Policy 4.4	Develop a distinctive community identity for commercial, business park and industrial developments that reflect the character and atmosphere of March JPA Planning Area through the use of good planning and design principals, and sound development practices which	The proposed Project, including the architectural renderings, would undergo staff review with the March JPA to ensure that the massing, height, siting, and design of the industrial warehouse development and landscape comply with the March JPA Development Code and building and construction code, and compatible with the surrounding area.	The Project would be consistent with this policy with compliance with the March JPA Development Code and building and construction code.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
	serve as guidelines for building materials, colors, site design and orientation, and landscaping.		
Policy 4.6	Encourage the use of master plans and design guidelines to permit the clustering of development and creating campus-like setting of large tracts of land, while capitalizing on areas with unique assets and opportunities.	The Project entails a GP Amendment, Zoning Designation, Parcel Map, and a Master Plot Plan. As such, the Project would result in the approval of a comprehensive development plan for the 35.4-acre K4 Parcel.	The Project would be consistent with this policy with the approval of the proposed GP Amendment, Zoning Designation, Parcel Map and Master Plot Plan.
Policy 4.7	Develop and enhance the economic climate and create a balanced business community to serve the work force, commerce, and industry of the region.	The Project would provide industrial warehouse buildings and industrial facilities whose ultimate use would create up to 900 new permanent jobs and help serve the goods movement needs of the region.	The Project would be consistent with this policy.
Goal 5	Maximize and enhance the tax base and generation of jobs through new, reuse, and joint use opportunities.	Development of the Project would increase the property value of the site and would provide temporary jobs during short-term construction and up to 900 permanent jobs during Project operations.	The Project would be consistent with this goal.
Policy 5.1	Support the development and establishment of new employment centers and economic development activities that contribute to an improved tax base.	See Goal 5.	The Project would be consistent with this policy.
Policy 5.5	Encourage the development of commercial, business park and industrial centers to expand the employment and fiscal base of the March JPA Planning Area and the western Riverside County Subregion.	See Goal 5.	The Project would be consistent with this policy.
Policy 5.6	Encourage employers in the March JPA Planning Area to hire from the local communities when seeking to fill employment positions.	Implementation of the proposed Project would not require installation of new roadways, public services, or utilities; the site is currently served by existing roadways, utilities, and services, and these services would be maintained as	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		part of the proposed Project. Therefore, the proposed Project would not induce substantial unplanned population growth and the additional 900 employment opportunities resulting from the Project would be assumed to be filled by the existing residential population in the greater Riverside County area.	
Goal 6	Support the continued Military Mission of March Air Reserve Base, and preservation of the airfield from incompatible land use encroachment.	The Project site is not located within a designated APZ I or APZ II, and instead lies outside of all APZs. The Project is located in C1 or Primary Approach/Departure Zone which limits projects to no more than 100 people per acre. The proposed land use on the K4 Parcel, which is 35.4 acres, would employ approximately 900 people, which is below the 100 people per acre threshold. As such, this Project would be compatible with this zone. The proposed Cactus Channel improvements would result in the installation of a box culvert within an existing earthen channel, thereby reducing the potential for bird attractants within the Channel, which would serve as a safety benefit to the airfield.	The Project would be consistent with this goal.
Policy 6.2	Plan for compatible land uses within the Clear Zone, APZ I and APZ II, as depicted in the Air Installation Compatible Use Zones (AICUZ) Report for the airfield use.	See Goal 6.	The Project would be consistent with this policy.
Policy 6.3	Ensure that plans and development do not interfere, conflict, or degrade the military mission of March ARB.	See Goal 6.	The Project would be consistent with this policy.
Policy 6.4	Ensure that plans and development do not conflict with the long-term needs of the Air Force Reserve in terms of encroachment, noise, accident zone, constraints, etc.	The Project is located in Zone C1, which allows for the uses proposed by the Project. The K4 Parcel is not located within a designated APZ I or APZ II, and instead lies outside of all APZs. Within the C1 Zone which limits projects to no more than 100 people per acre. The proposed land use on the K4	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		Parcel, which is 35.4 acres, would employ approximately 900 people, which is below the 100 people per acre threshold. As such, this Project would be compatible with this zone. The Project would be developed in accordance with the March JPA Development Code that would ensure the Project meets the setback requirements, height restrictions, site and building design, site orientation, etc. that would be compatible with adjacent and surrounding land uses. The Project would comply with the March ARB/Inland Port ALUCP, which would ensure that development does not conflict with the long-term needs of the Air Force Reserve.	
Policy 6.5	Ensure that plans and development conform to the draft Comprehensive Land Use Plan for March AFB/March Inland Port.	The Project would conform to the March ARB/Inland Port ALUCP, as described throughout this section of the EIR.	Given than none of the uses restricted in the Zone C1 would be constructed as part of the Project, the Project would be consistent with this policy.
Policy 6.6	Ensure that sensitive land uses (i.e., schools, high occupancy land uses, etc.) are discouraged from locating and operating in areas determined to be incompatibly with airport operations.	The Project would not introduce any new sensitive land uses such as schools or high occupancy land uses that would present an incompatibility. Instead the Project would result in the construction of a new industrial warehouse and improvements within the existing Cactus Channel.	The Project would be consistent with this policy.
Policy 6.7	Ensure that land uses adhere to floor area ratios applicable under California Department of Transportation (Caltrans) guidelines for airports.	The Project conforms to the floor area ratios as adopted in the March ARB/Inland Port ALUCP, which are more restrictive than the Caltrans guidelines for airports.	The Project would be consistent with this policy.
Policy 6.8	Ensure that land uses adhere to both military and civilian Part 77 conical surface criteria, relative to height restrictions.	The Project Applicant will submit an FAA 7460-1 application through ALUC to ensure compatibility. Within 5 days after construction of the Project reaches its greatest height, a FAA Form 7460-2 shall be completed by the Project Applicant or his/her designee and e-filed with the FAA.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 7.6	Plan for compatible land uses within the aviation area.	The Project is located in Zone C1, which allows for the uses proposed by the Project. The Project site is not located within a designated APZ I or APZ II, and instead lies outside of all APZs. Within the C1 Zone which limits projects to no more than 100 people per acre. The proposed land use on the K4 Parcel, which is 35.4 acres, would employ approximately 900 people, which is below the 100 people per acre threshold. As such, this Project would be compatible with this zone. The Project would be developed in accordance with the March JPA Development Code that would ensure the Project meets the setback requirements, height restrictions, site and building design, site orientation, etc. that would be compatible with adjacent and surrounding land uses. Outdoor activities at the industrial land use within the Project site are expected to be minimal and include employees traveling to and from their vehicles. Additionally, the March JPA would review and approve the plans and specifications of the proposed Project to ensure compliance with the provisions of the CBC and Title 24, which regulates building standards. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Additionally, the Project would comply with the Inland Port ALUCP, which would ensure that development does not conflict with the March ARB. Furthermore, the Project Applicant will submit an FAA 7460-1 application through ALUC to ensure compatibility. Within 5 days after construction of the Project reaches its greatest height, an FAA Form 7460-2 shall be completed by the Project Applicant or his/her designee and e-filed with the FAA.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 8.2	Sensitive biological resources and habitats, cultural resources, view shed areas shall be protected where practical.	The Project would be constructed on undeveloped lands. As discussed in the Initial Study prepared for the Project (Appendix A), no view sheds would be obstructed through Project implementation. While the K4 Parcel is currently vacant, as discussed in Section 4.3, Biological Resources, impacts can be mitigated to less than significant levels through the incorporation of **MM-BIO-1** through **MM-BIO-9**. Additionally, with implementation of **MM-CUL-1** through **MM-CUL-2** outlined in Section 4.4, Cultural Resources, impacts the Project would not affect valued cultural resources.	The Project would be consistent with this policy with implementation mitigation measures outlined in Section 4.3, Biological Resources, and 4.4, Cultural Resources, of the EIR.
Policy 8.4	Implement federal, state, regional, and local requirements that apply to water and air quality, wetlands, endangered species, and other environmental considerations.	The Project would be constructed in a manner that minimizes, to the extent feasible, impacts to water quality, air quality, wetlands, endangered species, and other environmental considerations, as detailed within this EIR. Where required, mitigation measures shall be implemented to reduce potentially significant environmental impacts throughout construction and operation. Therefore, the Project would continue to implement and comply with federal, state, regional and local requirements.	The Project would be consistent with this policy with implementation of mitigation measures.
Goal 10	Avoid undue burdening of infrastructure, public facilities, and services by requiring new development to contribute to the improvement and development of the March JPA Planning Area.	The Project is located adjacent to an area where infrastructure, public facilities, and services already exist. Development of the Project would contribute to the improvement and development of the March JPA Planning Area by completing off-site infrastructure and by providing the required Development Impact Fees (DIF), which would contribute to those facilities and services. The Project is located adjacent to an area surrounded by existing development immediately to the north, south and east.	The Project would be consistent with this goal.

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Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 10.1	Require new construction to pay its "fair share" of the cost of providing adequate public services, infrastructure, and facilities for the development.	The Project Applicant shall pay all the necessary development (DIF) and fair share fees associated with development of the Project. While payment of fees would be completed as part of Project approval, the use of these fees to implement programs and street system improvements cannot be guaranteed by the Project itself.	The Project would be consistent with this policy; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.
Policy 10.2	Require new construction to provide adequate infrastructure to serve the development (i.e., curbs and gutters, sidewalks, street lights, water service, sewer service, or septic systems, etc.) prior to initiation of use.	The K4 Parcel is currently undeveloped and would be required to install curbs and gutters, sidewalks, streetlights, water service connections, and sewer service connections prior to occupancy. Additionally, the Project proposes regional improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan. The proposed improvements include constructing an underground box culvert within the existing earthen channel.	The Project would be consistent with this policy.
Policy 10.3	Locate commercial and industrial development in areas where street rights-of-way and capacity are available, as well as sufficient infrastructure and public services.	The Project is located in an area where infrastructure, public facilities and services are available to support the Project. The Project would require the construction on new water and wastewater connections in order to connect to the WMWD water and wastewater collection and treatment. Also, the proposed proposes regional improvements to Cactus Channel proposed by Riverside County Flood Control and Water Conservation District as part of the District's master Plan Additionally, the Project is adjacent to existing commercial and industrial facilities already served by public services.	The Project would be consistent with this policy.
Policy 10.4	Facilitate the provision of public services, (i.e., sewer, water, streets, and public safety) to be provided in an efficient and cost-effective manner.	See Policy 10.3.	The Project would be consistent with this policy.

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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Goal 11	Plan for the location of convenient and adequate public services to serve the existing and future development of March JPA Planning Area.	See Policy 10.3.	The Project would be consistent with this goal.
Policy 11.2	Provide and maintain existing infrastructure and enhance service levels to meet the needs of March JPA Planning Area.	See Policy 10.3.	The Project would be consistent with this policy.
Goal 12	Ensure, plan, and provide adequate infrastructure for all facility reuse and new development, including but not limited to, integrated infrastructure planning, financing, and implementation.	The K4 Parcel is currently undeveloped yet located where infrastructure, public facilities and services would be available to support the Project. The Project would require the construction of new water and wastewater connections in order to connect to the WMWD water and wastewater collection and treatment. Also, the Project includes regional improvements to enhance drainage infrastructure along Cactus Avenue as part of Project development, proposed by Riverside County Flood Control and Water Conservation District as part of the District's master Plan. Additionally, the Project site is adjacent to existing commercial and industrial facilities already served by public services, and development of the Project would provide development impact fees (DIF) that would contribute to those facilities and services.	The Project would be consistent with this goal.
Policy 12.1	Coordinate the provision of all public utilities and services to ensure a consistent, complete and efficient system of service to development.	The Project site is located adjacent to an area where public facilities and services exist already. Development of the Project would contribute to the improvement and development of the March JPA Planning Area by completing off-site infrastructure and by providing impact fees which would contribute to those facilities and services. The Project is located adjacent to an area surrounded by existing development immediately to the east, south, and north.	The Project would be consistent with this policy.

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Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 12.2	Require new construction to pay its "fair share" for the regional infrastructure system by providing appropriate dedications, improvements, and/or fee assessment districts or other financing mechanisms.	The Project Applicant shall pay all the necessary development (DIF) and fair share fees associated with development of the Project. While payment of fees would be completed as part of Project approval, the use of these fees to implement programs and street system improvements cannot be guaranteed by the Project itself.	The Project would be consistent with this policy.
Policy 12.3	Require new development projects to provide for the extension of infrastructure to serve the development, including over-sizing facilities for future needs.	The K4 Parcel is currently undeveloped and not connected to water or wastewater infrastructure. As such, Project implementation would require the construction of new water and wastewater connections in order to connect to WMWD water and wastewater collection and treatment systems. Additionally, the Project would include regional improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, proposed by Riverside County Flood Control and Water Conservation District as part of the District's master Plan. The proposed improvements include undergrounding a box culvert. Existing utilities not being abandoned or improved would be extended to provide water, sewer, electricity, and other utility services, as discussed in Section 4.13, Utilities and Service Systems. While the development would require improvement and enhancement of existing infrastructure, it does not rely on the extension or up-sizing of facilities by other new development projects.	The Project would be consistent with this policy.
Goal 13	Secure adequate water supply system capable of meeting normal and emergency demands for existing and future land uses.	As part of the proposed Project, a Water Supply Assessment (WSA) has been prepared and approved by the WMWD to provide an analysis as to whether WMWD has sufficient water supplies available to serve the Project. As discussed in Section 4.13, Utilities and Service Systems, WMWD has determined that adequate water supplies do exist to serve the proposed Project.	The Project would be consistent with this goal.

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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 13.1	Only approve development which can demonstrate an adequate and secure water supply for the proposed use.	See Goal 13.	The Project would be consistent with this policy.
Policy 13.2	Enhance local groundwater supplies through development designs which promote an on-site recharge and minimize impermeable ground coverage with landscaped areas, open space, or recreation areas.	As discussed in Section 4.8, Hydrology and Water Quality, Project implementation would not affect groundwater supplies, and with Project design features, water would be allowed to percolate into the groundwater.	The Project would be consistent with this policy.
Policy 14.1	Require all development to adequately collect, treat, and dispose of wastewater in accordance with the Santa Ana Regional Water Quality Control Board requirements.	The Project would treat and dispose of wastewater in conformance with the requirements of the Santa Ana Regional Water Quality Control Board.	The Project would be consistent with this policy.
Policy 14.2	Require connection to the sewer system for any development occurring on land formerly part of March AFB.	The Project site is located on the Northeast Planning Subarea of land that was formerly part of March AFB. Project implementation would require wastewater connections to connect to the WMWD water and wastewater collection and treatment systems.	The Project would be consistent with this policy.
Policy 14.3	Encourage the reuse of reclaimed and treated non-potable water for irrigation and maintenance of recreation areas, landscaping and open space preservation.	See Policy 13.2.	The Project would be consistent with this policy.
Goal 15	In compliance with state law, ensure solid waste collection, siting and construction of transfer and/or disposal facilities, operation of waste reduction and recycling programs, and household hazardous waste disposal programs and education are consistent with the County Solid Waste Management Plan.	Solid waste collection for the Project would be consistent with the County Solid Waste Management Plan.	The Project would be consistent with this goal.

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Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 15.1	Ensure all hazardous materials are stored, treated, and disposed in accordance with state and federal law.	The Project site is located within Zone C1. The March ARB/Inland Port Airport Land Use Compatibility Plan (Mead & Hunt 2014) imposes restrictions and limitations on the types and quantities of uses and hazardous materials that can be stored on Project sites within the C1 zone. The Project would not contain any aboveground bulk storage of hazardous materials, as recommended by the March ARB/Inland Port Airport Land Use Compatibility Plan (Mead & Hunt 2014). As discussed in Section 4.7, Hazards and Hazardous Materials, any hazardous materials used on site would be stored, treated, and disposed of in accordance with state and federal law.**MM-HAZ-1** through **MM-HAZ-8** shall also be implemented to ensure hazardous materials would be properly stored, treated, and disposed of.	The Project would be consistent with this policy.
Goal 17	Adequate flood control facilities shall be provided prior to, or concurrent with, development in order to protect the lives and property within the March JPA Planning Area.	The Project site is currently undeveloped and not connected to any stormwater or flood infrastructure or facilities. However, the Cactus Channel does run along the northern property boundary. The Project would retain all post development flow on site; however, the Riverside County Flood Control District may allow minimal drainage into the regional improvements to the existing open Cactus Channel drainage that are proposed by Riverside County Flood Control and Water Conservation District as part of the District's master Plan. The Project would be required to comply with all rules, regulations, and other requirements of the March JPA for use of stormwater facilities and flood control.	The Project would be consistent with this goal.
Policy 17.1	Provide for the adequate drainage of storm runoff to protect the lives and property within the Planning Area.	See Goal 17.	The Project would be consistent with this policy.

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Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 17.3	Require new development to construct new or upgrade existing drainage facilities to accommodate the additional storm runoff caused by the development.	See Goal 17.	The Project would be consistent with this policy.
Policy 17.4	Require all storm drain and flood control facilities to be approved and operational prior to the issuance of certificates of occupancy for the associated development.	Prior to issuance of certificates of occupancy, the required storm drain and flood control facilities would be inspected and approved.	The Project would be consistent with this policy.
Policy 17.7	Seek to preserve drainage courses in their natural condition, while providing adequate safety and protection of property.	Appropriate permit(s) from the federal, state, regional, and local permitting agencies would be obtained to address the on-site drainage and protect persons and property.	The Project would be consistent with this policy.
Noise/Air Quality Element			
Policy 2.3	Noise sensitive land uses shall not be located in areas influenced by noise generating land uses, in particular the noise contours associated with the joint use airfield, unless appropriate mitigation is utilized.	See Policy 1.2.	The Project would be consistent with this policy.
Policy 3.1	Include mitigating measures such as landscaping, berming, and site orientation, in the design of projects located near noise generating sources such as arterial roadways.	The Project design includes a screening wall and landscaping that would provide sound mitigation.	The Project would be consistent with this policy.
Policy 3.6	Regulate the use of local streets by trucks, trailers, and construction vehicles, to the extent possible.	Regional access to the Project is provided via I-215, with local access for trucks, trailers, and construction vehicles provided via Cactus Avenue. Vehicular access points and circulation outside/inside the Project site, including the Project's parking lots, would be reviewed and approved by	The Project would be consistent with this policy.

Table 4.9-1
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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		the March JPA's planning and engineering staff. Additionally, Project construction would comply March JPA Development Code Sections 9.10.140 and 9.10.030.	
Policy 3.7	Limit trucking operations to appropriate routes, times and speeds.	See Policy 3.6.	The Project would be consistent with this policy.
Policy 3.8	Appropriate muffling systems for construction equipment and operations shall be required, as necessary.	During all Project construction, pursuant to March JPA General Plan Noise Element Policy 2(e), the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractors shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.	The Project would be consistent with this policy.
Goal 3	Reduce air pollution through proper land use, transportation, and energy use planning.	The proposed warehouse component of the Project would be constructed on approximately 35.4 acres located just south of existing industrial and warehouse development. The use would be similar to surrounding land uses, and the existing roadway network provides access to the K4 Parcel. Potential air impacts associated with the Project would be reduced to the maximum extent feasible through implementation of **MM-AQ-1** through **MM-AQ-6**; however, even with implementation of mitigation, operational air impacts associated with NO_x from truck trips would exceed established thresholds. However, the Project site is located far enough from sensitive land uses (i.e., schools, residences, etc.) that air impacts would not result in health hazards to individuals, and as explained in Section 4.2, Air Quality, and Section 4.6, Greenhouse Gas Emissions, the Project is consistent with the RTP/SCS.	The Project would be consistent with this goal to the maximum extent feasible, with implementation of mitigation measures **MM-AQ-1** through **MM-AQ-6**.

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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 3.4	Encourage ride share programs.	As required by mitigation measure **MM-AQ-5** Commute Trip Reduction, 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools to encourage ride share programs.	The Project would be consistent with this policy.
Goal 4	Pursue reduced emissions for stationary and mobile sources through the use and implementation of new and advancing technologies.	As required by **MM-AQ-1**, Construction Equipment Emissions Standards, and **MM-AQ-4**, Improved Energy Efficiency and Water District, the Project shall commit to the following: During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the United States Environmental Protection Agency (USEPA). In addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment. • The Project will install approximately 4.5 MW of solar photovoltaic electricity generation. • The Project will install Energy Star certified light bulb and lighting fixtures. • The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation as required by 2016 Title 24 and consistent with the Riverside County Climate Action Plan criteria. • Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof, defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of HVAC equipment	The Project would be consistent with this goal with implementation of **MM-AQ-1** and **MM-AQ-4.**

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		with a SEER of 14 or higher; Installation of water heaters with an energy factor of .92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project. • The Project will provide electrical outlets at building exterior areas. • The Project landscape non-potable water system will meet "purple" pipe standards. • The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers. • The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations.	
Policy 4.1	Pursue the use of equipment with reduced or zero emissions for stationary and mobile source equipment.	See Goal 4.	The Project would be consistent with this goal with implementation of **MM-AQ-1** and **MM-AQ-4.**
Policy 4.4	Promote for all development and encourage end-users to employ emission reducing or zero source equipment and processes.	See Goal 4.	The Project would be consistent with this goal with implementation of **MM-AQ-1** and **MM-AQ-4.**

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 5.5	Review development project to determine potential air quality impacts and provide appropriate mitigation, where necessary.	A comprehensive air quality analysis for the proposed Project is included within Section 4.2, Air Quality of the EIR, and applicable mitigation measures can be found in both the Executive Summary and in Section 4.2.7 of the EIR.	The Project would be consistent with this policy.
Goal 6	Reduce emissions associated with vehicle/engine use.	The Riverside Transit Agency (RTA) provides bus service within the March JPA (RTA 2019). The nearest bus stop is located at the northeast intersection of Fredrick Street and Cactus Avenue. There is an existing Class II bike lane along Cactus Avenue. Bicycle racks would be included as part of the proposed Project and would be reviewed as part of March JPA's design review process. Additionally, **MM-AQ-5** is required for the proposed Project and would entail: • 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools. • Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet of office space may pursue video conferencing as feasible. • The Project will provide short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces). • The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).	The Project would be consistent with this goal with implementation of **MM-AQ-5.**

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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		• Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Each tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will consider the provision of an ATM as feasible.	
Policy 6.1	Reduce idling emissions by increasing traffic flow through synchronized traffic signals.	The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of transportation uniform mitigation fee (TUMF). These fees shall be collected by the March JPA, with the proceeds solely used as part of a funding mechanism aimed at ensuring that signals are synchronized to reduce idling emissions along roadways in the vicinity of the Project.	The Project would be consistent with this policy with implementation of **MM-TRAF-1**, **MM-TRAF-2**, **MM-TRAF-4**, **MM-TRAF-7**, **MM-TRAF-8**, **MM-TRAF-13**, **MM-TRAF-15** and **MM-TRAF-18**.
Policy 6.2	Work with Riverside Transit Agency (RTA) to develop a local transit system and facilitate connections.	RTA Route 11 currently operates along Cactus Avenue and could potentially serve the Project. The Project Applicant and March JPA will continue to work with RTA during throughout Project design to ensure transit access to the Project site.	The Project would be consistent with this policy.
Policy 6.3	Encourage diversion of peak hour truck traffic, whenever feasible, to off-peak periods to reduce roadway congestion and associated emissions.	With implementation of **MM-AQ-5**, the Project would encourage diversion of peak hour traffic (see Goal 6, above for **MM-AQ-5** language).	The Project would be consistent with this policy with implementation of **MM-AQ-5**.
Policy 6.4	Work with Caltrans and traffic engineers to insure that roadways and freeway on-ramps that are heavily utilized by trucks are designed to safely accommodate trucks.	The freeway on-ramps and roadways already exist and are designed to safely accommodate trucks. Any infrastructure or street enhancements related to the Project would be reviewed by March JPA to ensure that the roadway is designed to safely accommodate trucks.	The Project would be consistent with this policy.

Table 4.9-1
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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 6.5	Encourage trucks operating within March JPA Planning Area to maintain safety equipment and operate at safe speeds so as to reduce the potential for accidents which create congestion and related emissions.	All trucks operating within the March JPA Planning Area are required to maintain safety equipment and operate at safe speeds. The Project is designed to minimize potential conflicts between truck and vehicular traffic, and reduce the potential for accidents. Additionally, as required by **MM-AQ-1**, during Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the United States Environmental Protection Agency (USEPA). In addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment	The Project would be consistent with this policy with implementation of **MM-AQ-1**.
Policy 6.6	Reduce vehicle emissions through improved parking design and management that provide for safe pedestrian access to and from various facilities.	See Goal 6.	The Project would be consistent with this goal with implementation of **MM-AQ-5.**
Policy 6.8	Encourage the use of compressed natural gas, clean diesel, and/or alternative fuels in engines.	See Goal 6.	The Project would be consistent with this goal with implementation of **MM-AQ-5.**
Goal 7	Reduce emissions associated with energy consumption.	As required in **MM-AQ-4**, the Project applicant shall incorporate the following measures into the Project design: • The Project will install approximately 4.5 MW of solar photovoltaic electricity generation. • The Project will install Energy Star certified light bulb and lighting fixtures. • The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation	The Project would be consistent with this goal with implementation **MM-AQ-4**.

Table 4.9-1
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Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		as required by 2016 Title 24 and consistent with the Riverside County Climate Action Plan criteria. • Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof, defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of HVAC equipment with a SEER of 14 or higher; Installation of water heaters with an energy factor of .92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project. • The Project will provide electrical outlets at building exterior areas. • The Project landscape non-potable water system will meet "purple" pipe standards. • The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers. • The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations.	

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 7.1	Support the use of energy-efficient equipment and design in the March JPA Planning Area for facilities and infrastructure.	See Goal 7.	The Project would be consistent with this policy with implementation of **MM-AQ-4**.
Policy 7.2	Encourage incorporation of energy conservation features in development.	See Goal 7.	The Project would be consistent with this policy with implementation of **MM-AQ-4**.
Policy 7.3	Support passive solar design in new construction.	The Project would include solar panels that are recessed into the building elevation or screened by a decorative wall or landscaping.	The Project would be consistent with this policy.
Policy 7.4	Support recycling programs which reduce emissions associated with manufacturing and waste disposal.	As discussed in Section 4.13, Utilities, the Project would be required to prepare a waste recycling plan to be approved by the Riverside County Waste Management Department. The plan would specify where and how the recyclable materials would be stored on the site.	The Project would be consistent with this policy.
Policy 7.5	Support drought-resistant vegetation in landscaping areas to reduce energy needed to pump water.	Drought-resistant vegetation would be installed on the Project site, thereby reducing the amount of potable water needing to be pumped to the Project site.	The Project would be consistent with this policy.
Goal 8	Reduce air pollution emissions and impacts through siting and building design.	See Goal 6.	The Project would be consistent with this goal with implementation of **MM-AQ-5**.
Policy 8.1	Support the use of low polluting construction materials and coatings.	The Project would be subject to the following with implementation of **MM-AQ-1** and **MM-AQ-2**: • During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the United States Environmental Protection Agency (USEPA). In	The Project would be consistent with this policy with implementation of **MM-AQ-1** and **MM-AQ-2**.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment. • The construction contractor shall be required to utilize Super-Compliant VOC interior and exterior paints, which are defined by SCAQMD as meeting the "super-compliant" VOC standard of 10 grams per liter (g/L), during construction and long-term operations.	
Policy 8.2	Encourage the separation of sensitive receptors, such as schools and hospitals, from sources of toxic emissions.	The Project is not located in the vicinity of sensitive receptors such as schools, hospitals and residences.	The Project would be consistent with this policy.
Policy 8.3	Encourage the separation of sensitive receptors from potential carbon monoxide hotspots.	See Policy 8.2.	The Project would be consistent with this policy.
Goal 9	Reduce fugitive dust and particulate matter emissions.	To account for dust control measures to comply with SCAQMD Rule 403 in the calculations, it was assumed that the active sites would be watered twice times daily, or as needed depending on weather conditions, resulting in a 55% reduction in fugitive dust as implemented by the CalEEMod.	The Project would be consistent with this goal.
Policy 9.1	Require all feasible fugitive dust reduction techniques to be utilized during construction activities.	Standard construction practices that would be employed to reduce fugitive dust emissions include watering the active sites twice times daily, as needed, depending on weather conditions.	The Project would be consistent with this policy.
Policy 9.3	Support land division design which minimizes grading and maintains the natural topography to the maximum extent feasible.	The K4 Parcel is relatively flat and would require minimal grading at the outset of Project construction. As detailed in Section 4.5, Geology and Soils, recommendations included within the Geotechnical Explorations prepared for the Project would be incorporated during Project design and construction, as required by **MM-GEO-1**.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Resource Management Element			
Policy 1.1	Where possible, retain local drainage courses, channels and creeks in their natural condition.	The Project site currently drains to the south and west and also connects to the existing Cactus Channel north of the K4 Parcel. Flows within the Cactus Channel drain from west to east, where they then connect with the Heacock Channel and drain to the south. Project implementation would retain existing flows both on the Project site and within the Cactus Channel. While the existing earthen Cactus Channel would be converted to an underground box culvert, this improvement would minimize bird strike hazards within the vicinity of the March ARB airstrip.	The Project would be consistent with this policy.
Policy 1.2	Protect groundwater and surface water resources from depletion and sources of pollution.	Potable water would be supplied by WMWD. Water sources from WMWD primarily depend on imported water resources. WMWD purchases both Colorado River and State Water Project water from Metropolitan Water District of Southern California. The Project would not directly draw groundwater from the underlying aquifer, would not result in a water demand from WMWD that appreciably deplete their overall groundwater supplies, and the Project would use water-efficient devices and landscaping to reduce water consumption. The development under the proposed Project would include LID stormwater design features such as bioretention best management practices (BMPs) which encourage on-site infiltration of stormwater runoff which would provide groundwater recharge. The Project would also use recycled water for non-potable uses. For these reasons, the Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 1.4	Require development to conserve water resources, including the use of water-efficient plumbing fixtures and irrigation systems.	Low water-use plumbing fixtures and irrigation systems would be installed as part of the proposed Project.	The Project would be consistent with this policy.
Policy 1.5	Conserve imported water by requiring water conservation techniques, water-conserving and recycling processes, drought-resistant landscaping, and reclaimed water for irrigation, when available and appropriate.	Drought-resistant landscaping would be used at the Project site, and low water-use plumbing fixtures and irrigation systems would be installed so as to minimize water use and encourage water conservation.	The Project would be consistent with this policy.
Policy 1.6	Promote the use of drought tolerant landscaping in development, and encourage the use of reclaimed water for irrigation, when available and appropriate.	See Policy 1.5.	The Project would be consistent with this policy.
Goal 4	Conserve energy resources through use of availability energy technology and conservation practices.	See Noise/Air Quality Element Goal 7. The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations.	The Project would be consistent with this goal with implementation **MM-AQ-4**.
Policy 4.1	Implement energy performance requirements established under the California Administration Code Title 24 Energy Conservation and Insulation Regulations.	See Goal 4.	The Project would be consistent with this goal with implementation **MM-AQ-4**.
Policy 4.3	Encourage the use and development of alternative and innovative energy resources and energy conservation techniques, where practical.	See Goal 4.	The Project would be consistent with this goal with implementation **MM-AQ-4**.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Goal 5	Conserve and protect significant stands of mature trees, native vegetation, and habitat within the planning area.	The Project site does not provide suitable habitat for federally or state threatened or endangered plants based on the disturbed nature of the site, lack of suitable soils to support listed plant species in the vicinity, and results of focused summer special-status plant surveys.	The Project would be consistent with this policy.
Policy 5.1	Where practical, conserve important plant communities and habitats such as riparian areas, wetlands, significant tree stands, and species by using buffers, creative site planning, revegetation and open space easements/dedications.	See Goal 5.	The Project would be consistent with this policy.
Policy 5.2	Encourage the planting of native species of trees and other drought-tolerant vegetation.	Native and drought-resistant landscaping would be used at the Project site, and low water-use plumbing fixtures and irrigation systems would be installed so as to minimize water use and encourage water conservation.	The Project would be consistent with this policy.
Policy 5.4	In areas that may contain important plant and animal communities, require development to prepare biological assessments identifying species types and locations and develop measures to preserve recognized sensitive species, as appropriate.	As discussed in Section 4.3, Biological Resources, the Project would incorporate **MM-BIO-1** through **MM-BIO-9.**	The Project would be consistent with this policy with implementation of **MM-BIO-1** through **MM-BIO-9.**
Policy 7.5	Require development proposals that are located on or near archaeological or paleontological resources to provide a cultural resources study that assesses potential impacts to the resource as a result of the proposed development. The report will include measures to avoid destruction of any significant cultural resources.	While no archeological or paleontological resources are anticipated to be encountered during Project construction, in the event of unanticipated discoveries, implementation of **MM-CUL-1** through **MM-CUL-2** would reduce impacts to such resources.	The Project would be consistent with this policy with implementation of **MM-CUL-1** through **MM-CUL-2**.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 7.6	Require the preservation of identified cultural resources to the extent possible, prior to development, through dedication, removal, transfer, reuse, or other means.	See Policy 7.5.	The Project would be consistent with this policy with implementation of **MM-CUL-1** through **MM-CUL-2**.
Safety/Risk Management Element			
Goal 1	Minimize injury and loss of life, property damage, and other impacts caused by seismic shaking, fault rupture, ground failure, and landslides.	The K4 Parcel is relatively flat and would require minimal grading at the outset of Project construction. As detailed in Section 4.5, Geology and Soils, recommendations included within the Geotechnical Explorations prepared for the Project would be incorporated during Project design and construction, as required by **MM-GEO-1**.	The Project would be consistent with this goal.
Policy 1.1	Require geological and geotechnical investigations in areas of potential seismic or geologic hazards as part of the environmental and development review process. Require mitigation of seismic or geologic hazards to the satisfaction of the responsible agencies.	See Goal 1.	The Project would be consistent with this policy.
Policy 1.2	Ensure all grading plans comply with the Uniform Building Code and California Building Code including, if necessary, requiring preliminary investigations of development sites by a State-registered geotechnical engineers and certified engineering geologists.	See Goal 1.	The Project would be consistent with this policy.
Policy 1.3	If necessary, require liquefaction assessment studies in any area identified as having moderate to high liquefaction susceptibility.	See Goal 1.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Goal 3	Minimize injury, loss of life, property damage, and economic and social disruption caused by flood hazards.	Implementation of (1) the SWPPP in conformance with the Construction General Permit, (2) the WQMP in compliance with the "New Development & Redevelopment Guidelines for Projects Under the March JPA," and (3) proposed drainage design according to the *Riverside County Flood Control & Water Conservation District Hydrology Manual* collectively ensure that Project impacts on hydrology and water quality would be less than significant.	The Project would be consistent with this goal.
Policy 3.3	Ensure all development within identified flood hazard areas complies with Floodplain Management Regulations.	See Goal 3.	The Project would be consistent with this policy.
Policy 3.4	Ensure that development does not divert stormwater runoff onto adjacent properties, or cause alterations of natural drainage courses that cannot be adequately handled by existing drainage facilities or the flood control improvements proposed with the development.	See Goal 3.	The Project would be consistent with this policy.
Policy 3.5	Require the installation and maintenance of storm drains by property owners.	See Goal 3.	The Project would be consistent with this policy.
Policy 3.6	Assess potential environmental drainage impacts of new construction, including the necessity and impact of Riverside County Flood Control and Water Conservation District drains and privately-owned and operated storm drains adjacent to slopes and stream-bed areas.	The Project is designed to provide adequate drainage of anticipated storm runoff. The Project is designed to provide for adequate drainage of anticipated storm runoff. Additionally, see Policy 3.4 for Project consistency analysis.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 3.7	Utilize and support storm drain maintenance efforts to prevent localized flooding and mud and debris flows from overtaxed storm drains during strong storms.	See Goal 3.	The Project would be consistent with this policy.
Policy 4.1	Ensure that law enforcement and fire services, such as fire equipment and response time, are adequate and able to respond to a major disaster.	With the nearby services of Station 65 – Moreno Valley Station as well as other nearby City of Moreno Valley and Riverside County fire stations, the Project would be served by sufficient fire protection services. The Riverside County Fire Department ensures that new development complies with the California Fire Code (24 CCR, Part 9). Buildings would be required to install fire prevention devices, such as fire alarms and sprinklers, in order to improve emergency-related problems for the proposed development. Zoned sprinkler systems would be installed throughout the building. Per discussions with the City of Moreno Valley Police Department, the development of the industrial use may result in additional enforcement calls and emergency responses, incrementally increasing demand for additional law enforcement personnel and services in the City of Moreno Valley and surrounding area. None of these increases, however, would trigger the need for new or improved facilities in order to meet the additional demand as no new population is expected per City of Moreno Valley Police Department. Any additional personnel (officers, supervisors, or support staff), equipment, and vehicles necessary could be accommodated at existing facilities. The proposed Project would also pay the criminal justice public facilities DIFs.	The Project would be consistent with this policy.
Policy 4.5	Ensure that new access roads have adequate widths and turning radius for fire and emergency vehicles.	All areas of the Project site would be accessible to emergency responders during both Project construction and operation. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. These access points, along with the internal drive aisles and other on-site circulation design features, would provide emergency responders access to the entirety of the site.	
Policy 4.6	Coordinate with the Riverside County Fire Department to support the development of adequate water supplies for emergency fire flow needs in an emergency, including on-site supplies of water, supplementary gravity-fed 1 water tanks, and auxiliary water distribution systems.	As part of standard development practices, prior to construction, Project plans would be reviewed by the Riverside County Fire Department, and the Project would be required to incorporate the County Fire Department's recommendations into the final Project design. The Project would coordinate with the Riverside County Fire Department to support the development of adequate water supplies for emergency fire flow during an emergency.	The Project would be consistent with this policy.
Policy 7.2	Ensure development and use of property within the vicinity of the airfield complies with appropriate building standards and codes, including height restrictions, restrictions on use, setbacks, population densities, insulation and materials, as contained within an approved Comprehensive Land use Plan and appropriate AICUZ.	The Project site is located in Zone C1, which allows for the uses proposed by the Project. The Project site is not located within a designated Accident Potential Zone (APZ) I or APZ II, and instead lies outside of all APZs. Within the C1 Zone which limits projects to no more than 100 people per acre. The proposed land use on the K4 Parcel, which is 35.4 acres, would employ approximately 900 people, which is below the 100 people per acre threshold. As such, this Project would be compatible with this zone. The Project would comply with 2005 Air Installation Compatible Use Zone Study and the March ARB/Inland Port ALUCP. The Project would be developed in accordance with the March JPA Development Code that would ensure the Project meets the setback requirements, height restrictions,	The Project would be consistent with this policy, as discussed above.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		site and building design, site orientation, etc. that would be compatible with adjacent and surrounding land uses. The Project will submit an FAA 7460-1 application through ALUC to ensure compatibility. Within 5 days after construction of the Project reaches its greatest height, an FAA Form 7460-2 shall be completed by the Project proponent or his/her designee and e-filed with the FAA.	
Policy 8.8	Encourage private businesses to develop disaster preparedness plans for their employees.	Future tenants of the Project would provide identification of the exit routes and signage to their employees, as required by law.	The Project would be consistent with this policy.
Transportation Element			
Policy 3.5	Driveway Entrances onto surrounding arterial highways, major and minor arterials streets should be redistricted when practical, and through traffic on interior streets should be minimized.	Driveway entrances onto surrounding arterial highways, major, and minor arterials would be redistricted when practical. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Driveways would be provided, each of which would be designed and constructed according to March JPA standards and under the direction of a licensed and qualified civil engineer.	The Project would be consistent with this policy.
Policy 4.3	Arterial roads should carry both local and through traffic and be planned and improved to maintain a Level of Service "D" or better with limiting circumstances of Level of Service "E" to occur.	Improvement strategies (**MM-TRAF-1** through **MM-TRAF-20**) would be required to improve on-site, site-adjacent, and off-site circulation; payment of TUMF fees; fair share fees to the City of Riverside, County of Riverside, City of Moreno Valley, and Caltrans. Refer to Section 4.11, Transportation for detail discussion.	The Project would be consistent with this policy with implementation of **MM-TRAF-1** through **MM-TRAF-20**; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 4.4	Through traffic planning, measures should be implemented to alleviate direct impacts to adjoining jurisdictions which decrease roadway function Level of Service below the jurisdiction's adopted accepted Level of Service, as appropriate.	The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project.	The Project would be consistent with this policy.
Policy 4.5	Require the dedication and improvement of arterial roadways prior to the issuance of certificates of occupancy.	Improvement strategies (**MM-TRAF-1** through **MM-TRAF-20**) would be required to improve on-site, site-adjacent, and off-site circulation; payment of TUMF fees; fair share fees to the City of Riverside, County of Riverside, City of Moreno Valley, and Caltrans. Refer to Section 4.12, Transportation for detail discussion.	The Project would be consistent with this policy with implementation of **MM-TRAF-** through **MM-TRAF-20**; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.
Goal 6	Establish vehicular access control policies in order to maintain and insure the effectiveness and capacity of arterial roadways.	See Policy 4.5.	The Project would be consistent with this policy with implementation of **MM-TRAF-** through **MM-TRAF-20**; however, implementation of these fees to fund the infrastructure improvements necessary to mitigate Project impacts cannot be guaranteed.
Policy 6.1	To the extent possible, access shall be provided on local or collector streets where the frontage is available on both local and arterials streets.	Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Driveways would be designed and constructed according to March JPA standards and under the direction of a licensed and qualified civil engineer. Similarly, the internal drive aisles, and loading and parking areas would be designed to comply with March JPA width, clearance, and turning radius requirements.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 6.2	Access to an arterial road shall be limited to one point for every 300 feet of frontage or one point for parcels with less than 300 feet of frontage.	Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. These access-points would provide access to the Project site with over 300 feet spacing between the cul-de-sacs.	The Project would be consistent with this policy.
Policy 7.2	Require major employers to prepare Transportation Management Plans with provisions for carpooling and vanpooling, flexible work hours or other techniques.	Project design shall include a designated bicycle route connecting all units, on-site bicycle parking facilities, off-site bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within one-half mile. Bicycle route connects to all streets contiguous with Project site. Additionally, as required within **MM-AQ-5**, the following would be included for the proposed Project: • 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools. • Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet of office space may pursue video conferencing as feasible. • The Project will provide short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces). • The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).	The Project would be consistent with this policy with implementation of **MM-AQ-5**.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		• Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Each tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will consider the provision of an ATM machine as feasible.	
Goal 9	Develop measures which will reduce the number of vehicle-miles travelled during peak travel periods.	Project design shall include a designated bicycle route connecting all units, on-site bicycle parking facilities, off-site bicycle facilities, site entrances, and primary building entrances to existing Class I or Class II bike lane(s) within one-half mile. Bicycle route connects to all streets contiguous with Project site. Additionally, as required within **MM-AQ-5**, the following would be included for the proposed Project: • 5% of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools. • Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet of office space may pursue video conferencing as feasible. • The Project will provide short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces). • The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).	The Project would be consistent with this goal with implementation of **MM-AQ-5**.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
		• Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Each tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will consider the provision of an ATM machine as feasible.	
Policy 9.2	Provide preferential parking for carpools and vanpools, where appropriate.	See Goal 9.	The Project would be consistent with this policy with implementation of **MM-AQ-5**.
Goal 10	Regulate the travel of trucks on March JPA Planning Area streets.	Trucks would access and leave the Project site solely via Cactus Avenue and I-215.	The Project would be consistent with this goal.
Policy 10.1	Establish a truck route system which designates truck commercial vehicle routes and provides adequately sized and designated roadways to meet the needs of trucks and commercial vehicles. This will eliminate truck and commercial vehicle traffic through inappropriate areas of the March JPA Planning Area.	See Goal 10.	The Project would be consistent with this policy.
Goal 11	Adequate off-street parking for all land uses shall be provided which requires adequate on-site parking to prevent spill over on the adjacent street system.	Parking requirements require 260 stalls for the proposed Project. Parking for employees and non-employee vehicles would be accommodated by 289 automobile parking stalls, and 317 truck trailer parking stalls on site. The on-site parking would prevent spill over on the adjacent street system.	The Project would be consistent with this goal.
Policy 11.1	Provide for adequate parking facilities for all uses.	See Goal 11.	The Project would be consistent with this policy.
Policy 11.4	Require all new development to provide adequate off-street parking based on expected parking needs.	See Goal 11.	The Project would be consistent with this policy.

Table 4.9-1
Project Consistency with March Joint Powers Authority General Plan

Goal or Policy/ Recommendation Number	Goal or Policy/Recommendation	Project	Project Consistency/ Inconsistency
Policy 11.5	Provide adequate loading areas within off-street parking areas for all commercial and manufacturing land uses.	The internal drive aisles, and loading and parking areas would be designed to comply with March JPA width, clearance, and turning radius requirements.	The Project would be consistent with this policy.
Goal 15	In accordance with state and federal law, promote and provide mobility for the disabled.	The Project shall comply with all applicable ADA requirements as required by state and federal law.	The Project would be consistent with this goal.
Policy 15.1	Require that all development comply with the requirements of the state and federal law for the disabled. Requirements may include ramps at street corners, access to public buildings, traffic signal timing and the like.	See Goal 15.	The Project would be consistent with this policy.

Notes: GP = General Plan; AFB = Air Force Base; JPA = Joint Powers Authority; APN = Assessor's Parcel Number; ARB = Air Reserve Base; dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level; APZ = Accident Potential Zone; FAA = Federal Aviation Administration; EIR = environmental impact report; WMWD = Western Municipal Water District; RTP = Regional Transportation Plan; SCS = Sustainable Communities Strategy; MW = megawatt; HVAC = heating, ventilation, and air conditioning; SEER = Seasonal Energy Efficiency Ratio; SCAQMD = South Coast Air Quality Management District; CalEEMod = California Emissions Estimator Model; LID = low impact development.

As outlined in Table 4.9-1, the Project would be consistent with the goals and policies presented in the March JPA General Plan. Impacts are considered **less than significant with mitigation incorporated.**

The Project site is also subject to compliance with the *2005 Air Installation Compatible Use Zone (AICUZ) Study* (March ARB 2005) and the *March ARB/Inland Port ALUCP* (Mead & Hunt 2014).

March JPA General Plan and Development Code

As previously mentioned, the Project would require a General Plan amendment that would re-designate the Project site from Business Park to Industrial. Additionally, the Project would include a zoning designation of Industrial, consistent with the requested General Plan designation of Industrial. Table 4.9-2 demonstrates the Project's compliance with the March JPA's Development Code.

Table 4.9-2
Project's Compliance with the March Joint Powers Authority's Development Standards

Development Standards	Required/Permitted	Project Provided
Site Area	35.4 acres	35.4 acres
Lot Dimensions Lot Width Lot Depth	600 feet 600 feet	~2,000 feet ~700 feet
Building Height	80 feet maximum	46 feet
Building Setbacks		
Front Side (Interior) Side (Street Side) Rear	20 feet 3 feet 20 feet 3 feet	240 feet 79 feet 79 feet 41 feet
Parking Requirements		
Warehouse		
0–50,000 sf – 1/1,000 50,000 sf – 200,000 sf 500,000 sf +	50 50 100	289 automobile spaces
Office		
18,000 sf	60	
Total Spaces Required	**260 spaces**	**289 spaces** **105 loading docks**

Notes: sf = square feet.

As shown in Table 4.9-2, the Project would be in compliance with the March JPA Development Code Standards. Therefore, the Project would be consistent with the March JPA Development Code, and impacts would be **less than significant**.

Threshold LU-2. Would the Project conflict with any applicable habitat conservation plan or natural community conservation plan?

As discussed in Section 4.3 Biological Resources, the Cactus Channel would function as part of the District's Master Plan, and these agencies are party to the Western Riverside County MSHCP area. The K4 Parcel is also located within the boundaries of the MSHCP. The March JPA is not a permittee to the MSHCP, and thus, does not have to comply with the Reserve Assembly goals of the MSHCP or any other MSHCP requirements. The Project site is not located in an area subject to Cell Criteria, Public/Quasi-Public Conserved Land areas, existing conserved Additional Reserve Land, or land described for conservation under the MSHCP, and therefore the Project's development would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented (Figure 4.3-3, MSHCP Overview, of Appendix E).

The Project site is located within an identified burrowing owl survey area within the MSHCP. Although burrowing owl individuals and/or sign were observed during general biological surveys conducted within the Project site in July 2018, focused burrowing owl surveys were not conducted and suitable burrowing owl habitat occurs on site and in adjacent areas immediately south of the Project site. Thus, additional burrowing owl measures within **MM-BIO-5** including, but not limited to preconstruction surveys for burrowing owl within 30 days of ground-disturbing activities, avoidance and minimization measures if found, potential preparation of a burrowing owl Relocation Plan, and potential compensatory mitigation, would ensure consistency with the MSHCP. As such, the development of the Project would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented. Conflicts with the MSHCP would be **less than significant** with Project implementation, and no additional mitigation is required.

Although suitable Stephens' kangaroo rat habitat was identified within the Project site (i.e., K4 Parcel and Cactus Channel improvements area), focused surveys were conducted for Stephens' kangaroo rat in 2018 with negative results. Provided that this species has not been identified within the Project site, and the negative findings for this species, Stephens' kangaroo rat are not expected to occur within the Project site and impacts to this species are anticipated to be **less than significant**, and further reduced by implementation of **MM-BIO-4** (presence/absence surveys if burrows cannot be avoided, installation of one-way doors, if present, development of a trapping/relocation plan, and mitigation requirements). Federally listed large branchiopod protocol-level surveys are currently underway, and results of these surveys will be provided to USFWS as per the survey requirements. If this species is identified to be present on site, then additional fairy shrimp measures within **MM-BIO-3** including, but not limited to conducting focused surveys, establishing Environmentally Sensitive Areas within 250 feet of occupied features, biological monitoring, establishment of BMPs, preparation of a Mitigation, Monitoring, and Management Plan, and mitigation requirements (i.e., minimum of 1:1 mitigation for temporary impacts and 2:1 mitigation for permanent impacts). Impacts to state and/or federally jurisdictional

waters would be less than significant with implementation of **MM-BIO-9**, which requires that state and/or federal permits be acquired prior to impacts, establishment of BMPs, biological monitoring, and mitigation requirements (i.e., minimum of 1:1 mitigation for temporary impacts and 2:1 mitigation for permanent impacts). Conflicts with the MSHCP would be **less than significant** with Project implementation, and no additional mitigation is required.

4.9.5 Mitigation Measures

The proposed Project is required to implement the following mitigation measures to reduce potentially significant Land Use and Planning impacts:

- **MM-AQ-1** through **MM-AQ-6**
- **MM-BIO-1** through **MM-BIO-9**
- **MM-CUL-1** through **MM-CUL-2**
- **MM-GEO-1**
- **MM-HAZ-1** through **MM-HAZ-8**
- **MM-TRAF-1** through **MM-TRAF-20**

4.9.6 Level of Significance After Mitigation

Impacts to land use and planning can be mitigated to less than significant levels by incorporating mitigation measures as described in Section 4.9.5 above. Therefore, no significant adverse impacts would remain after mitigation; impacts to land use and planning would be less than significant.

4.9.7 References

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CHAPTER 5
MANDATORY CEQA TOPICS

5.1 INTRODUCTION

Section 15128 of the California Environmental Quality Act (CEQA) guidelines requires that an environmental impact report (EIR) briefly describe potential environmental effects that were determined not to be significant and therefore were not discussed in detail in the EIR. The environmental issues discussed in the following sections are not considered significant, and the reasons for the conclusion of non-significance are discussed below.

The following is a guide to where most of these issues are discussed in this EIR:

- Significant Environmental Effects – throughout Chapter 4
- Mitigation Measures – Executive Summary and throughout Chapter 4
- Alternatives – Chapter 7
- Growth-Inducing Impacts – Chapter 8

Because the above issues are discussed in other sections of this EIR, this chapter will only address the significant unavoidable and irreversible impacts from implementation of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project).

5.1.1 Significant Unavoidable Environmental Effects

CEQA Guidelines Section 15126.2(b) further directs EIRs to address impacts from a project that will result in significant impacts, including those that cannot be mitigated below a level of significance. A summary of all the environmental issue areas and the resultant significance and listing of mitigation measures is found in the Executive Summary of this document. To summarize, the following issue areas would result in significant impacts even after mitigation measures have been incorporated, thus resulting in unavoidable impacts:

- Air Quality – oxides of nitrogen emissions during construction
- Transportation

5.1.2 Significant Irreversible Changes

CEQA Guidelines mandate that the EIR must address any significant irreversible environmental changes that would be involved in the proposed action should it be implemented (14 CCR 15126(c)). An impact would fall into this category if:

- The project would involve a large commitment of nonrenewable resources
- The primary and secondary impacts of the project would generally commit future generations of people to similar uses

- The project involves uses in which irreversible damage could result from any potential environmental incidents associated with the project
- The proposed consumption of resources is not justified (e.g., the project results in wasteful use of energy)

Determining whether the proposed Project may result in significant irreversible effects requires a determination of whether key resources would be degraded or destroyed in such a way that there would be little possibility of restoring them. Construction of each of the Project components would result in the use of nonrenewable resources and energy sources, including fossil fuels, natural gas, and electricity, as discussed in Section 4.14, Energy, of this EIR. Fossil fuels would be used to power construction equipment and delivery and construction employee vehicles. Construction equipment would also use electricity and natural gas. Use of these energy sources would be considered a permanent commitment of resources. However, Project impacts related to consumption of nonrenewable resources are considered to be less than significant because the Project would not use unusual or wasteful amounts of energy or construction materials. Because the proposed Project would not consume an unusual or wasteful amount of energy or materials, and would comply with California Building Energy Efficiency Standards (24 CCR Part 6), potential impacts associated with non-renewable energy consumption would be less than significant. In addition, a variety of resource materials would be used during the construction process, including steel, wood, concrete, and fabricated materials. Once these materials and fuels are used for purposes of construction, the commitment of such materials and fuels would be considered irreversible. These construction materials and fuels would likely be committed to other similar projects in the region if not used for this Project. Resources used for the Project would be typical of similar industrial projects in the region. Therefore, although irretrievable commitments of resources would result from the proposed Project, such changes would be less than significant. Provision of utilities and energy use are discussed in Section 4.13, Utilities and Service Systems, and Section 4.14.

Once operational, the Project components would consume more energy on a daily basis than is currently consumed on the Project site, given that the Project site is currently undeveloped. A portion of the energy used would be provided by nonrenewable sources. Once constructed, it is reasonable to assume that the industrial facilities would use nonrenewable energy resources, which would be an irreversible commitment of such resources. Additionally, the Project is a relatively minor energy consumer compared to other local and regional users.

The utilities that service the Project, and the design of the proposed Project are all subject to regulations that are working to reduce the amount of nonrenewable resources from development projects. Irreversible changes may also occur from environmental damage, such as spill or release of hazardous material, flooding due to failure of human-made structure for channeling, or accidental fire resulting from mechanical or industrial failure. While there are many other types of accidents possible, those listed above represent the key sources for irreversible damage that can be associated

with the types of future development. However, it is assumed that all new uses of hazardous materials would occur pursuant to applicable laws and regulations. That is, industrial use involving hazardous materials would obtain and comply with a valid materials license specifying the requisite safety measures for the use, handling, storage, transportation and disposal of these materials. Additionally, all drainage improvements would all be subject to the extensive local, state, and federal regulations, building codes and geotechnical standards enacted to ensure that such uses do not result in a geotechnical, soil, or slope hazard. Therefore, this would not be considered a significant irreversible environmental effect or cause irreversible environmental damage.

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CHAPTER 6
CUMULATIVE EFFECTS

6.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires that an environmental impact report (EIR) examine the cumulative impacts associated with a project, in addition to project-specific impacts. The discussion of cumulative impacts must reflect the severity of the impacts and the likelihood of their occurrence; however, the discussion need not be as detailed as the discussion of environmental impacts attributable to the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) alone (14 CCR 15130(b)).

As stated in the CEQA Guidelines, an EIR "shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable" (14 CCR 15130(a)). "Cumulatively considerable" means that "the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects as defined in Section 15130" (14 CCR 15065(c)). Section 15355 of the CEQA Guidelines states that cumulative impacts occur from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

A cumulative impact is not considered significant if the impact can be mitigated to below the level of significance through mitigation, including providing improvements and/or contributing funds through fee-payment programs. The EIR must examine "reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project" (14 CCR 15130(a)(3) and 15130(b)(5)).

6.2 CUMULATIVE ANALYSIS SETTING

The proposed Project consists of two components: the K4 Parcel Warehouse and the Cactus Channel improvements. For the purposes of this cumulative analysis, the analysis will refer to the combined two components as the proposed Project, unless separate analysis of the two components is justified. Where such separate analysis is provided, the discussion will clearly indicate which Project component is being discussed. The cumulative impact analysis for the proposed Project is based on information contained in the *General Plan of the March Joint Powers Authority (JPA)* (March JPA 1999) and the *March Air Reserve Base (ARB)/Inland Port Airport Land Use Compatibility Plan* (ALUCP) (Mead & Hunt 2014), since the Project site is located within the March JPA Planning Area and within these land use plan and study areas. All the above-mentioned documents are incorporated in this chapter by reference.

6.3 CUMULATIVE FORECASTING METHODOLOGY

Section 15130(b)(1)(A) of the CEQA Guidelines allows for the preparation of a list of past, present, and reasonably anticipated future projects as a viable method of determining cumulative impacts. This discussion uses the following approach: an initial list and description of all related projects is presented, followed by a discussion of the effects that the Project may have on each environmental category of concern. Consistent with CEQA (California Public Resources Code, Section 21000 et seq.), this discussion is guided by the standards of practicality and reasonableness.

6.3.1 Related Projects

This section provides a list of past, present, and reasonably foreseeable future projects based on the information that was provided in the Traffic Impact Analysis prepared for the proposed Project (Appendix R). The cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Riverside, City of Moreno Valley, and County of Riverside to include key projects in their respective jurisdictions.

Table 6-1 presents the cumulative projects generally within a 20-mile radius of the Project site that captures the March JPA Planning Areas as well as the surrounding areas. The projects listed in Table 6-1 serve as the foundation on which the cumulative analysis approach has been based. Figure 6-1, Cumulative Projects, shows geographically where the projects listed in Table 6-1 are located. As shown in Figure 6-1, the nearest project listed in Table 6-1 is the Cactus Commerce Center Drive Project, located approximately 0.3 miles west of the proposed Project. However, the geographic extent for cumulative analysis varies depending on each environmental issue area. For example, air quality impacts need to consider the entire South Coast Air Basin (SCAB), whereas noise impacts would be limited to the area more immediately surrounding the proposed Project. The geographic extent for cumulative analysis of each environmental issue are is described below.

Table 6-1
Cumulative Projects

ID	Project Name	Land Use	Density	Location	Status
March JPA					
MJPA1	Meridian Business Park (West Campus)	Industrial Park	2,278,852 sf	West of the MARB and the I-215	Approved
MJPA2	Meridian South Campus	Warehouse General Office Commercial Retail Fast Food w/ Drive Thru Gas Station	500,000 sf 338,800 sf 7,905 sf 3,300 sf 12,000 sf	South of Van Buren Boulevard and west of Village West Drive	Under construction

Table 6-1
Cumulative Projects

ID	Project Name	Land Use	Density	Location	Status
MJPA3	Meridian South Parcel Delivery	Warehouse	1,699 employees	South of Van Buren Boulevard and west of Village West Drive	Under review
MJPA4	Freeway Business Center	Warehouse	709,000 sf	Southeast corner of Seaton Avenue and Cajalco Expressway	Under construction
MJPA5	Veteran's Industrial Plaza/VIP 215	Warehouse	2,000,000 sf	East of the Interstate 215 Freeway off-ramp at Van Buren Boulevard; south of existing March Field Air Museum; west of an existing March Air Reserve Base airport runway	Under review
MJPA6	Veteran's Plaza	Commercial	198,000 sf	Northwest corner of 6th Street and N Street	Approved
MJPA7	MS Van Buren I	Warehouse	176,396 sf	Northeast corner of Meridian Parkway and Van Buren Boulevard	Approved
MJPA8	MS Van Buren II	Warehouse	162,041 sf		Approved
MJPA9	MS Prime Six	Office Building	74,922 sf	22180 Van Buren Boulevard	Approved
MJPA10	Meridian Distribution Center IV	Warehouse	90,000 sf	21800 Opportunity Way	Completed
MJPA11	MS Alessandro	Industrial Park	157,512 sf	Southeast corner of Alessandro Boulevard ad Meridan Parkway	Under review
MJPA12	Meridian Business Park North	Industrial Park	3,706,148 sf	West of I-215 and north of Van Buren Boulevard	Under review
MJPA13	Meridian Business Park South	Warehouse	2,510,000 sf	20801 Krameria Avenue	Under review
MJPA14	March Lifecare Campus Specific Plan	Medical Office Commercial Retail Research & Education Hospital Institutional Residential	190,000 sf 210,000 sf 200,000 sf 50,000 sf 660,000 sf	Northeastern corner of MARB	Approved
City of Moreno Valley					
MV1	PEN16-0039	Multifamily	272 du	South of Alessandro Boulevard and East of Perris Boulevard	Approved
MV2	Scottish Village	Multifamily	194 du	North of Cottonwood Avenue and east of Elsworth Street	Approved

Table 6-1
Cumulative Projects

ID	Project Name	Land Use	Density	Location	Status
MV3	TM 33607	Multifamily	52 du	North of Ironwood Avenue and west of Nason Street	Approved
MV4	TM 36708	SFDR	122 du	South or Kalmia Avenue and east of Kitching Street	Approved
MV5	TM 32556	SFDR	32 du	Northeast of Poppystone Drive and Heacock Street	In process
MV6	PA15-0039 Global Investment & Dev LLC	Residential	272 units	Northwest corner of Ironwood Avenue and Oliver Street	In Process
MV7	TM 34748	SFDR	135 du	Southeast corner of Gentian and Heacock Street	Approved
MV8	World Logistics Center	High-Cube Warehouse	41,400,000 sf	East of Redlands Boulevard, south Eucalyptus Avenue	Approved
MV9	Kaiser Permanente Moreno Valley Medical Center Master Plan	Medical Campus Expansion Parking Structure	460 beds 1,125,000 sf	north side of Iris Avenue, west of Oliver, and east of Nason Street	Under review
MV10	Indian Street Commerce Center Project	Industrial	347,080 sf	South of Grove View Road on the west side of Indian Street	Approved
MV11	Moreno Valley Logistics Center	Logistics Center	1,736,180 sf	South of SR-60, east of Redlands Boulevard, west of Gilman Springs Road and north of the San Jacinto Wildlife Area	Waiting for approval
MV12	Brodiaea Commerce Center Project	High-Cube Warehouse	261,807 sf	Northwest corner of Brodiaea Avenue and Heacock Avenue	Approved
MV13	Cactus Commerce Center Drive	Commercial Retail Drive Thru	1.500 sf 8,900 sf	Northeast corner of Cactus Avenue and Commerce Center Drive	Under construction
City of Riverside					
R1	P15-1035/P16-0556/P16-0567 (Rev Wheel Industrial Park)	Warehouse	176,149 sf	West side of Old Frontage Road, between Alessandro Boulevard and Cottonwood Avenue	Completed
R2	P14-0841 to P14-0848/P16-0472/P16-0474	Warehouse Commercial Retail	73,200 sf 15,000 sf	northeast corner of the intersection of Alessandro Boulevard and I-215	Completed
R3	P14-0472/P14-0473/P15-0321/P15-0322 (Planned Residential Development)	SFDR	85 du	Northerly side of Grove Community Drive, between Trautwein Road and Worchester Lane	Under review
R4	Magnolia Business Center	Industrial complex	280,598 sf	12000 Magnolia Avenue	Approved

Table 6-1
Cumulative Projects

ID	Project Name	Land Use	Density	Location	Status
R5	Main Street Plaza Project	Commercial: Car Wash Convenience Store Fast Food Restaurant	5,823 sf 3,645 sf 2,546 sf	2234 N. Main Street, 2225 Orange Street	Under review
R6	Park Sierra Development	Multi-tenant Commercial	9,520 sf	Northwest of the corner of Vallejo Street and Indiana Avenue	Under review
R7	Jones Wholesale Lumber	Office Storage	3,331 sf 21,000 sf	7027 Central Avenue Riverside	Approved
R8	Merill Avenue Brownstones	Mixed-Use: Residential Retail	98,608 sf 1,200 sf	3661 Merrill Avenue	Under review
R9	750 Marlborough Avenue Warehouse	Industrial Office	346,330 sf 6,820 sf	750 Marlborough Avenue and 1550 Research Park Drive	Under review
R10	Entrada Housing Project	Residential	65 units	Northwest corner of 7th Street and Chicago Avenue	Under review
County of Riverside					
CR1	SP 341; PP 21552 (Majestic Freeway Business Center)	High-Cube Warehouse	6,200,000 sf	West of I-215, north of Cajalco Expressway and south of Harley Knox Boulevard	Under construction
CR2	Vista Nuevo Project	Residential	314 units	Southeast corner of Nuevo Road and Dunlap Drive	Under review
CR3	Toscana Village	Commercial: gas station, Restaurants, Retail, Office, Supermarket	61,000 sf	East of I-15, north of Indian Truck Trail and Corona Lake, and west of Temescal Canyon Road	Under review
CR4	Rio Vista	SFDR	584 units	Northwest corner of South Jacinto Avenue and Pico Avenue	Under review
CR5	Windchester Community Plan	Residential Non-residential	TBD	Between Simpson Road and Stetson Avenue, and between Double Butte and California Avenue	In planning process
CR6	Alessandro Commerce Center	Industrial Warehouse	814,630 sf	south of Alessandro Boulevard, north of March Air Reserve Base	Complete

1 SFDR = Single Family Detached Residential.
2 DU = Dwelling Units; sf = Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions; STU = Students; EMP = Employees.
3 **Source:** Appendix R.
4 **Source:** Meridian West Campus Traffic Impact Analysis.
5 **Source**: City of Moreno Valley 2017.

6.4 ASSESSMENT OF CUMULATIVE IMPACTS

6.4.1 Aesthetics

The geographic extent for this cumulative impact analysis includes the March JPA Planning Area jurisdiction as well as portions of the City of Moreno Valley and Riverside County visibility accessible to the Project site. The Project site is located in an urbanized area within the County of Riverside, with commercial, industrial, residential, and federal uses in the Project vicinity. The K4 Parcel is currently undeveloped, yet previously disturbed land with perimeter fencing adjacent to existing industrial warehouse and office development. Mount Russel is visible from the K4 Parcel and Cactus Channel Improvement Site when facing east, however, according to the March JPA General Plan, this view is not designated as a scenic vista (Exhibit 5-5 in March JPA 1999). Additionally, according to the City of Moreno Valley General Plan Conservation Element, and the City of Riverside General Plan Open Space and Conservation Element, there are no designated scenic view or vista in the Project area (City of Moreno Valley 2006; City of Riverside 2012).

As described in Chapter 2, Project Description, of this EIR, the development on the K4 Parcel would cover approximately 35.4 acres and would consist of an industrial warehouse building and underground improvements to the existing Cactus Avenue Drainage Channel (Cactus Channel). The area surrounding the K4 Parcel generally includes commercial, office, and industrial uses, and the Interstate 215 (I-215) freeway.

Visual Character of Public Views

The K4 Parcel primarily consists of upland vegetation communities dominated by disturbed goldenbush/non-native grassland and developed/disturbed land. While implementation of the K4 Warehouse and Cactus Channel Improvements would change the immediate area's visual character, the new warehouse on the K4 Parcel would be generally consistent and compatible with the visual character along the Cactus Avenue corridor and the underground box culvert would be relatively non-visible and concealed through irrigated landscaping. Additionally, the larger visual context north, west and south of the Project site is predominantly industrial, commercial, and March ARB development. The proposed Cactus Channel improvements would result in noticeable visual changes to nearby receptors due to the removal of existing in-channel vegetation and replacement with a closed, yet depressed, box culvert. These changes would also affect the expectation of nearby casual observers that are accustomed to views of natural-appearing and unmaintained in-channel vegetation. However, the proposed approximately 7,900 linear-foot underground box culvert would be concealed through irrigated landscaping contoured mounds. The nearest cumulative project is the Cactus Commerce Center Drive Project, located approximately 0.3 mile west of the proposed Project, which would develop a vacant parcel into commercial and retail uses with a drive-thru. The Cactus Commerce Center Drive Project would be consistent with the visual character along the Cactus Avenue corridor, thus the nearby receptors would

not be significantly affected by this project in combination with the proposed Project. All other cumulative projects are not in close enough proximity to impact the visual character in combination with the proposed Project. As such, implementation of the K4 Parcel and Cactus Channel improvements in addition to the identified projects in Table 6-1, would not result in cumulatively considerable impacts to visual character.

Light and Glare

Implementation of the K4 Parcel warehouse building would introduce new sources of lighting in an area of March JPA that is currently undeveloped. However, as discussed in Section 4.1, Aesthetics, there is existing lighting in the surrounding area consisting of street lights on Cactus Avenue, and interior and exterior lighting from commercial and office land uses. Structures in the surrounding area are constructed with low reflective building materials. Lighting associated with the proposed Project would be of a similar nature to the daytime and nighttime illumination currently generated by surrounding commercial, and industrial developments, as well as existing light associated vehicle traffic. All lighting proposed for the Project would be subject to compliance with the provisions of March JPA Development Code, which would ensure proper design, installation, and operation of all exterior lighting, thereby reducing the potential for glare effects and light spillover onto adjacent properties. There would be no lighting associated with the Cactus Channel improvements. As such, given the commercial/industrial context of the surrounding area, implementation of the K4 Parcel and the Cactus Channel improvements would not result in or contribute to cumulatively significant lighting or impacts.

6.4.2 Air Quality

The geographic extent for the analysis of cumulative impacts related to air quality includes the SCAB (all cumulative projects in Table 6-1 are located within the Basin). In analyzing cumulative impacts from the K4 Parcel and Cactus Channel improvements, the analysis must specifically evaluate a project's contribution to the cumulative increase in pollutants for which the SCAB is designated as nonattainment for selected air pollutants under the California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). If a project's emissions would exceed the South Coast Air Quality Management District (SCAQMD) significance thresholds, it would be considered to have a cumulatively considerable contribution to nonattainment status in the SCAB. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant (SCAQMD 2015).

The SCAB has been designated as federal nonattainment area for ozone (O_3) and particulate matter with an aerodynamic diameter equal to or less than 2.5 microns ($PM_{2.5}$) and a state nonattainment area for O_3, particulate matter with an aerodynamic diameter equal to or less than 10 microns (PM_{10}), and $PM_{2.5}$. PM_{10} and $PM_{2.5}$ emissions associated with construction generally result in

localized impacts. The nonattainment status is the result of cumulative emissions from all sources of these air pollutants and their precursors within the SCAB. As discussed in Section 4.2, Air Quality, of this EIR, the oxides of nitrogen (NO_x) and volatile organic compounds (VOC) emissions during K4 Parcel construction would be above the significance threshold without mitigation. Construction activities required for the implementation of the K4 Parcel Project component would be considered typical of a warehouse facility.

Cumulative localized impacts would potentially occur if a construction project were to occur concurrently with another off-site project. Construction schedules for potential future projects near the Project site are currently unknown; therefore, potential construction impacts associated with two simultaneous projects would be considered speculative. The CEQA Guidelines state that if a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact (14 CCR 15145). This analysis is nonetheless provided in an effort to show good faith analysis and comply with CEQA's information disclosure requirements.

Construction of the proposed Project would generate VOC and NO_x emissions (which are precursors to O_3) that would exceed the SCAQMD's emission-based significance threshold. Mitigation measure **MM-AQ-1** and **MM-AQ-2** (see Section 4.2.7, Level of Significance After Mitigation, of this EIR) would reduce NO_x and VOC emissions, respectively, to **less than significant** levels. Thus, the proposed Project would not have a cumulatively considerable increase in emissions due to construction.

In terms of localized air pollutant concentrations of nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), PM_{10}, and $PM_{2.5}$, construction and operation of the Project would have a less than significant impact. According to the SCAQMD guidance, the Project's contribution to cumulative localized air quality concentrations of these pollutants would not be cumulatively considerable, and therefore, impacts would be **less than significant**.

There is no operational activity associated with the Cactus Channel improvements, hence operational emissions are zero (Appendix C, Air Quality Technical Report). Operational emissions generated by the proposed K4 Parcel Warehouse would exceed the SCAQMD operational threshold for NO_x (precursor to O_3) which is attributed to the vehicular source emissions from trucks traveling to and from the Project site. Mitigation Measures **MM-AQ-5** and **MM-AQ-6** would reduce mobile source emissions, but not to a level of less than significant. **MM-AQ-4** would apply to energy and water use, which are minimal sources of criteria air pollutants. Additionally, Mitigation Measures **MM AQ-5** and **MM-AQ-6** are conservatively not quantified for this analysis. For the reasons identified above, there is no feasible mitigation to reduce operational NO_x impacts to a less-than-significant level. As described above, if a Project's emissions exceed the SCAQMD significance thresholds for a pollutant or a precursor to a pollutant the SCAB is in nonattainment of under the CAAQS and/or NAAQS, it would have a cumulatively considerable contribution to

the SCAB's nonattainment status of that pollutant. Therefore, operation of the proposed K4 Parcel Warehouse component of the Project would contribute to the SCAB's O_3 nonattainment designation, and impacts would be **significant and unavoidable**.

With regard to cumulative impacts associated with nonattainment pollutants, in general, if a Project is consistent with the community and general plans, it has been accounted for in the attainment demonstration contained within the State Implementation Plan and would therefore not result in a cumulatively significant impact on the ambient air quality. The proposed Project would be consistent with the population and growth projections of the Southern California Association of Governments (SCAG). The proposed Project would indirectly stimulate population growth through the addition of new employees/staff. However, the growth would be consistent with employment growth envisioned in local and regional land use plans and in projections made by the March JPA. Since the proposed Project would be consistent with the SCAG *2016–2045 Regional Transportation Plan/Sustainable Communities Strategy*, the proposed Project would also be consistent with the SCAQMD Air Quality Management Plan (AQMP), because demographic growth forecasts for various socioeconomic categories (e.g., population, housing, employment by industry) developed by SCAG for their 2016 RTP/SCS were used to estimate future emissions in the 2016 AQMP. However, because operation of the K4 Parcel Warehouse could result in a cumulatively considerable increase in emissions of NOx, which are precursors to O_3, the K4 Parcel Warehouse component of the proposed Project would conflict with implementation of the applicable air quality plan. Thus, implementation of the K4 Parcel Warehouse would result in a **significant cumulative impact** to O_3 levels in the SCAB**.**

6.4.3 Biological Resources

The geographic extent for this cumulative impact analysis includes the jurisdiction of the March JPA Planning Area. This accounts for development projects within the nearby vicinity that may provide habitat for the same species as the proposed Project site.

Special-Status Plants and Wildlife

As discussed in Section 4.3, Biological Resources, the following species were identified as having a moderate or high potential to occur on site: smooth tarplant, Riverside fairy shrimp, vernal pool fairy shrimp, Stephen's kangaroo rat, burrowing owl, western spadefoot, California horned lark, nesting native birds, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, and Los Angeles pocket mouse. Focused surveys were not conducted for all species listed in this section. Special-status plants and wildlife have potential to occur on both the K4 Parcel and Cactus Channel Improvement Site. To reduce potential impacts to these species associated with both the Project components, mitigation measures **MM-BIO-1** through **MM-BIO-8** are required to reduce potential direct and/or indirect impacts to **less than significant.** Given that Project-specific impacts

to sensitive plant and animal species are less than significant with mitigation incorporated, the proposed Project (both the K4 Parcel and Cactus Channel components) would not create or contribute to a significant cumulative impact.

Special-Status Riparian Vegetation Communities

The K4 Parcel access driveways are proposed to cross over Cactus Channel to provide ingress/egress to the site from Cactus Avenue. These driveway crossings would permanently impact all potentially jurisdictional CDFW riparian vegetation communities on site (totaling approximately 0.06 acres) including 0.04 acres of freshwater marsh and 0.02 acres of southern willow scrub, which would result in potential significant impacts to riparian habitat. Potential indirect short-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, and changes in hydrology/hydraulics. **MM-BIO-2** and **MM-BIO-9** would be implemented to reduce potential indirect impacts to sensitive riparian vegetation communities.

The Cactus Channel improvements would permanently impact all potentially jurisdictional CDFW riparian vegetation communities on site (totaling approximately 0.48 acres), which would result in potential significant impacts. Riparian Potential indirect short-term impacts could also occur due to generation of fugitive dust, chemical pollutants, increased human activity, non-native invasive plant and animal species introduction, and changes in hydrology/hydraulics. With implementation of **MM-BIO-2** and **MM-BIO-9**, direct and indirect impacts to sensitive riparian vegetation would be **less than significant**. Given that Project-specific impacts to special-status riparian vegetation communities within the Cactus Channel are less than significant with mitigation incorporated, the collective proposed Project would not create or contribute to a significant cumulative impact.

Federally and State-Protected Wetlands

As discussed in Section 4.3.2, Relevant Plans, Policies, and Ordinances, the RWQCB is a division of the State Water Resources Control Board, provides oversight of the 401 permit (required by the Clean Water Act) process in California. The K4 Parcel access driveways are proposed to cross over Cactus Channel to provide ingress/egress to the site from Cactus Avenue. These crossings would permanently impact approximately 0.06 acres (131 linear feet) of potential Corps and RWQCB wetland waters of the United States/state. As concluded in the jurisdictional delineation, a majority of the Cactus Channel within the survey area met all three parameters per the Arid West Supplement and would therefore be considered potentially jurisdictional wetlands per the USACE and RWQCB. With incorporation of **MM-BIO-9**, the K4 Parcel would have a less than significant direct impact related to jurisdictional resources.

The proposed Cactus Channel Improvements would permanently impact approximately 1.34 acres (4,659 linear feet) of potential Corps and RWQCB wetland waters of the United States/state and

approximately 0.42 acres (2,876 linear feet) of non-wetland, ephemeral Corps and RWQCB waters of the United States/state during the construction of a box culvert along the Cactus Channel. The proposed Cactus Channel improvements would impact approximately 2.90 acres (7,535 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) and/or associated riparian habitat within the Cactus Channel. With incorporation of **MM-BIO-2** and **MM-BIO-9**, the K4 Parcel would have a less than significant direct impact related to jurisdictional resources. Cumulative projects listed in Table 6-1 would also be subject to consistency with the CWA, therefore, in combination with related cumulative projects, the K4 Parcel and Cactus Channel improvements would not result in or contribute to cumulatively significant impacts.

Migratory Fish or Wildlife Species

Construction of both the K4 Parcel Warehouse and the Cactus Channel improvements would have the potential to result in significant impacts to birds and raptors, in the event that such species were to be nesting, foraging, or reproducing within the biological resources study area. Implementation of **MM-BIO-7**, which requires pre-construction nesting bird surveys be conducted and impacts to protected nesting birds be avoided, has been included to avoid potential impacts to native nesting birds. With implementation of **MM-BIO-7**, impacts to native nesting birds would be **less than significant.** Given that Project-specific impacts to migratory fish and wildlife species are less than significant with mitigation incorporated, neither the K4 Parcel nor the Cactus Channel improvements would create or contributed to a significant cumulative impact.

Policies or Ordinances Protecting Biological Resources

No native oaks protected under the Riverside County Oak Tree Management Guidelines occur within the K4 Parcel or Cactus Channel Improvement Site and/or adjacent areas; therefore, the neither Project component would conflict with the County's Oak Tree Management Guidelines. Additionally, the K4 Parcel and Cactus Channel improvements would not conflict with the Unincorporated Riverside County Ordinance No. 559, which requires a permit for the removal of living native trees on parcels or property greater than 0.5 acres in size, located in the Unincorporated Riverside County, and above 5,000 feet in elevation. In addition, County of Riverside Ordinance 499 (as amended through 499.11) provides regulations on encroachments in County Highways and tree removal in the right or way of any County highway. Since no street tree plantings occur on the Project site, no impacts to trees protected under Ordinance No. 499.11 would occur with Project implementation. As discussed in Section 4.3, no impact would occur in relation to policies or ordinances protecting biological resources, therefore the K4 Parcel and Cactus Channel improvements would not create of contribute to a cumulatively significant impact.

Habitat Conservation Plan

The March JPA is not a permittee to the MSHCP, and thus, does not have to comply with the Reserve Assembly goals of the MSHCP or any other MSHCP requirements. The Project site is not located in an area subject to Cell Criteria, Public/Quasi-Public Conserved Land areas, existing conserved Additional Reserve Land, or land described for conservation under the MSHCP, and therefore the Project's development would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented. However, the Project site is located within an identified burrowing owl (BUOW) survey area within the MSHCP. Stephens' kangaroo rat are not expected to occur within the Project site and impacts to this species are anticipated to be **less than significant**, and further reduced by implementation of **MM-BIO-4.** Federally listed large branchiopod protocol-level surveys are currently underway. If this species is identified to be present on site, then additional fairy shrimp measures within **MM-BIO-3** would be implemented. As such, the development of the K4 Parcel and Cactus Channel improvements would not interfere or conflict with the ability of the MSHCP goals and objectives to be implemented. Conflicts with the MSHCP would be **less than significant** with implementation of both Project components, and no additional mitigation is required. As such, the K4 Parcel and Cactus Channel improvements, in combination with related projects within the March JPA Planning Area, would not result in or contribute to cumulatively significant impacts.

6.4.4 Cultural Resources

The geographic extent for this cumulative impact analysis includes the March JPA Planning Area. The collective proposed Project site (K4 Parcel and Cactus Channel Improvement Site) was surveyed for cultural resources relative to archaeological resources, and the March JPA General Plan concluded that no sites or artifacts are eligible for inclusion within the National Register of Historic Places (NRHP). As discussed in Section 4.4, Cultural Resources, of this EIR, a pedestrian field survey for the Cactus Channel and the K4 Parcel were conducted. As a result of the historic significance evaluation, the Cactus Channel (33-028200/CA-RIV-12721), constructed between 1941 and 1953, was found ineligible under all NRHP and CRHR designation criteria. No other potential "historic properties" or "historical resources" were identified throughout the various avenues of research.

Historical Resources

According to CEQA, the importance of cultural resources comes from the research value and the information that they contain. Therefore, the issue that must be explored in a cumulative analysis is the potential cumulative loss of that information. No historical resources were found eligible on the K4 Parcel. The Cactus Channel (33-028200/CA-RIV-12721), constructed between 1941 and 1953, was found ineligible under all NRHP and CRHR designation criteria. Moreover, no other

potential "historic properties" or "historical resources" of prehistoric or historical origin were identified within the Project APE. As such, the proposed Project would result in **no impact** on historical resources. When considering cumulative impacts to a cultural viewshed, there must be clearly identified resources to which a viewshed is a contributing element to the resources' CRHR eligibility. There have been no resources to which a viewshed has been identified as a contributing element to CRHR eligibility.

A cumulative impact, in terms of historical resources, refers to the collective potential effect upon historical resources due to modern or recent historical land use, that result from human activity. Considering the proposed Project would have no impact on historical resources, it cannot contribute to a cumulative impact.

Archeological Resources

No archaeological resources were observed on the K4 Parcel and the Cactus Channel Improvement Site. In the unlikely event that unanticipated archaeological resources are encountered during ground-disturbing activities for either Project component, mitigation **MM-CUL-1** requires that all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards for Archaeology, can evaluate the significance of the find, which would reduce potentially significant impacts to archaeological resources to less-than-significant levels.

The cumulative projects listed in Table 6-1 have the potential to result in discovery of unknown or subsurface archaeological resources of unknown significance, similar to the proposed Project. Cumulative projects located within fully developed areas would likely have a low chance of accidental discoveries of unknown archaeological resources due to previous grading and development likely removing, preserving, or destroying archaeological resources that previously existed within the sites. However, because the K4 Parcel, the Cactus Channel improvements, and those projects identified within the cumulative impact study area are primarily mitigated by the collection and curation of information and the preservation of the most important resources, adequate mitigation has occurred for in situ appreciation of and access to information regarding those sites for future generations. This reduces the potential for cumulative effects, and the K4 Parcel and the Cactus Channel improvements would not contribute to a cumulatively significant impact to archaeological resources.

Human Remains

Similar to archaeological resources, cumulative impacts to human remains would result from an aggregate of disturbance and loss of Native American remains. Projects located in the cumulative projects area would have the potential to result in an impact associated with human remains from grading, excavation, or other ground-disturbing activities. Each of the cumulative projects would

be required to comply with applicable laws for the proper handling of human remains, and a potential significant cumulative impact would therefore not occur. The proposed Project is also subject to regulations addressing discovery of human remains. Therefore, the proposed Project would not contribute considerably to a potential significant cumulative impact.

6.4.5 Geology and Soils

The geographic extent for this cumulative impact analysis includes the March JPA Planning Area, however, most geology and soil hazards associated with development on surrounding projects would be site-specific and can be mitigated on a project-by-project basis.

The K4 Parcel Warehouse building and the Cactus Channel improvements would be designed to the applicable California Building Code or Uniform Building Code standards, whichever is more restrictive, to anticipate impacts associated with seismic ground shaking. Mitigation measure **MM-GEO-1** would ensure the K4 Parcel Warehouse and Cactus Channel improvements are constructed in compliance with recommendations of the Project-specific geotechnical investigations, included in Appendices I1 and I2, thus minimizing direct and indirect potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking and liquefaction. Therefore, with incorporation of **MM-GEO-1**, impacts from the K4 Parcel and Cactus Channel related to seismic ground shaking would be reduced to **less than significant** levels.

As shown in Figure 6-1, there are multiple projects located within proximity to the Project site. The geology and soils impacts for each project are specific to its site and users, and would not be in common or contribute to (or be shared with, in an additive sense) the impacts on other project sites. In addition, each cumulative project would be required to adhere to required building engineering design per the most recent California Building Code in order to ensure the safety of building occupants and avoid a cumulative geologic hazard. Additionally, as needed, projects would incorporate individual mitigation or geotechnical requirements for site-specific geologic hazards present on each individual cumulative project site. Therefore, a potential cumulative impact related to site-specific geologic hazards such as landslides, liquefaction, soil stability characteristics, seismic hazards, and erosion would not occur. Therefore, the K4 Parcel and Cactus Channel improvements would not create or contribute to a significant cumulative impact.

Paleontological Resources

As described in Section 4.5.1, Existing Conditions, the Project area lies on the edge of a high portion of the Pleistocene-age Perris Block, which has a high potential for paleontological resources. Therefore, **MM-GEO-2** would be implemented to prevent potential impacts to paleontological resources. All current and future development resulting in earthwork into high sensitivity formations would be required to implement similar preservation measures. Potential impacts to paleontological resources would largely be limited to the Project site, as paleontological

resources impacts from the proposed Project would not have a substantial effect on adjacent properties. Where such resources exist, implementation of cumulative development in the region would represent an incremental adverse impact on paleontological resources. However, each cumulative project would be required by CEQA to implement appropriate mitigation measures that would minimize or avoid impacts to paleontological resources to the extent feasible. Furthermore, the proposed Project would implement **MM-GEO-2** to help reduce potential impacts to paleontological resources through monitoring and proper treatment of any discovered resources. Therefore, the proposed Project would not have a cumulatively considerable contribution to a cumulative impact on paleontological resources.

6.4.6 Greenhouse Gas Emissions

As explained earlier, the analysis of a project's greenhouse gas (GHG) emissions is inherently a cumulative analysis because climate change is a global issue and the emissions from individual projects are negligible in a global context. Accordingly, the analysis included within Section 4.6, Greenhouse Gas Emissions, demonstrations that GHG impacts would be less than significant and takes into account the potential for the proposed Project to contribute to a cumulative impact of global climate change.

The analysis shows that the proposed Project is consistent with the 2016 RTP/SCS goals to reduce regional GHG emissions from the land use and transportation sectors by 2020 and 2035. The proposed Project is also consistent with CARB's Scoping Plan, particularly its emphasis on the identification of emission reduction opportunities that promote economic growth while achieving greater energy efficiency and accelerating the transition to a low-carbon economy. Given the proposed Project's consistency with statewide and regional plans adopted for the purpose of reducing GHG emissions, it is concluded that the proposed Project's incremental contribution to greenhouse gas emissions and their effects on climate change would not be cumulatively considerable. For these reasons, the proposed Project's cumulative contribution to global climate change is less than significant.

6.4.7 Hazards and Hazardous Materials

Hazardous Materials

As discussed in Section 4.7, Hazards and Hazardous Materials, of the EIR, given both Project components' locations are within the C1 Zone, restrictions exist as to the materials, and quantities of each material, that can be stored on the proposed Project site, and specifically the K4 Parcel. In order to reduce potentially significant impacts associated with accidental release of chemicals during construction of the K4 Parcel and Cactus Channel improvements **MM-HAZ-1** through **MM-HAZ-3** would reduce potentially significant hazards and hazardous materials impacts to less than significant levels.

All handling, transport, use, and disposal would comply with applicable federal, state, and local agencies and regulations. Despite restrictions put in place on the Project site due to proximity to the March ARB/IP, K4 Parcel operations do have the potential to result in significant hazards and hazardous materials impacts through the routine transport, use, or disposal of hazardous materials. Operations associated with the Cactus Channel improvements would not have the potential to result in significant hazards and hazardous materials impacts. With implementation of **MM-HAZ-1** and **MM-HAZ-4**, potentially significant impacts from the K4 Parcel operations can be reduced to **less than significant** levels.

Cumulative impacts related to hazards and hazardous materials would result from projects that collectively increase exposure to hazards and hazardous materials. Risks associated with hazardous soils, underground storage tanks, and other existing sources of hazardous materials are generally site-specific and localized. Some of the identified cumulative projects are industrial uses and would therefore have the potential to increase exposure or the chance of the release of hazardous materials. The nearest cumulative project within Table 6-1 is the Meridian South Campus Project, located approximately 2 miles southwest of the proposed Project. Given this distance, the geographic extent for cumulative analysis is limited to the K4 Parcel and Cactus Channel site. Furthermore, all of the cumulative projects would be required to comply with federal, state, and local standards regarding the handling, use, transport, storage, and disposal of hazardous materials, which are intended to minimize risk to public health and the environment. In addition to these standards, the cumulative projects would be required to minimize erosion and any pollution discharges through compliance with the Regional Water Quality Control Board (RWQCB) through implementation of project-specific best management practices and stormwater pollution prevention practices (or equivalent, per project). Because regulations directing clean up and rehabilitation of hazardous materials sites are mandatory, and because such occurrences are tied to specific localized sources, they are not expected to combine with potential effects from other projects. Project-related potential cumulative impacts associated with hazardous emissions and materials would be reduced to less than significant levels and not cumulatively considerable.

Upset or Accident Conditions

Construction activities would include the use of fuels for equipment and vehicles, new and used motor oils, cleaning solvents, paints, and storage containers and applicators containing such materials. Given the proximity to the March ARB and based on the past use of the K4 Parcel as part of a military base for over 50 years, future development of the K4 Parcel and Cactus Channel improvements, including grading activities have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, UXO, and contaminated media, including soil, soil vapor/gas, and/or groundwater. In order to further reduce potentially significant impacts associated with accidental release of chemicals during construction of both the K4 Parcel and

Cactus Channel components **MM-HAZ-2** and **MM-HAZ-3** would be implemented to mitigate levels to less than significant levels.

Operations associated with the Cactus Channel improvements would not have to potential to result in significant hazards and hazardous materials impacts. Depending on the activities involved with the proposed warehouse and industrial uses, hazardous materials could be used. Therefore, with compliance with local, state, and federal regulations, along with implementation of **MM-HAZ-1** and **MM-HAZ-4** operations of the K4 Parcel would not create a significant hazard to the public or the environment through the reasonably foreseeable upset and accident conditions involving the release of hazardous materials. With implementation of mitigation measures **MM-HAZ-1** through **MM-HAZ-4**, impacts would be **less than significant**.

As previously discussed, some of the cumulative projects are industrial uses and would therefore have the potential to increase exposure or the chance of the release of hazardous materials. However, all of the cumulative projects would be required to comply with federal, state, and local standards regarding the handling, use, transport, storage, and disposal of hazardous materials, which are intended to minimize risk to public health and the environment. As such, implementation of the K4 Parcel and Cactus Channel improvements in combination with the cumulative projects would not create or contributed to a significant cumulative impact associated with upset or accident conditions.

Proximity to School

There is the potential for construction activities associated with both the K4 Parcel and Cactus Channel improvements to handle hazardous materials within one-quarter mile of one elementary school, Harvest Time Christian School, located approximately 0.2 mile northwest of both components of the proposed Project site. Regulations are in place regarding the handling of hazardous materials. **MM-HAZ-1** through **MM-HAZ-3** would further minimize potential significant impacts resulting from hazardous emissions or handling of hazardous materials from K4 Parcel and Cactus Channel construction. Therefore, with implementation of mitigation measures, K4 Parcel and Cactus Channel construction would result in a **less than significant impact** relative to hazardous emissions or hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

Cactus Channel improvement operations would not include the use of hazardous materials. Depending on the operational activities involved with the proposed K4 Parcel Warehouse, hazardous materials could be used. **MM-HAZ-4** would require the preparation and submittal of a Hazardous Materials Business Plan within 30 days of K4 Parcel Warehouse operations. Therefore, with compliance with local, state, and federal regulations, along with implementation of **MM-HAZ-4** operations of the K4 Parcel would result in a **less than significant impact.**

Cumulative impacts related to hazards in proximity to schools is generally site specific and addressed on a project-by-project basis. All other cumulative projects in the area would be required to comply with the federal, state, and local regulations in place for handling of hazardous materials. As such, the K4 Parcel and Cactus Channel improvements would not create or contributed to a significant cumulative impact associated with hazardous emission or materials, substances, or waste within one-quarter mile of an existing or proposed school.

List of Hazardous Materials Sites

Based on the past use of the K4 Parcel as part of a military base for over 50 years, grading activities for both the K4 Parcel and Cactus Channel improvements have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, UXO, and contaminated medial, including soil, soil vapor/gas, and or groundwater. With implementation of a Hazardous Materials Contingency Plan during construction of both Project components, as required by mitigation measure **MM-HAZ-2**, and development and implementation of a plan to manage UXO as required by mitigation measure **MM-HAZ-3**, potentially significant hazards impacts during construction could be mitigated to **less than significant** levels. Cumulative impacts related to hazards in proximity to schools is generally site specific and addressed on a project-by-project basis. All other cumulative projects in the area would be required to comply with the federal, state, and local regulations in place for handling of hazardous materials. Because regulations directing clean up and rehabilitation of hazardous materials sites are mandatory, and because such occurrences are tied to specific localized sources, they are not expected to combine with potential effects from other projects. Project-related potential cumulative impacts associated with hazardous materials sites would be less than significant and not cumulatively considerable.

Proximity to Airport

The K4 Parcel and Cactus Channel Project components are located approximately 4,500 feet from the March ARB and is also within the March ARB/Inland Port ALUCP. As depicted in the March ARB/Inland Port ALUCP, the proposed K4 Parcel and portions of the Cactus Channel are located within the Zone C1 (Mead & Hunt 2014). With the restrictions in place in this zone, potential impacts associated with proximity to the airfield are less than significant. Additionally, with implementation of mitigation measures **MM-HAZ-5**, requiring the use of non-reflective materials on all PV panels at the K4 Parcel, impacts associated with glare from solar panels could be reduced to less than significant. No PV panels would be associated with the proposed Cactus Channel improvements. Similar to potential sight obstructions to pilots caused by PV panels, smoke and steam emitted into the atmosphere from buildings and taller stacks can also obstruct line of sight for pilots. In the event that implementation of the K4 Parcel would construct stacks and/or a building that would emit smoke or steam, there would be the potential for significant safety impacts. With implementation of **MM-HAZ-6**, requiring written approval from March ARB and March Inland Port Airport officials,

impacts associated with visual obstruction on the K4 Parcel from smoke and/or steam would be reduced to less than significant. The Cactus Channel improvements would have the potential to attract birds, resulting in a potentially significant safety impact, given the Cactus Channel's proximity to an active runway. As such, with implementation of **MM-HAZ-7** and **MM-HAZ-8** would reduce this potentially significant impact to a less than significant level.

As discussed in Section 4.7, the Project site is partially located within the 60 to 65 dBA CNEL noise level contour boundaries of March ARB/IPA. Based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. A cumulative impact to airport hazards would result if cumulative projects are located in the March ARB/Inland Port ALUCP. However, all other projects within the March ARB/Inland Port ALUCP would be required to comply with the restrictions included in the March ARB/Inland Port ALUCP that provide restrictions with each of the zones. Given that K4 Parcel- and Cactus Channel-specific impacts would be mitigated to a less than significant level, the K4 Parcel and Cactus Channel improvements would not create or contributed to a significant cumulative impact associated with proximity to an airport.

6.4.8 Hydrology and Water Quality

The geographic scope of cumulative effects on surface water hydrology and water quality is typically watershed based, whereby projects contributing flow to the same water bodies as both the K4 Parcel and Cactus Channel Project components. The largest watershed applicable to the proposed Project site is the Santa Ana Watershed, approximately equivalent to the area covered by the Santa Ana RWQCB. The geographic scope of cumulative effects on groundwater quality is consists of the San Jacinto Groundwater Basin. Therefore, all projects listed in Table 6-1 are potential contributors to cumulative impacts on hydrology and water quality and are thus taken into consideration for this cumulative analysis. Cumulative projects listed in Table 6-1 include the construction of residential, commercial, industrial, transportation related facilities, and medical-related land which could potentially result in impacts to drainage patterns, erosion, or siltation on or off site if not properly managed.

Water Quality

Water quality problems in the receiving waters from both the K4 Parcel and the Cactus Channel improvements, which include both the Santa Ana River and the San Jacinto River, are the cumulative result of past and present urban and agricultural land uses within each watershed. For example, CWA Section 303(d) impairments within these waters include metals (copper and lead), pathogens and nutrients. To the extent of the K4 Parcel, Cactus Channel improvements, and

projects in Table 6-1, exacerbate these impairments or cumulatively result in new impairments, a cumulative impact could occur.

The analysis in Section 4.8, Hydrology and Water Quality, concludes that with implementation of the water quality BMPs and LID features required under the SWRCB Construction General Permit, and under the combined K4 Parcel- and Cactus Channel-specific Water Quality Management Plan (WQMP) per March JPA standards, water quality impacts would be less than significant. These water quality standards are implemented through permit programs administered by the SWRCB, the Santa Ana RWQCB, March JPA and applicable local jurisdictions. Other projects would be required to implement the same or similar set of BMPs necessary to meet performance standards in the Construction General Permit, regional MS4 Permits, and/or waste discharge requirements.

Operations of the Cactus Channel would not result in a substantial effect on water quality. Operations of the proposed K4 Warehouse would introduce pollutants of concern including metals, nutrients, trash and debris, and oil and grease. An increase in pollutant levels in the runoff conveyed to the storm drain system, if uncontrolled, could violate water quality standards and the waste discharge requirements of the Clean Water Act or the Porter-Cologne Water Quality Control Act. Implementation of operational source control BMPs for the K4 Parcel provided within the approved WQMP would result in an improvement to water quality on and off site compared to existing conditions because of the more stringent requirements for development in place today, and K-4 operational impacts would be less than significant.

Cumulative water quality impacts can result from projects that combine to either pollute or increase the turbidity of water. In the absence of regulatory controls, the primary potential cumulative effect would be to alter the natural hydrology of the region through increases in the area covered by impervious surfaces and to increase the potential for the release of non-point-source pollutants (i.e., motor fuels, trash, and sediment). Each of the cumulative projects would be required to comply with RWQCB standards for water discharge during construction and operation phases. Each cumulative project would employ site design features, treatment control, and source control best management practices, as necessary, to control for erosion and stormwater pollution. For projects that would be located on vacant land, proposed surface conditions would mimic existing patterns to the extent feasible, and adherence to a RWQCB Regional Municipal Separate Storm Sewer System Permit would be required to minimize adverse effects to hydrology and water quality. As such, a potential cumulative impact to water quality would not occur.

A cumulative impact to groundwater resources would result from cumulative projects drawing from a common groundwater source such that, in combination, the resources were depleted to unsustainable levels. Assessment for groundwater resources would occur on a project-by-project basis due to site-specific conditions. Each of the cumulative projects in the area would have water supplied by existing water supplies and distribution pipelines from the Western Municipal Water

District (WMWD). Furthermore, the cumulative projects identified in Table 6-1 would be similarly mandated to meet federal, state and local regulatory standards. Due to expected non-reliance on groundwater resources, cumulative projects would not result in the substantial depletion of known groundwater resources. The analysis in Section 4.8 concluded that the two components of the proposed Project, the K4 Parcel Warehouse and the Cactus Channel improvements, would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. As a result, the proposed Project's potential cumulative impacts to groundwater would be less than significant and not cumulatively considerable.

Drainage/Flooding

Cumulative hydrology impacts also result from projects that collectively alter the course of surface water flow or increase flood hazards in a particular area, either through diverting floodways or constructing structures within the floodways. Each of the cumulative projects would be required to comply with RWQCB standards for water discharge during construction and operation phases. Each cumulative project would employ site design features, treatment control, and source control best management practices, as necessary, to control for drainage. For projects that would be located on vacant land, proposed surface conditions would mimic existing patterns to the extent feasible, and adherence to a RWQCB Regional Municipal Separate Storm Sewer System Permit would be required to minimize adverse effects to hydrology and water quality. With regard to drainage and flooding, projects within the area serviced by regional detention basins are relevant to the cumulative impact analysis. The analysis in Section 4.8 concluded that the K4 Parcel and the Cactus Channel improvements would not result in substantial erosion or siltation on site or off site during short-term construction activities. Since the proposed Project would result in no increase in runoff, it would not contribute to existing or future cumulative effects with regard to flooding or downstream drainage capacity. Therefore, the proposed Project would not contribute considerably to a potential significant cumulative impact.

6.4.9 Land Use and Planning

While land use impacts tend to be localized in nature, and specific impacts are tied either directly or indirectly to the specific action, the proposed Project, specifically the K4 Parcel, may have the potential to work in concert with other past, present, or future projects to either cause unintended land use impacts such as reducing available open space or accommodate increased growth that may result in more intensive land uses. Therefore, the geographic extent for cumulative analysis tends toward larger policy areas.

The proposed Cactus Channel improvements would not conflict with any applicable land use plan, policy, or regulation. However, in order for the K4 Parcel component to be consistent with the

March JPA General Plan land use and zoning designations, the Project applicant has filed for a General Plan Amendment, Zoning Designation, Parcel Merger, and Plot Plan as discussed in Section 4.9, Land Use and Planning, of the EIR. The K4 Parcel's consistency with applicable land use plans, policies, or regulations is demonstrated in Table 4.9-1 in Section 4.9. The land use consistency analysis takes several factors into consideration. Overall, as shown in the consistency tables, with implementation of mitigation measures and approval of the proposed General Plan Amendment and Zoning Designation, the K4 Parcel would be consistent with or implement many of the pertinent goals, policies, guidelines, and recommendations.

The March JPA is not a permittee to the MSHCP, and thus, does not have to comply with the Reserve Assembly goals of the MSHCP or any other MSHCP requirements. However, the Project site is located within an identified burrowing owl (BUOW) survey area within the MSHCP, and burrowing owl measures within **MM-BIO-5** would ensure consistency with the MSHCP. Therefore, given that Project impacts would be limited to the K4 Parcel, that development of the proposed K4 Parcel has been envisioned in planning documents, and that impacts can be reduced to **less than significant** levels through implementation of mitigation referenced throughout the EIR, the K4 Parcel and Cactus Channel improvements would not create or contributed to a significant cumulative impact related to existing land use plans, designations, and policies.

Significant cumulative land use impacts would result from projects that contribute to development that is inconsistent with applicable land use plans or policies or are incompatible with existing or planned uses. All cumulative projects listed in Table 6-1 would be subject to similar plan consistency criteria as the proposed Project, which would ensure compliance with existing applicable land use plans with jurisdiction over the Project area. Any cumulative projects that propose amendments to the general plan or zoning ordinance, or require a specific plan, would be required to show that proposed uses would be consistent with applicable policies. Cumulative projects that exist outside the March JPA's jurisdiction, would be required to show consistency with relevant and applicable planning documents that govern each respective jurisdiction. Therefore, potentially significant cumulative conflicts with land use plans, policies, and ordinances are not anticipated.

6.4.10 Noise

Construction Noise Impacts

Section 4.10.4, Impacts Analysis, of the EIR states that construction noise impacts associated with the K4 Parcel and Cactus Channel improvements are expected to create temporarily high noise levels at the nearby receiver locations. However, the unmitigated K4 Parcel- and Cactus Channel-related construction noise levels would satisfy the less restrictive 90 dBA L_{eq} 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code. Therefore, the construction of

the K4 Parcel and Cactus Channel would result in a less than significant noise impact at the nearby sensitive receiver locations during peak construction activity. The nearest cumulative project is located 0.3 miles away, therefore, it is unlikely construction noise from the two Project components would combine for a significant impact at nearby off-site receptors.

Operational on-site noise-generating activities associated with proposed Project would include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. The off-site Project-related traffic noise level increase is considered a less than significant impact under Opening Year 2023 conditions. The off-site Project-related traffic noise level increase is considered a less than significant impact under Horizon Year 2040 conditions.

Noise levels tend to diminish quickly with distance from a source; therefore, the geographic scope for the analysis of cumulative impacts related to noise would be limited to projects within approximately 0.25 miles of the proposed Project site and access routes. At distances greater than 0.25 miles, construction noise would be briefly audible and steady construction noise from the proposed Project would generally dissipate into background noise levels. The temporal scope for cumulative impacts associated with noise would include the construction and operation phases of the proposed Project. The baseline for assessing cumulative noise impacts includes the noise sources associated with other projects within 0.25 miles of the proposed Project that could be constructed and/or operated at the same time as the proposed Project. No cumulative projects are located within a 0.25-mile vicinity of the proposed Project. Therefore, the proposed Project's contribution of noise from construction activities would not be cumulatively considerable.

Operational Noise Impacts

The Cactus Channel improvements are not anticipated to include operational noise sources requiring analysis. The K4 Parcel-related operational noise levels would satisfy the March JPA and City of Moreno Valley exterior noise level standards at all nearby sensitive receiver locations. The K4 Parcel operational noise levels would satisfy the City of Moreno Valley Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards at 200 feet from the source land use. The K4 Parcel is expected to generate an exterior traffic-related noise level increase of up to 0.2 dBA CNEL at adjacent land uses, which is not a significant increase and would not contribute considerably to a cumulative increase in traffic or associated traffic noise levels. Appendix Q, K4 Parcel Noise Impact Analysis, assesses operational traffic noise level impacts for the K4 Parcel combined under multiple scenarios which include cumulative projects.

Although all of the projects in the cumulative projects list could result in significant noise impacts related to construction and/or operations, none of the cumulative projects are located within a 0.25-mile vicinity of the proposed Project. In addition, the cumulative projects would be required

to comply with the same regulations as the proposed Project pertaining to noise levels and exposure to noise and vibration during construction and operation. These regulations would ensure that noise impacts would remain below a level of significance. Lastly, as discussed in Section 4.10, Noise, the K4 Parcel's traffic generation would not result in cumulative noise impacts on the surrounding roadway network. Therefore, the proposed Project's contribution of noise from long-term operations would not be cumulatively considerable

Ground-borne Vibration or Noise Levels

It is expected that ground-borne vibration from construction activities may occur from the K4 Parcel Warehouse and Cactus Channel improvements. Ground-borne vibration levels from the K4 Parcel and Cactus Channel improvements were estimated to remain below the FTA 80 VdB threshold at all sensitive receiver locations Therefore, the K4 Parcel and Cactus Channel construction vibrations would be considered a less than significant impact; no mitigation is required.

The Cactus Channel improvements would not result in substantial operational vibration levels. Typical vibration levels for K4 Parcel operational heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, the K4 Parcel component would result in a less than significant impact as vibration levels would remain below the FTA vibration threshold of 80 VdB at nearby receiver locations. No mitigation is required; operational impacts would be less than significant. It is unlikely that substantial construction vibration from the nearest cumulative project could combine for a significant impact at nearby off-site receptors, as construction vibration would attenuate with distance. Therefore, the K4 Parcel and Cactus Channel improvements would not contribute to a significant impact related to ground-borne vibrations.

Proximity with Airport Land Use Plan

The Project site is not within the vicinity of a private airstrip. Based on the analysis provided in Section 4.10.4 of the EIR, both the K4 Parcel and Cactus Channel improvements represent normally acceptable land uses based on the RC ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. Therefore, construction and operational noise impacts associated with exposing people residing or working within the vicinity of a public airport would be considered **less than significant**.

Cumulative projects within the March JPA planning area listed in Table 6-1 include the construction of residential, commercial, industrial, transportation related facilities and medical-related land uses that could potentially result in noise impacts. Considering the K4 Parcel or Cactus Channel improvements would not result in any significant impacts related to noise, the collective proposed Project would not contribute substantially to cumulatively significant traffic noise level increases.

6.4.11 Transportation

The CEQA Guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. As discussed in Section 4.11, Transportation, of this EIR, the traffic generated by individual cumulative projects has been manually added to the study area network to generate Opening Year Cumulative (2023) forecasts. In other words, this comprehensive list of cumulative development projects, as listed in Table 6-1, above, has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project).

Construction Traffic

Construction of the K4 Parcel and Cactus Channel Project components may potentially result in short-term traffic deficiencies related to construction employees, export of materials, and import of construction materials, etc. It is anticipated that the following construction-related activities would generate traffic and may potentially result in temporary construction-related traffic deficiencies:

- Construction employee commutes;
- Import of construction materials and soils; and
- Transport and use of heavy construction equipment.

To minimize the impact of the Cactus Channel improvements and K4 Parcel construction activities, the applicant would be required to develop and implement a March JPA-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the proposed Project site during off-peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses. With the incorporation of **MM-TRAF-20**, short term construction impacts would be **less than significant**.

Intersection Operations Analysis

The Cactus Channel improvements would not result in any operational vehicle trips, with exception to minimal as-needed maintenance trips. Operational traffic would occur as a result of the K4 Parcel development. LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative Conditions. The study area intersections are anticipated to operate at an acceptable LOS for Opening Year Cumulative without Project Conditions, with the exception of the following locations:

- Overlook Parkway – Canyon Crest Drive/Alessandro Boulevard – LOS F AM and PM peak hours

- Mission Grove Parkway/Alessandro Boulevard – LOS F AM peak hour
- Sycamore Canyon Boulevard/Alessandro Boulevard – LOS F AM and PM peak hours
- Meridian Parkway/Cactus Avenue – LOS E AM peak hour
- Meridian Parkway/Van Buren Boulevard – LOS F AM and PM peak hours
- Innovation Drive/Cactus Avenue – LOS F PM peak hour
- Old 215 Frontage Road – I-215 northbound ramps/Cactus Avenue – LOS F AM peak hour
- Elsworth Street/Cactus Avenue – LOS F AM and PM peak hours
- Heacock Street/Cactus Avenue – LOS F AM peak hour; LOS E PM peak hour

In addition to implementing mitigation measures **MM-TRAF-1** though **MM-TRAF-4**, the incorporation of mitigation measures **MM-TRAF-5** through **MM-TRAF-8** would reduce off-site impacts associated with the development of the K4 Parcel to less than significant levels for Opening Year Cumulative with Project condition.

Traffic Signal Warrants Analysis

Traffic signal warrants were prepared for the only unsignalized intersection in the study area, Meridian Parkway/Innovation Drive. Based on the warrant analysis, Meridian Parkway/ Innovation Drive would not warrant a traffic signal in the Opening Year Cumulative with Project condition. There are no additional traffic signals anticipated to meet traffic signal warrants under Opening Year Cumulative with Project Conditions.

Freeway Analysis

Off-Ramp Queuing

A queuing analysis was performed for the off-ramps to I-215 at the I-215/Cactus Avenue interchange to assess vehicle queues that may potentially result in deficient peak-hour operations at intersections and cause "spill back" onto the I-215 mainline. There are no queuing issues anticipated for Opening Year Cumulative Conditions.

Freeway Segments

Opening Year Cumulative mainline directional volumes for the weekday AM and PM peak hours without and with the K4 Parcel component of the Project were determined. The study area freeway segments are anticipated to operate at an acceptable LOS during the peak hours with and without the K4 Parcel component of the proposed Project.

Freeway Merge/Diverge

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative Conditions. most of the study area freeway ramp merge/diverge ramp junctions are forecast to operate with satisfactory LOS (LOS D or better), with exception of the I-215 northbound off-ramp (diverge) at Cactus Avenue, which is forecast to operate at LOS F in the AM peak hour in both, without and with, Project conditions. While the addition of the K4 Parcel component of the proposed Project traffic is not anticipated to result in an LOS letter grade change to this deficient ramp diverge junction, it would contribute to its deficiency.

Freeway Impacts Analysis

As described above, there are no identified significant operational K4 Parcel impacts to the study area off-ramp queues at I-215/Cactus Avenue, and the I-215 mainline segments with implementation of the K4 Parcel. However, the ramp (diverge) junction at the northbound I-215 off-ramp at Cactus Avenue is forecast to continue to operate with unsatisfactory LOS under Opening Year Cumulative with Project conditions. At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the March JPA (or other neighboring jurisdictions) on State Highway System (SHS) roadway segments. The Cactus Avenue overcrossing is the subject of a Project Study Report prepared by the City of Moreno Valley in conjunction with Caltrans. The Western Riverside Council of Governments (WRCOG's) Transportation Uniform Mitigation Fee (TUMF) Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along I-215. Additionally, the March JPA cannot guarantee the timing or implementation of such improvements as the facilities are under the jurisdiction of Caltrans. As such, the K4 Parcel's contribution to the deficiency is considered **cumulatively considerable**.

Summary of Cumulative Impacts

The Cactus Channel improvements would not result in any operational vehicle trips, with exception to minimal as-needed maintenance trips. Operational traffic would occur as a result of the K4 Parcel development. Cumulative traffic impacts are deficiencies that are not directly caused by the K4 Parcel, but occur as a result of regional growth combined with that or other nearby cumulative development projects or if the Project is anticipated to contribute traffic to a deficient intersection under pre-Project conditions. The K4 Parcel's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the K4 Parcel adds significant traffic to the forecasted deficiency.

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for Opening Year Cumulative (2023) traffic conditions:

- Old 215 Frontage Rd./I-215 NB Ramps and Cactus Avenue (No.16)
- Elsworth St. and Cactus Avenue (No.19)
- Heacock St. and Cactus Avenue (No. 25)

Based on the March JPA's significance criteria, the K4 Parcel is anticipated to have potentially significant and **cumulatively considerable** impact at the identified freeway mainline segments and merge/diverge ramp junctions, however no mitigation measures have been identified as no other improvements beyond those planned by the I-215 North Project have been evaluated. Neither Caltrans nor the state have adopted a fee program that can ensure that locally contributed impact fees will be tied to improvements to freeway mainlines, and only Caltrans has the jurisdiction over mainline improvements. Because Caltrans has exclusive control over state highway improvements, ensuring that fair share contributions to mainline improvements are actually part of a program tied to implementation is within the jurisdiction of Caltrans. As such, the impacts are considered **significant and unavoidable**.

6.4.12 Tribal Cultural Resources

The geographic extent for this cumulative impact analysis includes the March JPA Planning Area. A Sacred Lands File search and a California Historical Resources Information System search were conducted on the collective proposed Project site (K4 Parcel and Cactus Channel Improvement Site), and outreach under AB 52 and SB 18 was completed. As discussed in Section 4.12, Tribal Cultural Resources, of this EIR, no tribal cultural resources (TCRs) were identified on the K4 Parcel and the Cactus Channel Improvement Site or identified by tribes through the AB 52 and SB 18 consultation process. In the unlikely event that unanticipated a TCR is encountered during ground-disturbing activities for either Project component, mitigation MM-TCR-1 requires that all construction work occurring within 100 feet of the find shall immediately stop until the find can be evaluated; as such, potentially significant impacts to TCRs would be reduced to less than significant levels.

The cumulative projects listed in Table 6-1 have the potential to result in the discovery of unknown or subsurface TCRs of unknown significance, similar to the proposed Project. It is anticipated that TCRs that are potentially affected by related projects would also be subject to the same requirements of CEQA as the proposed Project and any impacts would be mitigated, as applicable. At this time, it is not known whether and to what extent these related projects would result in impacts to TCRs, or whether such impacts can be mitigated to less than significant. As such, these determinations would be made on a case-by-case basis, by employing Tribal consultation according to AB 52 and if applicable, SB 18, for each proposed project, and the effects of

cumulative development on TCRs would be mitigated to the extent feasible in accordance with CEQA and other applicable legal requirements. This reduces the potential for cumulative effects, and the K4 Parcel and the Cactus Channel improvements would not contribute to a cumulatively significant impact to TCRs.

6.4.13 Utilities and Service Systems

Wastewater

The Cactus Channel improvements would not result in an increase in demand of wastewater facilities. The K4 Parcel lies within the service area of Western Municipal Water District (WMWD). Upon implementation, the K4 Parcel's wastewater flows would be treated at the Riverside Water Quality Control Plant, which is a wastewater treatment plant that is currently being expanded to handle a capacity of 46 million gallons per day. The Riverside Water Quality Control Plant is subject to the waste discharge requirements set forth in RWQCB Order No R8-2015-0013 (NPDES No CA8000316), which expires July 31, 2020. Since the K4 Parcel would be served by the existing Riverside Water Quality Control Plant, which operates in compliance with the treatment and discharge requirements of the Santa Ana RWQCB, impacts would be less than significant.

Cumulative projects identified in Table 6-1 also receiving wastewater treatment services by WMWD would be accommodated by the recently expanded Riverside Water Quality Control Plant. Given that the K4 Parcel would be adequately served by WMWD and that the wastewater plant recently underwent expansion, K4 Parcel-related impacts would be less than significant and would not create or contribute to cumulative wastewater impacts.

Water

The Cactus Channel improvements would not result in an increase in demand of water facilities. Water service to the K4 Parcel would be provided by WMWD. As such, the geographic context for this cumulative analysis is projects that would also use water provided by WMWD. Upon implementation, the K4 Parcel would add demand for water services within the service area of WMWD. Since the K4 Parcel consists of an industrial development exceeding 650,000 square feet in floor area, in accordance with SB 610, a Water Supply Assessment was prepared by WMWD (Appendix P). The Water Supply Assessment evaluated the total projected water supplies available to WMWD during normal, single-dry, and multiple-dry water years during a 20-year project and whether WMWD's total projected supplies are sufficient to meet the projected water demand associated with the Project, in addition to existing and planned future uses. As discussed in the Water Supply Assessment, the ability for WMWD to meet water demands is, in part, dependent in part upon the available supply of water that can be purchased from MWD each year and completion of several water supply projects, including the Arlington Desalter and the Chino II Desalter Expansion, as well as the Riverside Wheeling and Purchase Agreement. WMWD has sufficient

supplies in all analyzed scenarios to serve the K4 Parcel demands, in addition to existing and planned future uses over the 20-year projection. Therefore, WMWD can be relied upon as a source of water for the K4 Parcel Project component. Given that WMWD has determined that adequate water supplies exist to serve the K4 Parcel, and also demonstrated that they have a surplus of water supplies, the K4 Parcel Project component would not result in or contribute to a cumulatively significant water impact.

Stormwater

The K4 Parcel will be divided into three Drainage Management Areas (DMAs), each served by a separate primary detention basin and a secondary basin. On-site runoff would be conveyed to the proposed on-site detention basins via proposed on-site catch basins and storm drains. The proposed basins will be located along the northern boundary of the site, separated into Detention Basin 'A', Detention Basin 'B', and Detention Basin 'C'. The Cactus Channel improvements component of the Project consists of channel improvements that would provide increased flood protection and contain 100-year storm flows. Considering the collective proposed Project would provide increased flood protection and contain 100-year storm flows, and would not have a negative impact on downstream facilities, the proposed stormwater drainage facilities would not cause significant environmental effects; therefore would have a **less than significant** impact. Collectively, implementation of the K4 Parcel and Cactus Channel improvements would not result in or contribute to cumulatively significant impacts.

Solid Waste

The Cactus Channel improvements would not result in an increase in demand of solid waste facilities. The K4 Parcel would be served by Waste Management for solid waste pickup and removal. In the future, Waste Management or another waste hauling company is expected to collect solid waste generated on the site and be brought to any of the County's landfill facilities. As discussed in Section 4.13, Utilities and Service Systems, of this EIR, collectively the six active landfills have a maximum capacity of 183.3 cubic yards. According to the County's 2017 Annual Report Summary, based on the best available estimates of current and future total County disposal, the County has 20 year of disposal capacity left. As such the County landfill facilities have capacity to service the proposed K4 Parcel Warehouse and the projects listed in Table 6-1 within the County's jurisdiction. Therefore, implementation of the K4 Parcel and Cactus Channel improvements would not result in or contribute to cumulatively significant impacts.

Electric Power, Natural Gas, or Telecommunications

Long-term energy consumption associated with the Project includes electricity consumption by employees, energy from water conveyance, and long-term vehicle operations by employees. Although electricity consumption would increase due to the implementation of the Project, the

building envelope, HVAC, lighting, and other systems, such as electric motor equipment, shall be designed to maximize energy performance.

Natural gas consumption during operation would be required for various purposes, including, but not limited to, building heating and cooling. The Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code.

No specific telecommunication system upgrades are proposed with the proposed Project, and the location and extent of future facilities is not known at this time.

As such, the existing utility infrastructure for electricity, natural gas, and telecommunications has capacity to service the proposed K4 Parcel Warehouse and the projects listed in Table 6-1. County's jurisdiction. No relocation or construction of new or expanded facilities would be required as a result of the Project. All other projects listed in Table 6-1 would be required to comply with the state regulations in place to minimize the use of these resources. Therefore, implementation of the K4 Parcel and Cactus Channel improvements would not result in or contribute to cumulatively significant impacts.

6.4.14 Energy

Cumulative impacts to energy would result when projects combine to increase inefficient consumption or increased demand for energy, adversely affecting energy resources. The cumulative projects would result in an increase in energy consumption and demand. However, since the cumulative developments represent a modest increase in development, and since each new development is required to be compliant with the latest Title 24 building requirements that include substantially more efficient fittings for energy, there would not be a cumulatively significant increase in inefficient use of energy; in fact, the converse would result. The cumulative analysis for energy conservation considers the projects listed in Table 6-1 and assesses the K4 Parcel's and Cactus Channel's compliance with the electricity, natural gas, and petroleum demands and supplies available. The K4 Parcel component is not expected to exceed energy resource demands as projected for Southern California Edison (SCE) and Southern California Gas Company (SoCal Gas), as discussed in Section 4.14, Energy, of this EIR. Although electricity and natural gas consumption would increase due to the implementation of the K4 Parcel, the building envelope, HVAC, lighting, and other systems, such as electric motor equipment, shall be designed to maximize energy performance. The K4 Parcel component is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Prior to Project approval, March JPA would ensure that the K4 Parcel component would meet Title 24 standards for 2016, as required by state regulations through their plan review process. Electricity and natural

gas consumed by the K4 Parcel are also subject to the cap-and-trade regulation. For these reasons, the electricity and natural gas consumption of the K4 Parcel would not be considered inefficient or wasteful, and impacts would be less than significant.

Although electricity consumption would increase due to the implementation of the K4 Parcel component, the building envelope, HVAC, lighting, and other systems, such as electric motor equipment, shall be designed to maximize energy performance. The K4 Parcel component is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. As with electricity demand, natural gas demand calculation for the Project assumes compliance with Title 24 standards for 2016. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. Prior to Project approval, March JPA would ensure that the K4 Parcel component would meet Title 24 requirements applicable at that time, as required by state regulations through their plan review process. For these reasons, the electricity and natural gas consumption of the K4 Parcel component would not be considered inefficient or wasteful, and impacts would be less than significant.

The K4 Parcel and other cumulative projects are required to meet the mandatory energy standards, current CCR Title 24, Part 6 California Energy Code, and Part 11 California Green Building Standards. Also, incorporation of Project design features, compliance with state and local regulations, and mitigation measures (**MM-AQ-4** through **MM-AQ-7**) from the Air Quality section of the EIR would further reduce Project's energy consumption. Compliance with these policies and other energy reduction strategies would ensure that energy use as a result of development would not be wasteful, inefficient, or unnecessary, and **no significant cumulative impacts would occur.**

6.5 REFERENCES

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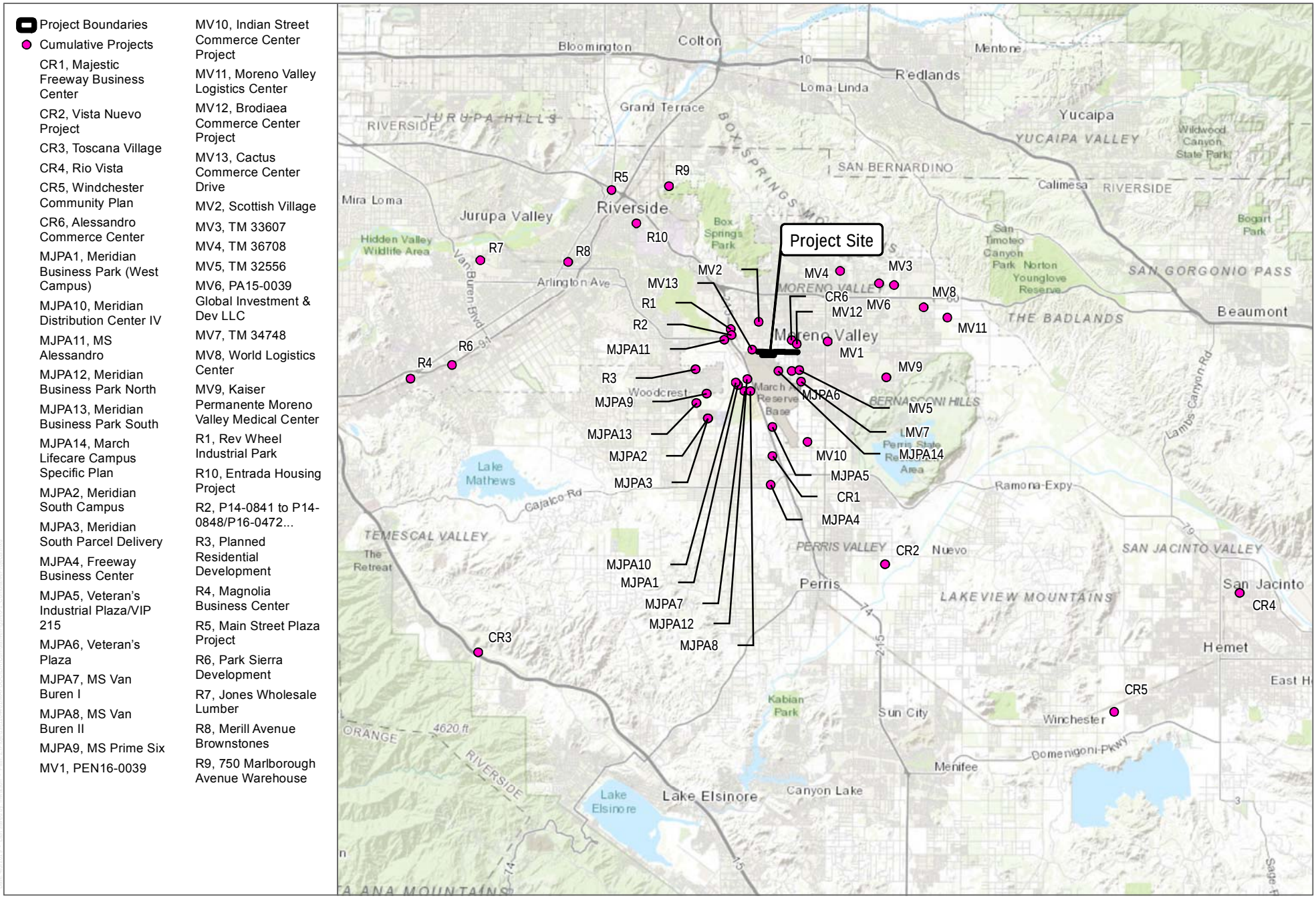
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SOURCE: ESRI 2018

FIGURE 6-1

Cumulative Projects

K4 Warehouse and Cactus Channel Improvements Project EIR

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CHAPTER 7
ALTERNATIVES

7.1 INTRODUCTION

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, an Environmental Impact Report (EIR) is required to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (14 CCR 15126.6(a)). An EIR "must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation" (14 CCR 15126.6(a)). This alternatives discussion is required even if these alternatives "would impede to some degree the attainment of the project objectives, or would be more costly" (14 CCR 15126.6(b)).

The inclusion of an alternative in an EIR does not constitute definitive evidence that the alternative is in fact "feasible." The final decision regarding the feasibility of alternatives lies with the decision maker for a given project, who must make the necessary findings addressing the potential feasibility of an alternative, including whether it meets most of the basic project objectives or reduces the severity of significant environmental effects pursuant to CEQA (California Public Resources Code, Section 21081; see also 14 CCR 15091).

7.2 PROJECT OBJECTIVES

In developing the alternatives to be addressed in this chapter, consideration was given to the ability to meet the basic objectives of the K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) and eliminate or substantially reduce the identified significant environmental impacts. As stated in Chapter 2, Project Description, of this EIR, the Project objectives against which the alternatives were analyzed include the following:

- Provide appropriate land use intensities to comply with the parameters of the March Air Reserve Base/Inland Port Airport Compatibility Plan.
- Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel, specifically encouraging the development of industrial uses to expand the employment and financial base of the March JPA Planning Area in a manner that is compatible with the nearby airbase and adjacent industrial uses.
- Provide increased job opportunities for local residents through the provision of employment-generating businesses.

- Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.
- Develop the property with land uses that are compatible with the March AFB Reuse program.
- Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.
- Provide a range of job types for the community's residents.
- Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians and bicyclists.
- Minimize impacts from construction of the development to sensitive biological resources.
- Minimize water wildlife attractants, which are hazards to aircraft flights, associated with the naturalized open-air Cactus Avenue Drainage Channel (Cactus Channel) by undergrounding the drainage channel.

Pursuant to the CEQA Guidelines stated above, as well as the Project objectives, a range of alternatives to the Project are considered and evaluated in this EIR. To summarize these Project alternatives, as suggested in CEQA Section 15126.6(d), a matrix was prepared to summarize and compare the impacts of each Project alternative (see Table 7-1).

Table 7-1
Comparison of Project and Alternatives Impacts

Environmental Issue Area	Proposed Project	Alternative 1 No Project	Alternative 2 Reduced Size General Warehouse	Alternative 3 High-Cube Short-Term Storage Warehouse	Alternative 4 High-Cube Parcel Hub Warehouse
Aesthetics	**LTS**	▼	▼	—	—
Air Quality	**SU**	▼	▼	▼	▲
Biological Resources	**LTS-MM**	▼	▼	—	—
Cultural Resources	**LTS-MM**	▼	▼	—	—
Geology and Soils	**LTS**	▼	▼	—	—
Greenhouse Gas Emissions	**LTS**	▼	▼	▼	▼
Hazards and Hazardous Materials	**LTS-MM**	▼	▼	—	—
Hydrology and Water Quality	**LTS**	▼	▼	—	—
Land Use and Planning	**LTS-MM**	▼	—	—	—
Noise	**LTS**	▼	▼	—	—
Transportation	**SU**	▼	▼	▼	▼
Tribal Cultural Resources	**LTS-MM**	▼	▼	—	—
Utilities and Service Systems	**LTS**	▼	▼	—	—

Table 7-1
Comparison of Project and Alternatives Impacts

Environmental Issue Area	Proposed Project	Alternative 1 No Project	Alternative 2 Reduced Size General Warehouse	Alternative 3 High-Cube Short-Term Storage Warehouse	Alternative 4 High-Cube Parcel Hub Warehouse
Energy	LTS	▼	▼	—	—
Meets Project Objectives?	Yes	No	Partially	Yes	Yes

— Alternative is likely to result in similar impacts to issue when compared to Project.
▼ Alternative is likely to result in reduced impacts to issue when compared to Project.
▲ Alternative is likely to result in greater impacts to issue when compared to Project.
LTS = less than significant impact; LTS-MM= less than significant impact with mitigation; SU = significant, unavoidable impact

7.3 ALTERNATIVES CONSIDERED BUT REJECTED

The following discussion presents information on alternatives to the Project that were considered but rejected. These alternative are not discussed in further detail and has been eliminated from further consideration.

Alternative Site Location

In accordance with CEQA Guidelines, Section 15126.6(f)(2), the March JPA attempted to identify a feasible alternative off-site location within the Project area that could be available for the development of the Project. Pursuant to CEQA Guidelines, Section 15126.6(f)(2)(A), the key question and first step in analysis of the off-site location is whether any of the significant effects of the Project would be avoided or substantially lessened by moving the Project to another location.

After a review of available open spaces of approximately 35 acres (similar to the K4 Parcel) within the Project vicinity, no large-scale additional sites that could accommodate the proposed Project exist. Additionally, the Project Applicant does not have ownership of 35 acres elsewhere within the Project vicinity such that the Project could be developed on an alternate site. Therefore, off-site locations capable of accommodating the entire Project are considered infeasible, and no off-site location alternatives were carried forward in this analysis.

Alternative Uses

The Project site is located approximately 0.8 mile northeast of the March Air Reserve Base (ARB) runway. The March ARB/Inland Port Land Use Compatibility Plan (Mead & Hunt 2014) and the March ARB Air Installation Compatible Use Zone (AICUZ) Study (March ARB 2005), impose restrictions and limitations on the types and quantities of uses that can exist on project sites within

specific zones in proximity to the airport. The Project site is located in the C1 zone. Within the C1 zone, the following restrictions apply:

- A maximum of three dwelling units per acre are permitted. A total of 35.4 acres of the Project site are within the C1 zone; as such, a total of 106 dwelling units could be constructed on this portion of the Project site. However, the proximity of these housing units to the March ARB and warehouse and industrial uses in the vicinity of the Project site, would be relatively incompatible. Furthermore, though low density residential is not prohibited by the airport compatibility plan, the proximity of this site to the airport flight paths and noise contours would result in an incompatible land use. As such, residential development on this portion of the Project site has been eliminated from further consideration.
- An average of 100 people per acre can occupy the 35.4-acre portion of the Project site within Zone C1. As such, no more than 3,540 employees can be present on the 35.4-acre portion of the Project site within Zone C1.
- Prohibited uses include children's school, day care centers, libraries, hospitals, congregate care facilities, hotels/motels, restaurants, and places of assembly. As such, development of these uses on the Project site has been eliminated from further consideration.
- Noise sensitive outdoor nonresidential uses are prohibited, examples of which include major spectator-oriented sports stadiums, amphitheaters, concert halls and drive-in theaters. Caution should be exercised with respect to uses such as poultry farms and nature preserves. As such, development of these uses on the Project site have been eliminated from further consideration.
- Hazards to flight, which include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations, land use development that may cause the attraction of birds are prohibited. Human-made features must be designed to avoid heightened attraction of birds. Though not located within Zones A, B1, and B2, flood control facilities should be designed to hold water for no more than 48 hours following a storm and be completely dry between storms (see FAA Advisory Circular 150/5200-33B). Additionally, certain farm crops and farming practices that tend to attract birds are strongly discouraged. These include: certain crops (e.g., rice, barley, oats, wheat – particularly durum – corn, sunflower, clover, berries, cherries, grapes, and apples); farming activities (e.g., tilling and harvesting); confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg-laying operations); and various farming practices (e.g., livestock feed, water, and manure). Fish production (i.e., catfish, trout) conducted outside of fully enclosed buildings may require mitigation measures (e.g., netting of outdoor ponds, providing covered structures) to prevent bird attraction. As such, uses that would generate hazards to flight have been eliminated from further consideration.

Given the land use restrictions in place for the proposed Project site, there are limited opportunities to introduce types of land uses other than those included within the proposed Project. As such, evaluating alternatives that include any part or combination of the above-listed uses were eliminated from further consideration.

7.4 ALTERNATIVES UNDER CONSIDERATION

This section discusses the alternatives to the Project, including the No Project Alternative, under consideration. However, the range of alternatives analyzed is greatly limited, as discussed above, based upon the Project site's location in the areas of the March ARB Zone C1 and proximity to the March ARB airstrip. As discussed in more detail in Section 4.9, Land Use and Planning, of the EIR, the Project site's designation prohibits numerous uses, requires low occupancy, and has strict height limits. The No Project (No Development) Alternative, which is a required element of an EIR pursuant to Section 15126.6(e) of the CEQA Guidelines, examines the environmental effects that would occur if the Project were not to proceed and no development activities were to occur. The other alternatives are discussed as part of the "reasonable range of alternatives" selected by the lead agency. The alternatives addressed in this section are listed below, followed by a more detailed discussion of each:

- Alternative 1 – No Project
- Alternative 2 – Reduced Size General Warehouse
- Alternative 3 – High-Cube Short-Term Storage Warehouse
- Alternative 4 – High-Cube Parcel Hub Warehouse

7.4.1 Alternative 1 – No Project

Under Alternative 1, development of the Project would not occur as discussed in Chapter 2 of this EIR. The Project site would remain unchanged, and no development activity would occur. As a result, the proposed General Plan Amendment, Zoning Designation, Master Plot Plan, Parcel Merger, and all other applicable pending approvals associated with the Project would not be necessary, as no new development would occur on the Project site that would trigger such actions.

No Project Alternative Environmental Impact Analysis

Aesthetics

As discussed in Section 4.1, Aesthetics, the Project would have less-than-significant impacts associated with changes to existing visual character and quality of the Project site and light and glare.

Under Alternative 1, the K4 Parcel and the Cactus Channel would remain in their current condition, and no development or improvements to the Channel would occur. The visual character of the K4

Parcel from the site would remain unchanged, and no new lighting would be introduced to the K4 Parcel. Therefore, because no development would occur as a result of Alternative 1, there would be no impacts compared to the proposed Project.

Air Quality

As discussed in Section 4.2, Air Quality, daily construction emissions would not exceed the SCAQMD's significance thresholds for CO, SOx, PM_{10}, or $PM_{2.5}$ during construction of the Project in any of the construction years. The Project would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.** The Project's operational emissions would not exceed the SCAQMD's significance threshold for VOCs, CO, SOx, PM_{10}, and $PM_{2.5}$. The Project, however, would exceed operational emissions thresholds for NOx even with implementation of mitigation due to emissions and exhaust from internal combustion engines used by construction equipment, therefore resulting in a significant and unavoidable operational impact.

The LST analysis included in Section 4.2 shows that the Project construction and operational emissions would not exceed the CAAQS for NO_2, CO, PM_{10}, and $PM_{2.5}$ or the 1-hour NO_2 NAAQS. Additionally, the Project would not result in on-road traffic volumes at affected intersections that would result in a CO hotspot. The cancer risk and noncancer risk at the nearby residents would not exceed the SCAQMD threshold of 10 in 1 million or chronic HI of 1.0, respectively, and impacts would also be less than significant.

Under Alternative 1, the K4 Parcel would remain in its current condition, and no development would occur. The K4 Parcel would continue to remain vacant and the Cactus Channel would continue to remain an open-air earthen drainage channel. Therefore, because no new construction or operational emissions would occur under Alternative 1, there would be no impacts compared to the Project.

Biological Resources

As discussed in Section 4.3, Biological Resources, both the K4 Parcel and Cactus Channel Improvement Site provide suitable habitat for federal and state special-status plant and animal species. However, with implementation of mitigation, potentially significant impacts to smooth tarplant, Riverside fairy shrimp, vernal pool fairy shrimp, Stephen's Kangaroo Rat, burrowing owl, western spadefoot, orange-throated whiptail, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, and Los Angeles pocket mouse can be reduced to less than significant levels. Additionally, there is the potential for the Project to affect special-status riparian vegetation communities and protected wetland communities; however, with implementation of mitigation, potential impacts can be reduced to less than significant levels.

Finally, there is the potential for the Project to affect implementation of the MSCHP; however, with implementation of mitigation, all potential conflicts with the MSCHP would be reduced to less than significant impacts.

Under Alternative 1, the new warehouse building would not be constructed on the K4 Parcel and the Cactus Channel improvements would not be implemented. The K4 Parcel would remain undeveloped and the Cactus Channel would remain as an open-air earthen drainage ditch. As such, all potential impacts to biological resources would be avoided when compared to the proposed Project, and no impacts would occur.

Cultural Resources

As discussed in Section 4.4, Cultural Resources, with the incorporation of mitigation, the Project would have less-than-significant impacts associated with historical resources, archaeological resources, unique geologic features, and human remains. Impacts to cultural resources can be mitigated to less-than-significant levels by incorporating mitigation measures, and no significant adverse impacts would remain after mitigation.

Alternative 1 would not result in any direct impacts related to cultural resources because no construction or site disturbance would occur. No construction or development activities would take place that could impact potential historical, paleontological, unique archaeological resources, tribal cultural resources, or human remains; therefore, the Alternative 1 would have no impacts compared to the Project.

Geology and Soils

As discussed in Section 4.5, Geology and Soils, the implementation of the Project would not conflict with any applicable plan, policy, or regulation adopted for the purposes of mitigating hazards associated with geology and soils. The Project would have a less-than-significant impact associated with strong seismic ground shaking and seismic-related ground failure with incorporation of mitigation. Lastly, the proposed Project would result in less than significant impacts to unique paleontological resources with mitigation incorporated.

Alternative 1 would not result in any direct impacts related to geology and soils because no construction or site disturbance would occur. No construction or operational activities would take place that could expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure; therefore, Alternative 1 would have no impacts compared to the Project.

Greenhouse Gas Emissions

As discussed in Section 4.6, Greenhouse Gas Emissions, the proposed Project would result in greenhouse gas (GHG) emissions that are primarily associated with use of off-road equipment and on-road construction and worker vehicles during construction. Operation of the proposed Project would result in GHG emissions through energy use; motor vehicle trips to and from the proposed Project; generation of electricity associated with water supply, treatment, and distribution and wastewater treatment; and solid waste disposal. The Project would result in a less-than-significant impact associated with GHG emissions.

Under Alternative 1, the K4 Parcel would remain in its current condition, and no development would occur. The K4 Parcel would continue to remain vacant and the Cactus Channel would continue to remain an open-air earthen drainage channel. Alternative 1 would not have GHG emissions so it would be considered less than significant in accordance with the Riverside County CAP. With respect to consistency with AB 32, Alternative 1 would not conflict with any of the GHG reduction measures provided in AB 32 as there would be no action. However, it would also not support any of the measures within AB 32. Similarly, Alternative 1 would not conflict with the March JPA General Plan Noise/Air Quality Element (March JPA 1999) or support any goals or policies within it. With respect to consistency with SB 375, Alternative 1 would not create jobs and therefore would not support the SCAG 2016 RTP/SCS goal of improving the Project area, which is considered a jobs poor area. Impacts would be less than significant.

Hazards and Hazardous Materials

As discussed in Section 4.7, Hazards and Hazardous Materials, with the implementation of mitigation, impacts to hazards related to air traffic and proximity to the March ARB Airport as a result of the Project can be mitigated to less-than-significant levels. The Project would be in compliance with the *Citizen's Brochure for the 452d Air Mobility Wing AICUZ Study*, *March ARB AICUZ*, and the *March ARB/Inland Port ALUCP*, and impacts would be less than significant. Therefore, no adverse significant impacts would remain after mitigation. Additionally, based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction.

Alternative 1 would not result in any potential increase in hazards or hazardous materials used during construction, because no construction would occur. Similarly, the No Project Alternative would not introduce a greater number of employees, and visitors to potential hazards from the airport at March ARB during construction or operation because nothing would be built as a result of Alternative 1. Additionally, no relocation of underground petroleum or natural gas lines would occur. Therefore, Alternative 1 would have no impacts on hazards and hazardous materials compared to the Project.

Hydrology/Water Quality

As discussed in Section 4.8, Hydrology and Water Quality, the Project would have less-than-significant impacts associated with water quality standards, waste discharge requirements, increased runoff of pollutants, decrease of groundwater supplies, interference of groundwater recharge, altering existing drainage patterns, or degrading water quality. The Project would be in compliance with all applicable federal, state, and local rules and regulations regarding water quality and hydrology. In addition, implementation of (1) the Storm Water Pollution Prevention Plan (SWPPP) in conformance with the Construction General Permit, (2) the Water Quality Management Plan (WQMP) in compliance with the New Development & Redevelopment Guidelines for Projects Under the March JPA, and (3) proposed drainage design according to the *Riverside County Flood Control and Water Quality District Hydrology Manual* collectively ensure Project impacts on hydrology and water quality would be less than significant.

Alternative 1 would not result in any direct impacts related to hydrology and water quality because no construction would occur, and there would be no increase in runoff from the site. No construction or development activities would take place that could generate an increase in potential pollutants in stormwater, nor would there be changes to groundwater recharge and drainage patterns; therefore, Alternative 1 would have no impacts compared to the Project.

Land Use and Planning

As described in Section 4.9, the K4 Parcel is currently designated Business Park (BP) within the March JPA General Plan Land Use Map (March JPA 2012). Under the proposed Project, the K4 Parcel would be re-designated as Industrial (IND) under the proposed General Plan amendment. Additionally, the K4 Parcel is not yet zoned and as part of the Project, the zoning designations of Industrial (IND) would be applied to the parcel. The proposed Project would also include the processing of a master plot plan and parcel merger. The Project would not cause a significant environmental impact due to a conflict with the goals and policies outlined in the March JPA General Plan, and impacts would be considered less than significant with mitigation incorporated. The Project is also in compliance with the March JPA Development Standards and impacts would be less than significant.

Under Alternative 1, the March JPA General Plan amendment and zoning designation would not be implemented and the Project site would not be incorporated into the March JPA Land Use Authority. Under Alternative 1, existing March JPA General Plan land use and zoning designations would remain and Project objectives would not be met. Therefore, the Project would have no impacts compared to Alternative 1 related to Land Use and Planning.

Noise

As discussed in Section 4.10, Noise, the Project would result in less-than-significant impacts relative to temporary or permanent noise levels. Alternative 1 would not result in any construction or introduce any new land uses or vehicle trips with the potential to generate noise. The existing noise conditions at the Project site and in the vicinity of the Project site would remain unchanged. Therefore, even though noise impacts associated with the proposed Project would be less than significant, Alternative 1 would have no impacts compared to the Project.

Transportation

As discussed in Section 4.11, Transportation, construction of the proposed Project would result in less-than-significant traffic impacts following implementation of mitigation requiring the preparation of a Construction Traffic Management Plan. While Project implementation has the potential to result in several traffic-related impacts, all traffic impacts can be reduced to less than significant levels with the exception of the following:

- **Overlook Parkway/Canyon Crest/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the south leg of the Overlook Parkway/Canyon Crest/Alessandro Boulevard, increasing intersection operations to LOS D and reducing Project impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard**. The Project shall pay its fair share towards the restriping of lanes and the modification of the traffic signal at the intersection of Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the southbound approach at the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of City and County of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards the traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The intersection of Sycamore Canyon Boulevard/Alessandro Boulevard is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Southbound Ramps/Cactus Avenue**. The intersection of I-215 southbound ramps/Cactus Avenue is anticipated to operate at LOS A during the AM peak hour and at LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Northbound Ramps/Alessandro Boulevard**. The intersection of I-215 northbound ramps/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/Alessandro Boulevard**. The intersection of Old 215 Frontage Road/Alessandro Boulevard is anticipated to operate at LOS C with fair share contributions towards lane modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of Moreno Valley and the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the

Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Elsworth Street/Alessandro Boulevard**. The intersection of Elsworth Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Frederick Street/Alessandro Boulevard**. The intersection of Frederick Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

Since the above required improvements are within the jurisdiction of another public agency and not the lead agency, impacts associated with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, as well as impacts related to an applicable congestion management program, would be considered significant and unavoidable following the incorporation of mitigation measures.

Alternative 1 would not result in any direct or indirect impacts related to the roadway network because the Project would not be constructed and no new vehicle trips would be introduced to the Project area. As such, Alternative 1 would have no impacts compared to the Project.

Tribal Cultural Resources

As discussed in Section 4.12, Tribal Cultural Resources, Project implementation could have the potential to affect tribal cultural resources; however, with implementation of mitigation, potential impacts to tribal cultural resources would be reduced to less than significant levels. Alternative 1 would not result in any construction activities, and as such, Alternative 1 would not have the potential to affect tribal cultural resources. Alternative 1 would have no impacts compared to the Project.

Utilities

As discussed in Section 4.13, Utilities and Service Systems, the Project would result in less-than-significant impacts associated with water, wastewater, solid waste, and electric power, natural gas,

and telecommunication services. Alternative 1 would not result in any direct impacts related to water, wastewater, solid waste, and electric power, natural gas, and telecommunication services because nothing would be built as a result of Alternative 1, and a larger number of employees would not be introduced to the area. No construction or development activities would take place that could generate an increase in needed water, wastewater, solid waste, and electric power, natural gas, and telecommunication services; therefore, Alternative 1 would have no impacts compared to the Project.

Energy

As concluded in Section 4.14, Energy, there would be an increase in the amount of electricity, natural gas, and petroleum used during construction and operation of the Project; however, the Project includes features such as alternative modes of transportation that would help reduce the number of vehicle miles traveled generated by the Project operation. Additionally, bike racks would be installed so that employees can use biking as a mode of transportation, thus, reducing the amount of gasoline that would be consumed by Project operation. In addition, the Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. The Project would not contribute to inefficient or wasteful consumption of electricity, natural gas or petroleum, and impacts related to conflicts with existing energy standards would be less than significant. Further, the Project would not place significant demand on local or regional energy supplies or require a substantial amount of additional capacity. Therefore, impacts related to energy supplies and capacity would be less than significant.

Since Alternative 1 would not increase the use of energy, natural gas, or petroleum or require additional energy supplies because no construction would occur under this alternative, there would be no impacts compared to the Project.

Relationship to Project Objectives and Feasibility

Under Alternative 1, the land on the Project site would remain vacant, and no new construction would be developed on the Project site. Table 7-2 provides a list of the Project objectives and whether Alternative 1 meets each objective.

Table 7-2
Summary of Alternative 1 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
1. Provide appropriate land use intensities to comply with the parameters of the March Air Reserve Base/Inland Port Airport Compatibility Plan.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel and would not result in the conversion of the Cactus Channel to an underground box culvert, thereby reducing wildlife attractants which can be hazards to aircraft flight.
2. Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel and would not implement any of the goals, objectives or policies of the March JPA General Plan.
3. Provide increased job opportunities for local residents through the provision of employment-generating businesses.	**No.** Alternative 1 would not result in construction or permanent employment opportunities, as the K4 Parcel would remain undeveloped.
4. Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel and would not provide any new construction or permanent employment opportunities.
5. Develop the property with land uses that are compatible with the March ARB Reuse program.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel and would not develop available land consistent with the March ARB Reuse program.
6. Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel, and no improvements to Cactus Avenue along the K4 Parcel frontage would occur. Additionally, no new employees would be accessing the K4 Parcel. As such, Alternative 1 would not encourage the use of alternative modes of transportation.
7. Provide a range of job types for the community's residents.	**No.** Alternative 1 would not result in construction or permanent employment opportunities, as the K4 Parcel would remain undeveloped.
8. Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians, and bicyclists.	**No.** Alternative 1 would continue to provide vacant land on the K4 Parcel, and no improvements to Cactus Avenue along the K4 Parcel frontage would occur. Additionally, no new employees would be accessing the K4 Parcel. As such, Alternative 1 would not enhance the circulation system to facilitate movement and access for automobiles, pedestrians, or bicyclists.
9. Minimize impacts from construction of the development to sensitive biological resources.	**Yes.** Alternative 1 would not result in any construction activities or changes in operations. As such, no changes to sensitive biological resources would occur.
10. Minimize hazards to flight associated with the naturalized Cactus Channel drainage channel by undergrounding the drainage channel.	**No.** Alternative 1 would not include the proposed Cactus Channel improvements. As such, the open-air earthen channel would continue to attract wildlife and pose hazards to flight.

7.4.2 Alternative 2 – Reduced Size General Warehouse

Under Alternative 2 – Reduced Size General Warehouse, a smaller version, approximately 700,000 square feet, of the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end uses, the building on the K4 Parcel would operate

as a general warehouse. As a general warehouse, Alternative 2 would be primarily devoted to the storage of materials with minimal space devoted to office and maintenance areas. Alternative 2 would require the same proposed General Plan Amendment, Zoning Designation, Master Plot Plan, Parcel Merger, and all other applicable pending approvals associated with the Project would not be necessary, as no new development would occur on the Project site that would trigger such actions. Under Alternative 2, access to the Project site would be via two clear span bridges would be constructed over the Cactus Avenue Drainage Channel (Cactus Channel), and no improvements or installation of an underground box culvert would be completed within the Cactus Channel.

Reduced Size General Warehouse Alternative Environmental Impact Analysis

Aesthetics

As discussed in Section 4.1, the Project would have less-than-significant impacts associated with changes to existing visual character and quality of the Project site and light and glare.

Under Alternative 2, the K4 Parcel would still be developed with a new, yet smaller, warehouse building. The visual character of the K4 Parcel would be similar as under the proposed Project. Access to the Project site would be via two bridges constructed over the Cactus Channel, and no improvements to the Cactus Channel would be made. Therefore, because the building on the K4 Parcel would be the similar, yet smaller, under Alternative 2 as the proposed Project, impacts would be similar to those of the proposed Project and remain less than significant.

Air Quality

As discussed in Section 4.2, daily construction emissions would not exceed the SCAQMD's significance thresholds for CO, SOx, PM_{10}, or $PM_{2.5}$ during construction of the Project in any of the construction years. The Project would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.** The Project's operational emissions would not exceed the SCAQMD's significance threshold for VOCs, CO, SOx, PM_{10}, and $PM_{2.5}$**.** The Project, however, would exceed operational emissions thresholds for NOx even with implementation of mitigation due to emissions and exhaust from internal combustion engines used by construction equipment, therefore resulting in a significant and unavoidable operational impact.

The localized significance threshold (LST) analysis included in Section 4.2 shows that the Project construction and operational emissions would not exceed the CAAQS for NO_2, CO, PM_{10}, and $PM_{2.5}$ or the 1-hour NO_2 NAAQS. Additionally, the Project would not result in on-road traffic volumes at affected intersections that would result in a CO hotspot. The cancer risk and noncancer risk at the nearby residents would not exceed the SCAQMD threshold of 10 in 1 million or chronic HI of 1.0, respectively, and impacts would also be less than significant.

Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel, and no Cactus Channel improvements would be implemented. Construction under Alternative 2 would therefore result in the fewer impacts as the proposed Project because no construction activities would be performed along the alignment of the Cactus Channel. Nonetheless, Alternative 2 construction would still exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.**

Under Alternative 2, the new 700,000 warehouse building on the K4 Parcel would be operated as a general warehouse, thereby resulting in fewer operational vehicle trips when compared to the proposed Project. Table 7-3 summarizes unmitigated and mitigated emissions associated with operation of Alternative 2.

Table 7-3
Alternative 2 Estimated Maximum Daily Operational Emissions
(pounds per day unmitigated)

	VOC [1]	NO_x	CO	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Unmitigated Emissions						
Area source emissions [3]	16.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	11.0	208	66	0.8	39	13.1
Combined total emissions	**27.4**	**208**	**67**	**0.8**	**39**	**13.1**
SCAQMD Pollutant threshold [5]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded? [6]	**No**	**Yes**	**No**	**No**	**No**	**No**
Mitigated Emissions						
Area source emissions [3]	14.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	11.0	208	66	0.8	38	13.1
SCAQMD Pollutant threshold [5]	**25.7**	**208**	**67**	**0.8**	**38**	**13.1**
Threshold exceeded? [6]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded?	**No**	**Yes**	**No**	**No**	**No**	**No**

Source: Ramboll 2019.
Notes:
1 For purposes of this analysis VOC emissions are assumed to be equal to ROG.
2 PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.
3 Emissions estimated using CalEEMod®. Refer to Appendix C for CalEEMod® outputs.
4 Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the K4 Parcel Alternatives Trip Generation Evaluation dated December 14, 2018.
5 SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.
6 Comparison of mitigated operational emissions against SCAQMD significance thresholds. Quantified mitigation measure includes the use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

Under Alternative 2, operational activities would be less intense than those associated with the proposed Project, thereby resulting in fewer vehicle trips and associated air emission reductions and energy emissions. However, under Alternative 2, emissions related to NO_x would remain at significant and unavoidable even with implementation of mitigation measures due to emissions and exhaust from internal combustion engines used by construction equipment. Therefore, operational emissions would be significant and unavoidable but slightly reduced when compared to the proposed Project.

Biological Resources

As discussed in Section 4.3, both the K4 Parcel and Cactus Channel Improvement Site provide suitable habitat for federal and state special-status plant and animal species. However, with implementation of mitigation, potentially significant impacts to smooth tarplant, Riverside fairy shrimp, vernal pool fairy shrimp, Stephen's Kangaroo Rat, burrowing owl, western spadefoot, orange-throated whiptail, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, and Los Angeles pocket mouse can be reduced to less than significant levels. Additionally, there is the potential for the Project to affect special-status riparian vegetation communities and protected wetland communities; however, with implementation of mitigation, potential impacts can be reduced to less than significant levels. Finally, there is the potential for the Project to affect implementation of the Multiple Species Habitat Conservation Plan (MSHCP); however, with implementation of mitigation, all potential conflicts with the MSHCP would be reduced to less than significant impacts.

Under Alternative 2, a new 700,000-square-foot warehouse building would be constructed on the K4 Parcel; no improvements would be constructed within the Cactus Channel and instead two clear span bridges would be constructed over the Cactus Channel thereby removing any potential impacts to biological resources within the Cactus Channel. The same construction footprint would occur on the K4 Parcel; however, no construction activities would occur within the Cactus Channel. As with the proposed Project, with implementation of mitigation, all impacts to biological resources under Alternative 2 would be reduced to less than significant levels; however, under Alternative 2, impacts would be reduced because no impacts would occur within the Cactus Channel. Additionally, without the Cactus component of the Project, the Project would not affect implementation of the MSHCP. Impacts to biological resources associated with Alternative 2 would be reduced in comparison to the proposed Project.

Cultural Resources

As discussed in Section 4.4, with the incorporation of mitigation, the Project would have less-than-significant impacts associated with historical resources, archaeological resources, unique geologic features, and human remains. Impacts to cultural resources can be mitigated to less-than-

significant levels by incorporating mitigation measures, and no significant adverse impacts would remain after mitigation.

Alternative 2 would result in the same impacts related to cultural resources on the K4 Parcel because a comparable, yet smaller, warehouse building would be constructed. However, no improvements would occur within the Cactus Channel. As such, the same potential as the proposed Project exists to impact potential historical, paleontological, unique archaeological resources, or human remains on the K4 Parcel; however, no potential impacts would occur within the Cactus Channel. As with the proposed Project, implementation of mitigation measures for Alternative 2 would reduce potentially significant impacts to a less than significant level on the K4 Parcel; however, because no impacts would occur within the Cactus Channel, Alternative 2 would result in reduced potential impacts to cultural resources when compared to the proposed Project.

Geology and Soils

As discussed in Section 4.5, the implementation of the Project would not conflict with any applicable plan, policy, or regulation adopted for the purposes of mitigating hazards associated with geology and soils. The Project would have a less-than-significant impact associated with strong seismic ground shaking and seismic-related ground failure with incorporation of mitigation. Lastly, the proposed Project would result in less than significant impacts to unique paleontological resources with mitigation incorporated.

Alternative 2 would result in comparable impacts related to geology and soils because a similar, yet smaller, warehouse building would be constructed on the K4 Parcel. However, under Alternative 2, the proposed Cactus Channel improvements would not be implemented. With incorporation of the recommendations included in the Geotechnical Exploration prepared for the Project (Appendix I1 and Appendix I2), which would also apply to the warehouse building constructed under Alternative 2, impacts related to risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure would be less than significant and the same as those identified for the proposed Project. However, because no impacts would occur within the Cactus Channel, Alternative 2 would result in reduced potential impacts when compared to the proposed Project.

Greenhouse Gas Emissions

As discussed in Section 4.6, the proposed Project would result in greenhouse gas (GHG) emissions that are primarily associated with use of off-road equipment and on-road construction and worker vehicles during construction. Operation of the proposed Project would result in GHG emissions through energy use; motor vehicle trips to and from the proposed Project; generation of electricity associated with water supply, treatment, and distribution and wastewater treatment; and solid waste disposal. The Project would result in a less than significant impact associated with GHG emissions.

As provided in Appendix J, Greenhouse Gas Technical Report, Alternative 2's total unmitigated and mitigated GHG emissions (including construction) would not exceed 3,000 MT carbon dioxide equivalent per year and thus would be considered less than significant in accordance with the Riverside County CAP. Furthermore, Alternative 2 would not need to complete the Riverside County's CAPs screening table. As Alternative 2 would only reduce the size of the project and not reduce any of the sustainable features of the proposed Project, Alternative 2 would be consistent with AB 32 as shown in detail in Table 4.6-4. Similar to the proposed Project, Alternative 2 would also be consistent with the March JPA General Plan Noise/Air Quality Element as provided in Table 4.6-5. Alternative 2 would also be consistent with SB 375 as it would add jobs consistent with the SCAG 2016 RTP/SCS projections in accordance with ARB's emissions reduction targets. Impacts would be less than significant.

Hazards and Hazardous Materials

As discussed in Section 4.7, with the implementation of mitigation, impacts to hazards related to air traffic and proximity to the March ARB Airport as a result of the Project can be mitigated to less-than-significant levels. The Project would be in compliance with the *Citizen's Brochure for the 452d Air Mobility Wing AICUZ Study*, *March ARB AICUZ*, and the *March ARB/Inland Port ALUCP*, and impacts would be less than significant. Therefore, no adverse significant impacts would remain after mitigation. Additionally, based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction.

Under Alternative 2, the proposed warehouse building on the K4 Parcel would still be constructed, yet would be smaller in size at 700,000 square feet, and new employees would be introduced to a site within proximity of the March ARB. There would also still be the potential to encounter unexploded ordinance during construction on the K4 Parcel. However, under Alternative 2, the Cactus Channel improvements would not be implemented. The mitigation measures included for the proposed Project would remain applicable to Alternative 2, and as such, all potentially significant impacts could be reduced to less-than-significant levels. Given that the potential for Alternative 2 to result in similar hazards and hazardous materials impacts on the K4 Parcel as the proposed Project yet reduced for the Cactus Channel improvements component of the proposed Project, Alternative 2 would be result in reduced impacts compared to the proposed Project with respect to hazards and hazardous materials.

Hydrology/Water Quality

As discussed in Section 4.8, the Project would have less-than-significant impacts associated with water quality standards, waste discharge requirements, increased runoff of pollutants, depletion of

groundwater supplies, interference of groundwater recharge, altering existing drainage patterns, or degrading water quality. The Project would be in compliance with all applicable federal, state, and local rules and regulations regarding water quality and hydrology. In addition, implementation of (1) the SWPPP in conformance with the Construction General Permit, (2) the WQMP in compliance with the New Development & Redevelopment Guidelines for Projects Under the March JPA, and (3) proposed drainage design according to the *Riverside County Flood Control and Water Quality District Hydrology Manual* collectively ensure Project impacts on hydrology and water quality would be less than significant.

Under Alternative 2, a smaller warehouse building would be constructed on the K4 Parcel, and the proposed Cactus Channel improvements would not be implemented. As such, with implementation of a similar, yet smaller, building hydrology and water quality impacts for the K4 Parcel would be similar to those of the proposed Project. However, given that the Cactus Channel improvements component of the Project would not be implemented, Alternative 2 would result in reduced hydrology and water quality impacts compared to the proposed Project.

Land Use and Planning

As described in Section 4.9, the K4 Parcel is currently designated Business Park (BP) within the March JPA General Plan Land Use Map (March JPA 2012). Under the proposed Project, the K4 Parcel would be re-designated as Industrial (IND) under the proposed General Plan amendment. Additionally, the K4 Parcel is not yet zoned and as part of the Project, the zoning designations of Industrial (IND) would be applied to the parcel. The proposed Project would also include the processing of a master plot plan and parcel merger. The Project would be consistent with the goals and policies outlined in the March JPA General Plan, and impacts would not cause a significant environmental impact due to a conflict less than significant with mitigation incorporated. The Project is also in compliance with the March JPA Development Standards and impacts would be less than significant.

Under Alternative 2, the K4 Parcel would be developed with an industrial warehouse building that is smaller than the proposed Project. This alternative would still require the processing of a General Plan amendment to designate the site as Industrial (IND), assign zoning of IND, approval of a master plot plan, and approval of a parcel merger. As such, given that the same land use entitlements would be required under Alternative 2 as the proposed Project, land use impacts under Alternative 2 would be comparable to those of the proposed Project and less than significant with the incorporation of mitigation measures.

Noise

As discussed in Section 4.10, the Project would result in less-than-significant impacts relative to temporary or permanent noise levels. Alternative 2 would result in the construction and operation of

a 700,000-square-foot industrial warehouse building on the K4 Parcel. Alternative 2 would not result in implementation of the Cactus Channel improvements. As such, given that Alternative 2 would not include construction impacts along the Cactus Channel alignment, construction noise impacts would be less than the proposed Project. Additionally, during operation of Alternative 2, given the smaller building, fewer trucks and vehicles would be accessing the K4 Parcel. As such, noise impacts under Alternative 2 would be reduced in comparison to those of the proposed Project.

Transportation

As discussed in Section 4.11, construction of the proposed Project would result in less-than-significant traffic impacts following implementation of mitigation requiring the preparation of a Construction Traffic Management Plan. While Project implementation has the potential to result in several traffic-related impacts, all traffic impacts can be reduced to less than significant levels with the exception of the following:

- **Overlook Parkway/Canyon Crest/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the south leg of the Overlook Parkway/Canyon Crest/Alessandro Boulevard, increasing intersection operations to LOS D and reducing Project impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard**. The Project shall pay its fair share towards the restriping of lanes and the modification of the traffic signal at the intersection of Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the southbound approach at the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of City and County of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue is anticipated to operate

at LOS D with fair share contributions towards the traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The intersection of Sycamore Canyon Boulevard/Alessandro Boulevard is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Southbound Ramps/Cactus Avenue**. The intersection of I-215 southbound ramps/Cactus Avenue is anticipated to operate at LOS A during the AM peak hour and at LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Northbound Ramps/Alessandro Boulevard**. The intersection of I-215 northbound ramps/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/Alessandro Boulevard**. The intersection of Old 215 Frontage Road/Alessandro Boulevard is anticipated to operate at LOS C with fair share contributions towards lane modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of Moreno Valley and the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the

improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Elsworth Street/Alessandro Boulevard**. The intersection of Elsworth Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Frederick Street/Alessandro Boulevard**. The intersection of Frederick Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

Under Alternative 2, the K4 Parcel would be developed with a new, yet smaller, warehouse building that would be approximately 700,000 square feet. The Cactus Channel improvements would not be implemented under Alternative 2. As such, construction traffic under Alternative 2 would be reduced when compared to the proposed Project. The new building constructed on the K4 Parcel would be utilized as a general warehouse under Alternative 2, compared to an e-commerce/fulfillment center under the proposed Project. Additionally, the warehouse building itself would be smaller in size, at 700,000 square feet instead of 718,000 square feet. Table 7-4 presents the overall vehicle trips under Alternative 2, and provides the difference and percent reductions when compared to the proposed Project.

Table 7-4
Alternative 2 Trip Generation Comparison and Summary

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
General Warehouse	700.000	TSF							
Passenger Cars			64	19	83	28	76	104	770
Truck Trip									
2-axle:			5	1	6	1	4	5	75
3-axle:			6	1	7	1	4	5	93
4+-axle:			18	6	23	5	13	18	281
- Net Truck Trips (Actual)[2]			28	7	36	7	22	28	448
Alternative 2 Total Net Trips (Actual)[3]			*92*	*26*	*119*	*35*	*98*	*133*	*1,219*

Table 7-4
Alternative 2 Trip Generation Comparison and Summary

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
Project Net Trips (PCE)[3]			*327*	*98*	*425*	*275*	*708*	*983*	*5,873*
Variance (Alternative 2-Project)			**-235**	**-72**	**-306**	**-240**	**-610**	**-850**	**-4,654**

Source: Urban Crossroads 2019.
Notes:
1 Trip Generation Source: ITE 2017.
2 TSF = Thousand Square Feet
3 TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

Under Alternative 2, a total of 4,654 fewer actual vehicle trips would occur when compared to the proposed Project. During the AM and PM peak hours, trips would also all be reduced when compared to the proposed Project, with a total of 306 fewer AM peak hour trips and a total of 850 fewer PM peak hour trips.

However, as with the proposed Project, since the required improvements to the street network are within the jurisdiction of another public agency and not the lead agency, impacts under Alternative 2 would be reduced when compared to the proposed Project but still remain significant and unavoidable.

Tribal Cultural Resources

As discussed in Section 4.12, Project implementation could have the potential to affect tribal cultural resources; however, with implementation of mitigation, potential impacts to tribal cultural resources would be reduced to less than significant levels. Alternative 2 would result in the construction of a comparable, yet smaller, industrial warehouse building on the K4 Parcel. The Cactus Channel improvements component of the Project would not be implemented. As such, the same potential to affect tribal cultural resources could occur on the K4 Parcel under Alternative 2. However, the potential to affect tribal cultural resources within the Cactus Channel would be reduced since no construction activities would occur within the Channel. As such, Alternative 2 would result in fewer potential impacts to tribal cultural resources than the proposed Project.

Utilities

As discussed in Section 4.13, the Project would result in less-than-significant impacts associated for water, wastewater, solid waste, and electric power, natural gas, and telecommunication services resulting in no need to develop new or improve existing facilities. Under Alternative 2, the K4 Parcel would be developed with a smaller industrial warehouse building; the proposed Cactus Channel improvements would not be implemented. As such, given that the new warehouse

building under Alternative 2 would be smaller than the warehouse building under the proposed Project, operational activities would be reduced where compared with the proposed Project.

Energy

As concluded in Section 4.14, there would be an increase in the amount of electricity, natural gas, and petroleum used during construction and operation of the Project; however, the Project includes features such as alternative modes of transportation that would help reduce the number of vehicle miles traveled generated by the Project operation. Additionally, bike racks would be installed so that employees can utilize biking as a mode of transportation, thus, reducing the amount of gasoline that would be consumed by Project operation. In addition, the Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. The Project would not contribute to inefficient or wasteful consumption of electricity, natural gas or petroleum, and impacts related to conflicts with existing energy standards would be less than significant. Further, the Project would not place significant demand on local or regional energy supplies or require a substantial amount of additional capacity. Therefore, impacts related to energy supplies and capacity would be less than significant.

Under Alternative 2, the construction schedule would be similar to that of the proposed Project and a comparable, yet smaller industrial warehouse building would be constructed on the K4 Parcel. However, no Cactus Channel improvements would be implemented under Alternative 2. As such, Alternative 2 would result in less energy consumption when compared to the proposed Project, and as such, fewer energy impacts than the proposed Project.

Relationship to Project Objectives and Feasibility

Under Alternative 2, a comparable, yet smaller, industrial warehouse building would be constructed on the K4 Parcel and no Cactus Channel improvements would be implemented. Table 7-5 provides a list of the Project objectives and whether Alternative 2 meets each objective.

Table 7-5
Summary of Alternative 2 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
1. Provide appropriate land use intensities to comply with the parameters of the March Air Reserve Base/Inland Port Airport Compatibility Plan.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. The general warehouse use is consistent with the C1 Zone of the K4 Parcel and Alternative 2 would continue to provide fewer than 100 persons per acre as building occupants.

Table 7-5
Summary of Alternative 2 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
2. Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. The general warehouse use is consistent with, and would implement the goals, objectives and policies of the March JPA General Plan.
3. Provide increased job opportunities for local residents through the provision of employment-generating businesses.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
4. Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. The flexibility associated with the general warehouse use would allow for Project viability both in the short- and long-term.
5. Develop the property with land uses that are compatible with the March ARB Reuse program.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. This use would be consistent and compatible with the March ARB Reuse program.
6. Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. As part of the Alternative 2, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.
7. Provide a range of job types for the community's residents.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
8. Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians, and bicyclists.	**Yes.** Under Alternative 2, a 700,000-square-foot general warehouse building would be constructed on the K4 Parcel. As part of the Alternative 2, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.
9. Minimize impacts from construction of the development to sensitive biological resources.	**Yes.** While Alternative 2 would result in the implementation of a new warehouse building on the K4 Parcel, as with the proposed Project, mitigation would be implemented to minimize impacts to sensitive biological resources.
10. Minimize hazards to flight associated with the naturalized Cactus Channel drainage channel by undergrounding the drainage channel.	**No.** Under Alternative 2 the Cactus Channel improvements would not be implemented and the existing hazards to flight associated with the open-air drainage channel would remain.

7.4.3 Alternative 3 – High-Cube Short-Term Storage Warehouse

Under Alternative 3 – High-Cube Short-Term Storage Warehouse, the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end uses, the building on the K4 Parcel would operate as a high-cube warehouse (HCW) building. A HCW is a building that typically has at least 200,000 gross square feet of floor area, has a ceiling height of 24 feet or more, and is used primarily for the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. A typical HCW has a high level of on-site automation and logistics management. The automation and logistics enable highly efficient processing of goods through the HCW. The HCWs included in this land use include transload and short-term facilities. Transload facilities have a primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. They typically have little storage duration, high throughput, and are high-efficiency facilities. Short-term HCWs are high-efficiency distribution facilities often with custom/special features built into structure for movement of large volumes of freight with only short-term storage of products. Alternative 3 would require the same proposed General Plan Amendment, Zoning Designation, Master Plot Plan, Parcel Merger, and all other applicable pending approvals associated with the Project would not be necessary, as no new development would occur on the Project site that would trigger such actions. Under Alternative 3, improvements to the Cactus Avenue Drainage Channel (Cactus Channel) would also be completed.

High-Cube Short-Term Storage Warehouse Alternative Environmental Impact Analysis

Aesthetics

As discussed in Section 4.1, the Project would have less-than-significant impacts associated with changes to existing visual character and quality of the Project site and light and glare.

Under Alternative 3, the K4 Parcel would still be developed with a new warehouse building of comparable size, and the Cactus Channel improvements would be constructed underground within the existing depressed Channel. The visual character of the K4 Parcel would be the same as under the proposed Project, and as with the Project's proposed Cactus Channel improvements, the improvements would not be visible. Therefore, because the building on the K4 Parcel would be the same under Alternative 3 as the proposed Project, impacts would be comparable to those of the proposed Project and remain less than significant.

Air Quality

As discussed in Section 4.2, daily construction emissions would not exceed the SCAQMD's significance thresholds for CO, SOx, PM_{10}, or $PM_{2.5}$ during construction of the Project in any of the

construction years. The Project would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.** The Project's operational emissions would not exceed the SCAQMD's significance threshold for VOCs, CO, SOx, PM_{10}, and $PM_{2.5}$. The Project, however, would exceed operational emissions thresholds for NOx even with implementation of mitigation due to emissions and exhaust from internal combustion engines used by construction equipment, therefore resulting in a significant and unavoidable operational impact.

The LST analysis included in Section 4.2 shows that the Project construction and operational emissions would not exceed the CAAQS for NO_2, CO, PM_{10}, and $PM_{2.5}$ or the 1-hour NO_2 NAAQS. Additionally, the Project would not result in on-road traffic volumes at affected intersections that would result in a CO hotspot. The cancer risk and noncancer risk at the nearby residents would not exceed the SCAQMD threshold of 10 in 1 million or chronic HI of 1.0, respectively, and impacts would also be less than significant.

Under Alternative 3, a new warehouse building comparable to the one under the proposed Project would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. Construction under Alternative 3 would therefore result in the same impacts as the proposed Project. Alternative 3 construction would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.**

Under Alternative 3, the new warehouse building on the K4 Parcel would be operated as a HCW, thereby resulting in fewer operational vehicle trips when compared to the proposed Project. Table 7-6 summarizes unmitigated and mitigated emissions associated with operation of Alternative 3.

Table 7-6
Alternative 3 Estimated Maximum Daily Operational Emissions
(pounds per day unmitigated)

	VOC [1]	NO_x	CO	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Unmitigated Emissions						
Area source emissions [3]	16.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	8.4	150	52	0.6	29	9.9
Combined total emissions	**24.7**	**151**	**53**	**0.6**	**29**	**9.9**
SCAQMD Pollutant threshold [5]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded? [6]	**No**	**Yes**	**No**	**No**	**No**	**No**

	VOC [1]	NO_x	CO	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Mitigated Emissions						
Area source emissions [3]	14.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	8.4	150	52	0.6	29	9.9
SCAQMD Pollutant threshold [5]	**23.0**	**151**	**53**	**0.6**	**29**	**9.9**
Threshold exceeded? [6]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded?	**No**	**Yes**	**No**	**No**	**No**	**No**

Source: Ramboll 2018a.
Notes:
1 For purposes of this analysis VOC emissions are assumed to be equal to ROG.
2 PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.
3 Emissions estimated using CalEEMod®. Refer to Appendix C for CalEEMod® outputs.
4 Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the K4 Parcel Alternatives Trip Generation Evaluation dated December 14, 2018.
5 SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.
6 Comparison of mitigated operational emissions against SCAQMD significance thresholds. Quantified mitigation measure includes the use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

Under Alternative 3, operational activities would be less intense than those associated with the proposed Project, thereby resulting in few vehicle trips and associated air emission reductions and energy emissions. However, under Alternative 3, emissions related to NO_x would remain at significant and unavoidable even with implementation of mitigation measures due to emissions and exhaust from internal combustion engines used by construction equipment. Therefore, operational emissions would be significant and unavoidable but slightly reduced when compared to the proposed Project.

Biological Resources

As discussed in Section 4.3, both the K4 Parcel and Cactus Channel Improvement Site provide suitable habitat for federal and state special-status plant and animal species. However, with implementation of mitigation, potentially significant impacts to smooth tarplant, Riverside fairy shrimp, vernal pool fairy shrimp, Stephen's Kangaroo Rat, burrowing owl, western spadefoot, orange-throated whiptail, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, and Los Angeles pocket mouse can be reduced to less than significant levels. Additionally, there is the potential for the Project to affect special-status riparian vegetation communities and protected wetland communities; however, with implementation of mitigation, potential impacts can be reduced to less than significant levels. Finally, there is the potential for the Project to affect implementation of the MSCHP; however, with implementation of mitigation, all potential conflicts with the MSCHP would be reduced to less than significant impacts.

Under Alternative 3, the new warehouse building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented in the same manner as the proposed Project. As such, because construction would occur within the same footprint and operational activities

would be similar to those of the proposed Project, Alternative 3 would result in the same impacts as the proposed Project. As with the proposed Project, with implementation of mitigation, all impacts to biological resources under Alternative 3 would be reduced to less than significant levels.

Cultural Resources

As discussed in Section 4.4, with the incorporation of mitigation, the Project would have less-than-significant impacts associated with historical resources, archaeological resources, unique geologic features, and human remains. Impacts to cultural resources can be mitigated to less-than-significant levels by incorporating mitigation measures, and no significant adverse impacts would remain after mitigation.

Alternative 3 would result in the same impacts related to cultural resources because a comparable warehouse building would be constructed on the K4 Parcel, and the Cactus Channel improvements included within the proposed Project would still be implemented. As such, the same potential as the proposed Project exists to impact potential historical, paleontological, unique archaeological resources, or human remains. As with the proposed Project, implementation of mitigation measures for Alternative 3 would reduce potentially significant impacts to a less than significant level.

Geology and Soils

As discussed in Section 4.5, the implementation of the Project would not conflict with any applicable plan, policy, or regulation adopted for the purposes of mitigating hazards associated with geology and soils. The Project would have a less-than-significant impact associated with strong seismic ground shaking and seismic-related ground failure with incorporation of mitigation. Lastly, the proposed Project would result in less than significant impacts to unique paleontological resources with mitigation incorporated.

Alternative 3 would result in comparable impacts related to geology and soils because a similar warehouse building would be constructed on the K4 Parcel. Additionally, under Alternative 3, the proposed Cactus Channel improvements would be implemented. With incorporation of the recommendations included in the Geotechnical Exploration prepared for the Project (Appendix I1 and Appendix I2), which would also apply to the warehouse building constructed under Alternative 3, impacts related to risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure would be less than significant and the same as those identified for the proposed Project.

Greenhouse Gas Emissions

As discussed in Section 4.6, the proposed Project would result in greenhouse gas (GHG) emissions that are primarily associated with use of off-road equipment and on-road construction and worker

vehicles during construction. Operation of the proposed Project would result in GHG emissions through energy use; motor vehicle trips to and from the proposed Project; generation of electricity associated with water supply, treatment, and distribution and wastewater treatment; and solid waste disposal. The Project would result in a less than significant impact associated with GHG emissions.

As provided in Appendix J, Alternative 3's total unmitigated and mitigated GHG emissions (including construction) would not exceed 3,000 MT carbon dioxide equivalent per year and thus would be considered less than significant in accordance with the Riverside County CAP. Furthermore, Alternative 3 would not need to complete the Riverside County's CAPs screening table. As Alternative 3 would only reduce the size of the project and not reduce any of the sustainable features of the proposed Project, Alternative 3 would be consistent with AB 32 as shown in detail in Table 4.6-4. Similar to the proposed Project, Alternative 3 would also be consistent with the March JPA General Plan Noise/Air Quality Element as provided in Table 4.6-5. Alternative 3 would also be consistent with SB 375 as it would add jobs consistent with the SCAG 2016 RTP/SCS projections in accordance with ARB's emissions reduction targets. Impacts would be less than significant.

Hazards and Hazardous Materials

As discussed in Section 4.7, with the implementation of mitigation, impacts to hazards related to air traffic and proximity to the March ARB Airport as a result of the Project can be mitigated to less-than-significant levels. The Project would be in compliance with the *Citizen's Brochure for the 452d Air Mobility Wing AICUZ Study*, *March ARB AICUZ*, and the *March ARB/Inland Port ALUCP*, and impacts would be less than significant. Therefore, no adverse significant impacts would remain after mitigation. Additionally, based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction.

Under Alternative 3, the proposed warehouse building on the K4 Parcel would still be constructed, new employees would be introduced to a site within proximity of the March ARB, and there would still be the potential to encounter unexploded ordinance. Additionally, the Cactus Channel improvements would still be implemented under Alternative 3. The mitigation measures included for the proposed Project would remain applicable to Alternative 3, and as such, all potentially significant impacts could be reduced to less-than-significant levels. Given that the potential for Alternative 3 to result in similar hazards and hazardous materials impacts as the proposed Project, Alternative 3 would be comparable to the proposed Project with respect to impacts associated with hazards and hazardous materials.

Hydrology/Water Quality

As discussed in Section 4.8, the Project would have less-than-significant impacts associated with water quality standards, waste discharge requirements, increased runoff of pollutants, depletion of groundwater supplies, interference of groundwater recharge, altering existing drainage patterns, or degrading water quality. The Project would be in compliance with all applicable federal, state, and local rules and regulations regarding water quality and hydrology. In addition, implementation of (1) the SWPPP in conformance with the Construction General Permit, (2) the WQMP in compliance with the New Development & Redevelopment Guidelines for Projects Under the March JPA, and (3) proposed drainage design according to the *Riverside County Flood Control and Water Quality District Hydrology Manual* collectively ensure Project impacts on hydrology and water quality would be less than significant.

Under Alternative 3, a comparable warehouse building would be constructed on the K4 Parcel, and the proposed Cactus Channel improvements would still be implemented. As such, with implementation of the same building and Channel improvements, impacts associated with Alternative 3 would be the same as the proposed Project and would be less than significant.

Land Use and Planning

As described in Section 4.9, the K4 Parcel is currently designated Business Park (BP) within the March JPA General Plan Land Use Map (March JPA 2012). Under the proposed Project, the K4 Parcel would be re-designated as Industrial (IND) under the proposed General Plan amendment. Additionally, the K4 Parcel is not yet zoned and as part of the Project, the zoning designations of Industrial (IND) would be applied to the parcel. The proposed Project would also include the processing of a master plot plan and parcel merger. The Project would not cause a significant environmental impact due to a conflict with the goals and policies outlined in the March JPA General Plan, and impacts would be considered less than significant with mitigation incorporated. The Project is also in compliance with the March JPA Development Standards and impacts would be less than significant.

Under Alternative 3, the K4 Parcel would be developed with a comparable industrial warehouse building. This alternative would still require the processing of a General Plan amendment to designate the site as Industrial (IND), assign zoning of IND, approval of a master plot plan, and approval of a parcel merger. As such, given that the same land use entitlements would be required under Alternative 3 as the proposed Project, land use impacts under Alternative 3 would be comparable to those of the proposed Project and less than significant with the incorporation of mitigation measures.

Noise

As discussed in Section 4.10, the Project would result in less-than-significant impacts relative to temporary or permanent noise levels. Alternative 3 would result in the construction and operation of a comparable industrial warehouse building on the K4 Parcel and implementation of the Cactus Channel improvements. As such, Alternative 3 would result in the same noise impacts as the proposed Project and would continue to be less than significant.

Transportation

As discussed in Section 4.11, construction of the proposed Project would result in less-than-significant traffic impacts following implementation of mitigation requiring the preparation of a Construction Traffic Management Plan. While Project implementation has the potential to result in several traffic-related impacts, all traffic impacts can be reduced to less than significant levels with the exception of the following:

- **Overlook Parkway/Canyon Crest/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the south leg of the Overlook Parkway/Canyon Crest/Alessandro Boulevard, increasing intersection operations to LOS D and reducing Project impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard**. The Project shall pay its fair share towards the restriping of lanes and the modification of the traffic signal at the intersection of Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the southbound approach at the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of City and County of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards the traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The intersection of Sycamore Canyon Boulevard/Alessandro Boulevard is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Southbound Ramps/Cactus Avenue**. The intersection of I-215 southbound ramps/Cactus Avenue is anticipated to operate at LOS A during the AM peak hour and at LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Northbound Ramps/Alessandro Boulevard**. The intersection of I-215 northbound ramps/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/Alessandro Boulevard**. The intersection of Old 215 Frontage Road/Alessandro Boulevard is anticipated to operate at LOS C with fair share contributions towards lane modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of Moreno Valley and the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal

modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Elsworth Street/Alessandro Boulevard**. The intersection of Elsworth Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Frederick Street/Alessandro Boulevard**. The intersection of Frederick Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

Under Alternative 3, the K4 Parcel would be developed with a new warehouse building that would be the same size as the proposed Project and the same Cactus Channel improvements would be implemented. As such, construction traffic under Alternative 3 would be the same as the proposed Project. However, the new building constructed on the K4 Parcel would be utilized as a high-cube short-term storage warehouse under Alternative 3, compared to an e-commerce/fulfillment center under the proposed Project. Table 7-7 presents the overall vehicle trips under Alternative 3, and provides the difference and percent reductions when compared to the proposed Project.

Table 7-7
Alternative 3 Trip Generation Comparison and Summary

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
High-Cube Short-Term Warehouse	718.000	TSF							
Passenger Cars			31	9	40	16	40	56	682
Truck Trip									
2-axle:			2	1	3	1	2	3	54
3-axle:			3	1	4	1	2	3	67
4+-axle:			9	3	12	3	7	10	203
- Net Truck Trips (Actual)[2]			*14*	*5*	*19*	*5*	*11*	*16*	*324*
Alternative 2 Total Net Trips (Actual)[3]			*44*	*14*	*58*	*21*	*51*	*72*	*1,005*

Table 7-7
Alternative 3 Trip Generation Comparison and Summary

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
Project Net Trips (PCE)[3]			*327*	*98*	*425*	*275*	*708*	*983*	*5,873*
Variance (Alternative 2-Project)			**-283**	**-84**	**-367**	**-254**	**-657**	**-911**	**-4,868**

Source: Urban Crossroads 2018a.
Notes:
1 Trip Generation Source: ITE 2017.
2 TSF = Thousand Square Feet
3 TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

Under Alternative 3, a total of 4,868 fewer actual vehicle trips would occur when compared to the proposed Project. During the AM and PM peak hours, trips would also all be reduced when compared to the proposed Project, with a total of 367 fewer AM peak hour trips and a total of 911 fewer PM peak hour trips.

However, as with the proposed Project, since the required improvements to the street network are within the jurisdiction of another public agency and not the lead agency, impacts under Alternative 3 would be reduced when compared to the proposed Project but still remain significant and unavoidable.

Tribal Cultural Resources

As discussed in Section 4.12, Project implementation could have the potential to affect tribal cultural resources; however, with implementation of mitigation, potential impacts to tribal cultural resources would be reduced to less than significant levels. Alternative 3 would result in the construction of a comparable industrial warehouse building on the K4 Parcel and implementation of the Cactus Channel improvements. As such, the same potential to affect tribal cultural resources could occur under Alternative 3. However, as with the proposed Project, implementation of mitigation would reduce potentially significant impacts to tribal cultural resources. Alternative 3 would have the same impacts as the Project.

Utilities

As discussed in Section 4.13, the Project would result in less-than-significant impacts associated for water, wastewater, solid waste, and electric power, natural gas, and telecommunication services resulting in no need to develop new or improve existing facilities. Under Alternative 3, the K4 Parcel would be developed with a comparable industrial warehouse building and the proposed Cactus Channel improvements would be implemented. As such, operational activities would be comparable to those associated with the proposed Project.

Energy

As concluded in Section 4.14, there would be an increase in the amount of electricity, natural gas, and petroleum used during construction and operation of the Project; however, the Project includes features such as alternative modes of transportation that would help reduce the number of vehicle miles traveled generated by the Project operation. Additionally, bike racks would be installed so that employees can utilize biking as a mode of transportation, thus, reducing the amount of gasoline that would be consumed by Project operation. In addition, the Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. The Project would not contribute to inefficient or wasteful consumption of electricity, natural gas or petroleum, and impacts related to conflicts with existing energy standards would be less than significant. Further, the Project would not place significant demand on local or regional energy supplies or require a substantial amount of additional capacity. Therefore, impacts related to energy supplies and capacity would be less than significant.

Under Alternative 3, the construction schedule would be similar to that of the proposed Project and a comparable industrial warehouse building would be constructed on the K4 Parcel. Additionally, the same Cactus Channel improvements would be implemented under Alternative 3. As such, Alternative 3 would result in similar energy consumption to the proposed Project, and as such, similar energy impacts as the proposed Project.

Relationship to Project Objectives and Feasibility

Under Alternative 3, a comparable industrial warehouse building would be constructed on the K4 Parcel and the same Cactus Channel improvements would be implemented. Table 7-8 provides a list of the Project objectives and whether Alternative 3 meets each objective.

Table 7-8
Summary of Alternative 3 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
1. Provide appropriate land use intensities to comply with the parameters of the March Air Reserve Base/Inland Port Airport Compatibility Plan.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. The HCW warehouse use is consistent with the C1 Zone of the K4 Parcel and Alternative 3 would continue to provide fewer than 100 persons per acre as building occupants.
2. Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. The HCW use is consistent with, and would implement the goals, objectives and policies of the March JPA General Plan.

Table 7-8
Summary of Alternative 3 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
3. Provide increased job opportunities for local residents through the provision of employment-generating businesses.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
4. Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel. The flexibility associated with the HCW use would allow for Project viability both in the short- and long-term.
5. Develop the property with land uses that are compatible with the March ARB Reuse program.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. These would be consistent and compatible with the March ARB Reuse program.
6. Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. As part of the Alternative 3, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.
7. Provide a range of job types for the community's residents.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
8. Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians, and bicyclists.	**Yes.** Under Alternative 3, a HCW building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. As part of the Alternative 3, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.
9. Minimize impacts from construction of the development to sensitive biological resources.	**Yes.** While Alternative 3 would result in the implementation of a new HCW building on the K4 Parcel and the installation of an underground box culvert within the existing Cactus Channel, as with the proposed Project, mitigation would be implemented to minimize impacts to sensitive biological resources.
10. Minimize hazards to flight associated with the naturalized Cactus Channel drainage channel by undergrounding the drainage channel.	**Yes.** Under Alternative 3 the Cactus Channel improvements would be implemented thereby undergrounding the drainage channel and minimizing hazards to flight by reducing wildlife attractants.

7.4.4 Alternative 4 – High-Cube Parcel Hub Warehouse

Under Alternative 4 – High-Cube Parcel Hub Warehouse, the Project shell would be constructed on the K4 Parcel, and rather than operating as a High-Cube Fulfillment Center, which is characterized by a significant storage function and direct distribution of ecommerce product to end

uses, the building on the K4 Parcel would operate as a high-cube parcel hub warehouse. A high-cube parcel hub warehouse typically serves as a regional and local freight forwarder facility for time-sensitive shipments via airfreight and ground carriers. These sites also often include truck maintenance, wash and fueling facilities. Alternative 4 would require the same proposed General Plan Amendment, Zoning Designation, Master Plot Plan, Parcel Merger, and all other applicable pending approvals associated with the Project would not be necessary, as no new development would occur on the Project site that would trigger such actions. Under Alternative 4, improvements to the Cactus Avenue Drainage Channel (Cactus Channel) would also be completed.

High-Cube Parcel Hub Warehouse Alternative Environmental Impact Analysis

Aesthetics

As discussed in Section 4.1, the Project would have less-than-significant impacts associated with changes to existing visual character and quality of the Project site and light and glare.

Under Alternative 4, the K4 Parcel would still be developed with a new warehouse building of comparable size, and the Cactus Channel improvements would be constructed underground within the existing depressed Channel. The visual character of the K4 Parcel would be the same as under the proposed Project, and as with the Project's proposed Cactus Channel improvements, the improvements would not be visible. Therefore, because the building on the K4 Parcel would be the same under Alternative 4 as the proposed Project, impacts would be comparable to those of the proposed Project and remain less than significant.

Air Quality

As discussed in Section 4.2, daily construction emissions would not exceed the SCAQMD's significance thresholds for CO, SOx, PM_{10}, or $PM_{2.5}$ during construction of the Project in any of the construction years. The Project would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and VOC emissions and impacts during Project construction would be less than significant**.** The Project's operational emissions would not exceed the SCAQMD's significance threshold for VOCs, CO, SOx, PM_{10}, and $PM_{2.5}$. The Project, however, would exceed operational emissions thresholds for NOx even with implementation of mitigation due to emissions and exhaust from internal combustion engines used by construction equipment, therefore resulting in a significant and unavoidable operational impact.

The LST analysis included in Section 4.2 shows that the Project construction and operational emissions would not exceed the CAAQS for NO_2, CO, PM_{10}, and $PM_{2.5}$ or the 1-hour NO_2 NAAQS. Additionally, the Project would not result in on-road traffic volumes at affected intersections that would result in a CO hotspot. The cancer risk and noncancer risk at the nearby

residents would not exceed the SCAQMD threshold of 10 in 1 million or chronic HI of 1.0, respectively, and impacts would also be less than significant.

Under Alternative 4, a new warehouse building comparable to the one under the proposed Project would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. Construction under Alternative 4 would therefore result in the same impacts as the proposed Project. Alternative 4 construction would exceed daily construction emissions thresholds for NOx and VOCs; however, implementation of mitigation would reduce NO_x and Under Alternative 4, the new warehouse building on the K4 Parcel would be operated as a high-cube parcel hub warehouse, thereby resulting in more operational vehicle trips when compared to the proposed Project. Table 7-9 summarizes unmitigated and mitigated emissions associated with operation of Alternative 4.

Table 7-9
Alternative 4 Estimated Maximum Daily Operational Emissions
(pounds per day unmitigated)

	VOC [1]	NO_x	CO	SO_x	PM_{10} [2]	$PM_{2.5}$ [2]
Unmitigated Emissions						
Area source emissions [3]	16.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	51.2	970	304	3.5	174	60.7
Combined total emissions	**67.6**	**970**	**305**	**3.5**	**174**	**60.7**
SCAQMD Pollutant threshold [5]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded? [6]	**Yes**	**Yes**	**No**	**No**	**Yes**	**Yes**
Mitigated Emissions						
Area source emissions [3]	14.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy source emissions [3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile source emissions [4]	51.2	970	304	3.5	174	60.7
SCAQMD Pollutant threshold [5]	**65.9**	**970**	**305**	**3.5**	**174**	**60.7**
Threshold exceeded? [6]	*55*	*55*	*550*	*150*	*150*	*55*
Threshold exceeded?	**Yes**	**Yes**	**No**	**No**	**Yes**	**Yes**

Source: Ramboll 2018b.
Note:
1 For purposes of this analysis VOC emissions are assumed to be equal to ROG.
2 PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.
3 Emissions estimated using CalEEMod®. Refer to Appendix C for CalEEMod® outputs.
4 Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the K4 Parcel Alternatives Trip Generation Evaluation dated December 14, 2018.
5 SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.
6 Comparison of mitigated operational emissions against SCAQMD significance thresholds. Quantified mitigation measure includes the use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

Under Alternative 4, operational activities would be more intense than those associated with the proposed Project, thereby resulting in more vehicle trips and associated air emissions and energy

emissions. Under Alternative 4, emissions related to VOCs, NO_x, PM_{10} and $PM_{2.5}$would remain at significant and unavoidable even with implementation of mitigation measures due to emissions and exhaust from internal combustion engines used by construction equipment. Therefore, operational emissions would be significant and unavoidable and increased when compared to the proposed Project.

Biological Resources

As discussed in Section 4.3, both the K4 Parcel and Cactus Channel Improvement Site provide suitable habitat for federal and state special-status plant and animal species. However, with implementation of mitigation, potentially significant impacts to smooth tarplant, Riverside fairy shrimp, vernal pool fairy shrimp, Stephen's Kangaroo Rat, burrowing owl, western spadefoot, orange-throated whiptail, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, and Los Angeles pocket mouse can be reduced to less than significant levels. Additionally, there is the potential for the Project to affect special-status riparian vegetation communities and protected wetland communities; however, with implementation of mitigation, potential impacts can be reduced to less than significant levels. Finally, there is the potential for the Project to affect implementation of the MSCHP; however, with implementation of mitigation, all potential conflicts with the MSCHP would be reduced to less than significant impacts.

Under Alternative 4, the new warehouse building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented in the same manner as the proposed Project. As such, because construction would occur within the same footprint and operational activities would be similar to those of the proposed Project, Alternative 4 would result in the same impacts as the proposed Project. As with the proposed Project, with implementation of mitigation, all impacts to biological resources under Alternative 4 would be reduced to less than significant levels.

Cultural Resources

As discussed in Section 4.4, with the incorporation of mitigation, the Project would have less-than-significant impacts associated with historical resources, archaeological resources, unique geologic features, and human remains. Impacts to cultural resources can be mitigated to less-than-significant levels by incorporating mitigation measures, and no significant adverse impacts would remain after mitigation.

Alternative 4 would result in the same impacts related to cultural resources because a comparable warehouse building would be constructed on the K4 Parcel, and the Cactus Channel improvements included within the proposed Project would still be implemented. As such, the same potential as the proposed Project exists to impact potential historical, paleontological, unique archaeological resources, or human remains. As with the proposed Project, implementation of mitigation measures for Alternative 4 would reduce potentially significant impacts to a less than significant level.

Geology and Soils

As discussed in Section 4.5, the implementation of the Project would not conflict with any applicable plan, policy, or regulation adopted for the purposes of mitigating hazards associated with geology and soils. The Project would have a less-than-significant impact associated with strong seismic ground shaking and seismic-related ground failure with incorporation of mitigation. Lastly, the proposed Project would result in less than significant impacts to unique paleontological resources with mitigation incorporated.

Alternative 4 would result in comparable impacts related to geology and soils because a similar warehouse building would be constructed on the K4 Parcel. Additionally, under Alternative 4, the proposed Cactus Channel improvements would be implemented. With incorporation of the recommendations included in the Geotechnical Exploration prepared for the Project (Appendix I1 and Appendix I2), which would also apply to the warehouse building constructed under Alternative 4, impacts related to risk of loss, injury, or death involving strong seismic ground shaking or seismic related ground failure would be less than significant and the same as those identified for the proposed Project.

Greenhouse Gas Emissions

As discussed in Section 4.6, the proposed Project would result in GHG emissions that are primarily associated with use of off-road equipment and on-road construction and worker vehicles during construction. Operation of the proposed Project would result in GHG emissions through energy use; motor vehicle trips to and from the proposed Project; generation of electricity associated with water supply, treatment, and distribution and wastewater treatment; and solid waste disposal. The Project would result in a less-than-significant impact associated with GHG emissions.

As provided in Appendix J, Alternative 4's total unmitigated GHG emissions (including construction) would exceed 3,000 MT carbon dioxide equivalent per year and thus would be required to complete the Riverside County's CAPs screening table. All sustainable design features outlined in Section 4.6 for the proposed Project would remain for Alternative 4. Therefore, Alternative 4 would exceed the 100-point minimum using the CAP screening tables and would be consistent with the CAP. As Alternative 4 would only reduce the size of the project and not reduce any of the sustainable features of the proposed Project, Alternative 4 would be consistent with AB 32 as shown in detail in Table 4.6-4. Similar to the proposed Project, Alternative 4 would also be consistent with the March JPA General Plan Noise/Air Quality Element as provided in Table 4.6-5. Alternative 4 would also be consistent with SB 375 as it would add jobs consistent with the SCAG 2016 RTP/SCS projections in accordance with ARB's emissions reduction targets. Impacts would be less than significant.

Hazards and Hazardous Materials

As discussed in Section 4.7, with the implementation of mitigation, impacts to hazards related to air traffic and proximity to the March ARB Airport as a result of the Project can be mitigated to less-than-significant levels. The Project would be in compliance with the *Citizen's Brochure for the 452d AICUZ Study*, *March ARB AICUZ*, and the *March ARB/Inland Port ALUCP*, and impacts would be less than significant. Therefore, no adverse significant impacts would remain after mitigation. Additionally, based on the Riverside County ALUCP noise level contours for the March ARB/IPA, the Project represents a normally acceptable land use based on the Riverside County ALUCP compatibility criteria, and no noise mitigation is required with typical building construction.

Under Alternative 4, the proposed warehouse building on the K4 Parcel would still be constructed, new employees would be introduced to a site within proximity of the March ARB, and there would still be the potential to encounter unexploded ordinance. Additionally, the Cactus Channel improvements would still be implemented under Alternative 4.

There is the potential that within Alternative 4, there could be a truck maintenance facility. While certain chemicals and materials could be utilized at a truck maintenance facility that are different than those previously considered under the proposed use of the site, use of these chemicals would be regulated and material health, safety and protocol plans, as legally required, would be established. Section 9.08.090 of the March JPA Development Code requires that commercial and industrial uses which receive, utilize, store, transport, or dispose of hazardous waste in quantities exceeding 500 pounds at one time, shall have access to sewer and freeways, and shall keep such materials at least 2,000 feet from residential areas. In addition, the Applicant would be required to provide the Fire Department with a list of hazardous materials to be used at the site, a description of where and how each is stored, and how each react in a fire. Placards or other appropriate signage shall be placed on all buildings which have hazardous materials or wastes stored. March JPA prohibits discharge of hazardous wastes into the air, land, or into water resources within March JPA Planning Area and requires the preparation of a hazardous materials and waste management plan for any commercial and industrial uses which create, utilize, store, or treat hazardous materials or waste. The plan shall be subject to approval by the March JPA Planning Director, review by the Police Department and shall outline source reduction, treatment, handling, transportation, disposal, emergency response, and employee training methods. Further, uses which involve hazardous waste, shall implement the best available technology for on-site pre-treatment and reduction of hazardous wastes, whenever feasible (March JPA 2016). Additionally, the County of Riverside Ordinance 651.4 requires disclosure where businesses handle hazardous materials and the acquisition of a permit issued by the Department of Environmental Health for any owner or operator of a business where hazardous materials are handled. The Project Applicant would ensure compliance with the regulations set forth by March JPA and the County of Riverside. As such, no

new or more severe hazardous impacts would occur than those previously evaluated in past environmental documents prepared for the March Business Center Specific Plan.

Therefore, through compliance with the same mitigation measures imposed on the proposed Project as well as compliance with existing regulations, all potentially significant impacts associated with Alternative 4 could be reduced to less-than-significant levels. Given that the potential for Alternative 4 to result in similar hazards and hazardous materials impacts as the proposed Project, Alternative 4 would be comparable to the proposed Project with respect to impacts associated with hazards and hazardous materials.

Hydrology/Water Quality

As discussed in Section 4.8, the Project would have less-than-significant impacts associated with water quality standards, waste discharge requirements, increased runoff of pollutants, depletion of groundwater supplies, interference of groundwater recharge, altering existing drainage patterns, or degrading water quality. The Project would be in compliance with all applicable federal, state, and local rules and regulations regarding water quality and hydrology. In addition, implementation of (1) the SWPPP in conformance with the Construction General Permit, (2) the WQMP in compliance with the New Development & Redevelopment Guidelines for Projects Under the March JPA, and (3) proposed drainage design according to the *Riverside County Flood Control and Water Quality District Hydrology Manual* collectively ensure Project impacts on hydrology and water quality would be less than significant.

Under Alternative 4, a comparable warehouse building would be constructed on the K4 Parcel, and the proposed Cactus Channel improvements would still be implemented. There is the potential that as a part of Alternative 4, a truck maintenance area could be included in the alternative. According to Section 402 of the Clean Water Act (CWA), a National Pollutant Discharge Elimination System (NPDES) permit is required for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the State Water Resources Control Board with assistance and local oversight from the nine Regional Water Quality Control Boards, who have several programs that implement individual and general permits related to construction activities, stormwater runoff quality, and various kinds of non-stormwater discharges. Alternative 4 would be constructed and operated in compliance with CWA Section 402. Further, and in compliance with NPDES – New Development & Redevelopment Guidelines for Projects under the March JPA and the Riverside County Municipal Separate Storm Sewer System (MS4), the Applicant would ensure the reduction of pollutants in urban stormwater discharge to the maximum extent practicable through the use of structural and nonstructural BMPs to manage runoff water. In compliance with the March JPA General Plan, Alternative 4 would ensure that stormwater runoff is not diverted onto adjacent properties, or cause

alterations of natural drainage courses that cannot be adequately handled by existing drainage facilities or the flood control improvements proposed with the development.

As such, with implementation of the same building and Channel improvements and compliance with existing regulations, impacts associated with Alternative 4 would be the same as the proposed Project and would be less than significant.

Land Use and Planning

As described in Section 4.9, the K4 Parcel is currently designated Business Park (BP) within the March JPA General Plan Land Use Map (March JPA 2012). Under the proposed Project, the K4 Parcel would be re-designated as Industrial (IND) under the proposed General Plan amendment. Additionally, the K4 Parcel is not yet zoned and as part of the Project, the zoning designations of Industrial (IND) would be applied to the parcel. The proposed Project would also include the processing of a master plot plan and parcel merger. The Project would not cause a significant environmental impact due to a conflict with the goals and policies outlined in the March JPA General Plan, and impacts would be considered less than significant with mitigation incorporated. The Project is also in compliance with the March JPA Development Standards and impacts would be less than significant.

Under Alternative 4, the K4 Parcel would be developed with a comparable industrial warehouse building. This alternative would still require the processing of a General Plan amendment to designate the site as Industrial (IND), assign zoning of IND, approval of a master plot plan, and approval of a parcel merger. As such, given that the same land use entitlements would be required under Alternative 4 as the proposed Project, land use impacts under Alternative 4 would be comparable to those of the proposed Project and less than significant with the incorporation of mitigation measures.

Noise

As discussed in Section 4.10, the Project would result in less-than-significant impacts relative to temporary or permanent noise levels. Alternative 4 would result in the construction and operation of a comparable industrial warehouse building on the K4 Parcel and implementation of the Cactus Channel improvements. As such, Alternative 4 would result in the same noise impacts as the proposed Project and would continue to be less than significant.

Transportation

As discussed in Section 4.11, construction of the proposed Project would result in less-than-significant traffic impacts following implementation of mitigation requiring the preparation of a Construction Traffic Management Plan. While Project implementation has the potential to result

in several traffic-related impacts, all traffic impacts can be reduced to less than significant levels with the exception of the following:

- **Overlook Parkway/Canyon Crest/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the south leg of the Overlook Parkway/Canyon Crest/Alessandro Boulevard, increasing intersection operations to LOS D and reducing Project impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard**. The Project shall pay its fair share towards the restriping of lanes and the modification of the traffic signal at the intersection of Overlook Parkway/Canyon Crest Drive/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The Project shall pay its fair share towards the elimination of the pedestrian crosswalk on the southbound approach at the intersection of Sycamore Canyon Boulevard/Alessandro Boulevard, increasing intersection operations to LOS D and reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of City and County of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards the traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Sycamore Canyon Boulevard/Alessandro Boulevard**. The intersection of Sycamore Canyon Boulevard/Alessandro Boulevard is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impacts to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction

of the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **I-215 Southbound Ramps/Cactus Avenue**. The intersection of I-215 southbound ramps/Cactus Avenue is anticipated to operate at LOS A during the AM peak hour and at LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **I-215 Northbound Ramps/Alessandro Boulevard**. The intersection of I-215 northbound ramps/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS B during the PM peak hour, thus reducing the Project's contribution to cumulative impact to less than significant. These improvements are included in the TUMF program. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/Alessandro Boulevard**. The intersection of Old 215 Frontage Road/Alessandro Boulevard is anticipated to operate at LOS C with fair share contributions towards lane modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdictions of Moreno Valley and the City of Riverside, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Old 215 Frontage Road/I-215 Northbound Ramps/Cactus Avenue**. The intersection of Old 215 Frontage Road/I-215 northbound ramps/Cactus Avenue is anticipated to operate at LOS D with fair share contributions towards lane and traffic signal modifications, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of Caltrans, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.
- **Elsworth Street/Alessandro Boulevard**. The intersection of Elsworth Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

- **Frederick Street/Alessandro Boulevard**. The intersection of Frederick Street/Alessandro Boulevard is anticipated to operate at LOS C during the AM peak hour and LOS D during the PM peak hour with fair share contributions towards lane improvements, thus reducing the Project's contribution to cumulative impact to less than significant. However, since the improvement is within the jurisdiction of the City of Moreno Valley, and March JPA does not have the authority to implement the mitigation, the impact is considered significant and unavoidable.

Under Alternative 4, the K4 Parcel would be developed with a new warehouse building that would be the same size as the proposed Project and the same Cactus Channel improvements would be implemented. As such, construction traffic under Alternative 4 would be the same as the proposed Project. However, the new building constructed on the K4 Parcel would be utilized as a high-cube parcel hub warehouse under Alternative 4, compared to an e-commerce/fulfillment center under the proposed Project. Table 7-10 presents the overall vehicle trips under Alternative 4, and provides the difference and percent reductions when compared to the proposed Project.

Table 7-10
Alternative 4 Trip Generation Comparison and Summary

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	*Out*	*Total*	*In*	*Out*	*Total*	
High-Cube Short-Term Warehouse	718.000	TSF							
Passenger Cars			126	126	252	221	104	325	3,467
Truck Trip									
2-axle:			21	21	42	15	7	22	350
3-axle:			26	26	52	19	9	28	434
4+-axle:			78	78	156	57	27	84	1,313
- Net Truck Trips (Actual)[2]			*125*	*125*	*250*	*91*	*43*	*134*	*2,098*
Alternative 2 Total Net Trips (Actual)[3]			*251*	*251*	*502*	*312*	*147*	*459*	*5,565*
Project Net Trips (PCE)[3]			*327*	*98*	*425*	*275*	*708*	*983*	*5,873*
Variance (Alternative 2-Project)			**-76**	**153**	**77**	**37**	**-561**	**-524**	**-309**

Source: Urban Crossroads 2018b.
Notes:
1 Trip Generation Source: ITE 2017.
2 TSF = Thousand Square Feet
3 TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

Under Alternative 4, a total of 309 fewer actual vehicle trips would occur when compared to the proposed Project. However, during the AM peak hour, trips would be increased when compared to the proposed Project. A total of 77 more AM peak our trips would occur under Alternative 4. During the PM peak hour, however, a total of 524 fewer trips would occur under Alternative 4 when compared to the proposed Project.

However, as with the proposed Project, since the required improvements to the street network are within the jurisdiction of another public agency and not the lead agency, impacts under Alternative 4 would be reduced when compared to the proposed Project but still remain significant and unavoidable.

Tribal Cultural Resources

As discussed in Section 4.12, Project implementation could have the potential to affect tribal cultural resources; however, with implementation of mitigation, potential impacts to tribal cultural resources would be reduced to less than significant levels. Alternative 4 would result in the construction of a comparable industrial warehouse building on the K4 Parcel and implementation of the Cactus Channel improvements. As such, the same potential to affect tribal cultural resources could occur under Alternative 4. However, as with the proposed Project, implementation of mitigation would reduce potentially significant impacts to tribal cultural resources. Alternative 4 would have the same impacts as the Project.

Utilities

As discussed in Section 4.13, the Project would result in less-than-significant impacts associated for water, wastewater, solid waste, and electric power, natural gas, and telecommunication services resulting in no need to develop new or improve existing facilities. Under Alternative 4, the K4 Parcel would be developed with a comparable industrial warehouse building and the proposed Cactus Channel improvements would be implemented. As such, operational activities would be comparable to those associated with the proposed Project.

Energy

As concluded in Section 4.14, there would be an increase in the amount of electricity, natural gas, and petroleum used during construction and operation of the Project; however, the Project includes features such as alternative modes of transportation that would help reduce the number of vehicle miles traveled generated by the Project operation. Additionally, bike racks would be installed so that employees can utilize biking as a mode of transportation, thus, reducing the amount of gasoline that would be consumed by Project operation. In addition, the Project is subject to statewide mandatory energy requirements as outlined in Title 24, Part 6, of the California Code of Regulations. Title 24, Part 11, contains voluntary energy measures that are applicable to Project under the California Green Building Standards Code. The Project would not contribute to inefficient or wasteful consumption of electricity, natural gas or petroleum, and impacts related to conflicts with existing energy standards would be less than significant. Further, the Project would not place significant demand on local or regional energy supplies or require a substantial amount of additional capacity. Therefore, impacts related to energy supplies and capacity would be less than significant.

Under Alternative 4, the construction schedule would be similar to that of the proposed Project and a comparable industrial warehouse building would be constructed on the K4 Parcel. Additionally, the same Cactus Channel improvements would be implemented under Alternative 4. As such, Alternative 4 would result in similar energy consumption to the proposed Project, and as such, similar energy impacts as the proposed Project.

Relationship to Project Objectives and Feasibility

Under Alternative 4, a comparable industrial warehouse building would be constructed on the K4 Parcel and the same Cactus Channel improvements would be implemented. Table 7-11 provides a list of the Project objectives and whether Alternative 4 meets each objective.

Table 7-11
Summary of Alternative 4 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
1. Provide appropriate land use intensities to comply with the parameters of the March Air Reserve Base/Inland Port Airport Compatibility Plan.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. The HCW warehouse use is consistent with the C1 Zone of the K4 Parcel and Alternative 4 would continue to provide fewer than 100 persons per acre as building occupants.
2. Implement the goals, objectives and policies of the March JPA General Plan at the K4 Parcel.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. The high-cube warehouse parcel hub use is consistent with, and would implement the goals, objectives and policies of the March JPA General Plan.
3. Provide increased job opportunities for local residents through the provision of employment-generating businesses.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
4. Establish a land use and facility plan that ensures project viability in consideration of existing and anticipated economic conditions.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel. The flexibility associated with the high-cube warehouse parcel hub use would allow for Project viability both in the short- and long-term.
5. Develop the property with land uses that are compatible with the March ARB Reuse program.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. These would be consistent and compatible with the March ARB Reuse program.
6. Encourage the use of alternative modes of transportation through the provision of a pedestrian and bicycle circulation system that is both safe and comfortable.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. As part of the Alternative 4, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.

Table 7-11
Summary of Alternative 4 Success at Meeting Project Objectives

Project Objective	Alternative Meets Objective?
7. Provide a range of job types for the community's residents.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and would provide both temporary jobs during construction and permanent jobs during operations. However, under this alternative, fewer new permanent jobs would be provided when compared to the proposed Project.
8. Provide a circulation system that facilitates movement and access needs of automobiles, pedestrians, and bicyclists.	**Yes.** Under Alternative 4, a high-cube warehouse parcel hub building would be constructed on the K4 Parcel and the Cactus Channel improvements would be implemented. As part of the Alternative 4, roadway improvements on Cactus Avenue along the K4 Parcel frontage would be implemented, bicycle parking would be provided at the site, and a connection to the local transit system would be provided.
9. Minimize impacts from construction of the development to sensitive biological resources.	**Yes.** While Alternative 4 would result in the implementation of a new high-cube warehouse parcel hub building on the K4 Parcel and the installation of an underground box culvert within the existing Cactus Channel, as with the proposed Project, mitigation would be implemented to minimize impacts to sensitive biological resources.
10. Minimize hazards to flight associated with the naturalized Cactus Channel drainage channel by undergrounding the drainage channel.	**Yes.** Under Alternative 4 the Cactus Channel improvements would be implemented thereby undergrounding the drainage channel and minimizing hazards to flight by reducing wildlife attractants.

7.5 EVALUATION OF ALTERNATIVES

In accordance with the CEQA Guidelines Section 15126.6(d), the discussion of the environmental effects of the alternatives may be less detailed than the discussion of the impacts of the Project. Table 7-1, above, provides a summary of the comparison of the impacts of the alternatives with the Project; an analysis of the Environmentally Superior Alternative is provided in Section 7.6, below.

7.6 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As indicated in Table 7-1, above, Alternative 1, the No Project Alternative, would result in the least environmental impacts, and therefore would be considered the Environmentally Superior Alternative. However, Section 15126.6(e)(2) of the CEQA Guidelines states that if the Environmentally Superior Alternative is the No Project Alternative, the EIR shall also identify an Environmentally Superior Alternative among the other alternatives.

Of the alternatives evaluated above, Alternative 2 was found to be environmentally superior over the Project (see Table 7-1) because it had the most reductions in impacts from the Project. Alternative 2 was found to have fewer environmental impacts for each environmental issue area, with the exception of land use and planning, when compared to the proposed Project. Additionally, Alternative 2 achieves most of the Project objectives, as outlined in detail in Table 7-5. However,

as with the proposed Project, identified significant and unavoidable impacts associated with air quality and transportation would remain under Alternative 2.

7.7 References

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Urban Crossroads. 2019. Alternative 2 Trip Generation Comparison and Summary.

CHAPTER 8
GROWTH-INDUCING IMPACTS

8.1 GROWTH-INDUCING IMPACTS

Section 15126.2(d) of the California Environmental Quality Act (CEQA) Guidelines requires a discussion of how the potential growth-inducing impacts of the proposed K4 Warehouse and Cactus Channel Improvements Project (proposed Project or Project) could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Induced growth is distinguished from the direct employment, population, or housing growth of a project (14 CCR 15000 et seq.). If a project has characteristics that "may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively," then these aspects of the project must be discussed as well. Induced growth is any growth that exceeds planned growth and results from new development that would not have taken place in the absence of that project. Typically, the growth-inducing potential of a project is considered significant if it stimulates population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities, such as the Southern California Association of Governments (SCAG).

The CEQA Guidelines also indicate that growth should not be assumed to be either beneficial or detrimental (14 CCR 15126.2(d)). According to Section 15126.2(d) of the CEQA Guidelines, a project may foster economic or population growth, or additional housing, either indirectly or directly, in a geographical area if it meets any one of the following criteria:

- The project would remove obstacles to population growth.
- Increases in the population may tax existing community service facilities, causing significant environmental effects.
- The project would encourage and facilitate other activities that could significantly affect the environment.

The Project would involve the construction of an approximately 718,000-square-foot warehouse development for future e-commerce/fulfillment center use on an approximately 35.4-acre site. Additionally, the Project would involve the undergrounding of the existing Cactus Avenue Drainage Channel (Cactus Channel) which runs along the south side of Cactus Avenue between Elsworth Street to the west and the Heacock Channel to the east. The Project site is surrounded by a mix of commercial, industrial, air reserve base, and vacant lands. The Project would not involve the development of additional housing. However, the Project would require the hire of temporary construction workers during construction activities and part-time/full-time employees during Project operations.

At the time this Environmental Impact Report (EIR) was prepared, the future tenant(s) of the proposed e-commerce/fulfillment center warehouse building had not yet been identified. For the purposes of CEQA and to ensure full disclosure on all potential allowable uses within the proposed Industrial (IND) lots, this assessment assumes a total of 900 jobs would result with implementation of the Project. Because the tenant is not yet known, the number of jobs that the Project would generate is based off the Institute of Transportation Engineers *Trip Generation Manual* (ITE 2017) and the Institute of Transportation Engineers trip generation rates for the Project in order to be consistent with the traffic impact analysis.

According to the SCAG Growth Forecast (Appendix to the *2016–2040 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS); SCAG 2016a), employment is anticipated to grow from 70,500 in 2012 to 156,600 in 2040 in unincorporated Riverside County (SCAG 2016a). The Project lies entirely within Traffic Analysis Zone (TAZ) 43268200. The 2016 RTP/SCS projects that within TAZ 43268200, there will be a total of 8,755 jobs by 2020 and 22,196 by 20451. As of 2016, there are 4,531 jobs in the March JPA jurisdiction. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Adding jobs consistent with 2016 RTP/SCS projections supports SCAG's achievement of March Air Reserve Base emissions reductions targets.

The SCS also indicates that this is a jobs poor area so providing more jobs will actually reduce greenhouse gas emissions and reduce vehicle miles traveled as it will provide local jobs to achieve a more favorable jobs housing balance. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities.

Indirect growth can also occur by a Project installing infrastructure that can support further growth. The Project site is served by existing public services and utilities, and no new off-site utility systems would be needed in order to serve the Project. Regional improvements to Cactus Channel are a minor infrastructure improvement that would function as part of the existing Riverside County Flood Control and Water Conservation District's Master Plan. Therefore, indirect growth inducement as a result of the extension of these facilities into a new area would not occur.

Overall, the Project would indirectly stimulate population growth through the addition of new employees. However, the growth would be consistent with employment growth envisioned in local and regional land use plans and in projections made by regional planning authorities, since the planned growth of the Project and its land use intensity have been factored into the underlying growth projections of the SCAG 2016–2040 RTP/SCS.

[1] Jobs data provided by March JPA.

8.2 SCAG'S 2016–2040 RTP/SCS CONSISTENCY ANALYSIS

SCAG's Regional Council recently adopted the 2016–2040 RTP/SCS in April 2016 (SCAG 2016b). The 2016–2040 RTP/SCS links the goal of sustaining mobility with the goals of fostering economic development, enhancing the environment, reducing energy consumption, promoting transportation-friendly development patterns, and encouraging fair and equitable access to residents affected by socio-economic, geographic, and commercial limitations. The goals in SCAG's RTP/SCS are meant to provide guidance for considering the Project within the context of regional goals and policies. Table 8-1 provides an assessment of the Project's relationship to SCAG's RTP/SCS goals.

Table 8-1
Consistency with SCAG's 2016–2040 RTP/SCS Goals

RTP/SCS Goal	Project's Consistency
RTP/SCS G1: Align the plan investments and policies with improving regional economic development and competiveness.	**Consistent**: Development of the Project would increase the property value of the site and would provide temporary jobs during short-term construction and permanent jobs during Project operations. Development of the Project may also provide goods distribution to and from the ports and regional area.
RTP/SCS G2: Maximize mobility and accessibility for all people and goods in the region.	**Consistent**: The Project would locate an industrial warehouse building within proximity to the Interstate (I) 215 and would also include circulation improvements, including vehicular (e.g., cul-de-sac), pedestrian (e.g., sidewalks) and bicycle (e.g., bicycle lane) infrastructure which would foster the efficient movement of people and goods throughout the Project area and the region as a whole.
RTP/SCS G3: Ensure travel safety and reliability for all people and goods in the region.	**Consistent:** The Project would include traffic improvements (e.g., cul-de-sac), pedestrian (e.g., sidewalks), and bicycle (e.g., bicycle lane) infrastructure that would be designed and constructed to meet applicable safety requirements and design standards as required by applicable jurisdiction (e.g., County of Riverside, California Department of Transportation), which would ensure the travel safety and reliability are maximized.
RTP/SCS G4: Preserve and ensure a sustainable regional transportation system.	**Consistent:** The Project would be required to construct on-site and off-site traffic system improvements and pay applicable fair-share contributions to local and regional off-site improvements in order to mitigate Project-related traffic impacts. As such, with implementation of applicable improvements, the Project would not hinder the preservation or sustainability of the regional transportation system.
RTP/SCS G5: Maximize the productivity of our transportation system.	**Consistent:** As noted above, the Project would either construct traffic improvements or pay applicable fair-share contributions to help fund additional improvements, which would reduce the Project's impact on, and maximize the productivity of, the region's transportation system.
RTP/SCS G6: Protect the environment and health for our residents by improving air quality and encouraging active transportation (e.g., bicycling and walking).	**Consistent:** The Project area includes a network of commuter rail, pedestrian and bicycle-related facilities and bus transit that offer non-vehicular transportation options within the Project area.

Table 8-1
Consistency with SCAG's 2016–2040 RTP/SCS Goals

RTP/SCS Goal	Project's Consistency
RTP/SCS G7: Actively encourage and create incentives for energy efficiency, where possible.	**Consistent:** The Project would include eleven on-site electric vehicle (EV) charging stations and 54 off-site EV charging stations for at least 5% of all vehicle parking spaces.
RTP/SCS G8: Encourage land use and growth patterns that facilitate transit and active transportation.	**Consistent:** The Project would include on-site and off-site traffic improvements (e.g., cul-de-sac); pedestrian (e.g., sidewalks) and bicycle (e.g., bicycle lane) infrastructure; and would pay applicable fair-share contributions to local and regional off-site improvements in order to mitigate Project-related traffic impacts.
RTP/SCS G9: Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies.	**Not applicable**: This goal relates to SCAG's ongoing efforts to maintain security within the regional transportation system, which would not be affected by the Project.

Source: SCAG 2016b.
Notes: RTP = Regional Transportation Plan; SCS = Sustainable Communities Strategy; SCAG = Southern California Association of Governments.

The analysis in Table 8-1 concludes that the Project would be consistent with the applicable RTP/SCS goals. Therefore, implementation of the Project would not result in significant impacts related to relevant RTP/SCS goals which are designed to manage growth on a regional basis.

8.3 REFERENCES

ITE (Institute of Transportation Engineers). 2017. *Trip Generation Manual.* 10th Edition. Washington, DC: ITE.

SCAG. 2016a. *Demographics & Growth Forecast, Appendix to 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy*. Adopted April 2016. Accessed December 17, 2018. http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_DemographicsGrowthForecast.pdf.

SCAG. 2016b. *The 2016–2040 Regional Transportation Plan/Sustainable Communities Strategy.* Adopted April 2016. Accessed December 17, 2018: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf.

Notice of Preparation of a Draft Environmental Impact Report

Notice of Public Scoping Meeting

TO:	Responsible Agencies, Trustee Agencies and Interested Parties	FROM:	March Joint Powers Authority 14205 Meridian Parkway, Suite 140 Riverside, CA 925 1 8 (951) 656-7000

The March Joint Powers Authority (JPA) will be the Lead Agency and will prepare an environmental impact report (EIR) for the Project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed Project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the Project.

The Project description, location, and the probable environmental effects are contained in the attached materials. An Initial Study has been prepared for the Project. The Initial Study document outlines the issues that March JPA has determined will be addressed in the forthcoming EIR.

☒	A copy of the Initial Study IS attached.
☐	A copy of the Initial Study IS NOT attached, but can be downloaded at www.marchjpa.com (link: K4 Warehouse and Cactus Channel Improvements Project NOP)
☒	The proposed project IS considered a project of statewide, regional or areawide significance.
☐	The proposed project IS NOT considered a project of statewide, regional or areawide significance.
☒	The proposed project WILL affect highways or other facilities under the jurisdiction of the State Department of Transportation.
☐	The proposed project WILL NOT affect highways or other facilities under the jurisdiction of the State Department of Transportation.
☒	A scoping meeting WILL be held by the lead agency.
☐	A scoping meeting WI LL NOT be held by the lead agency.

The Project meets the criteria requiring a scoping meeting, and as such, the Lead Agency will hold the meeting at the following date, time and location:

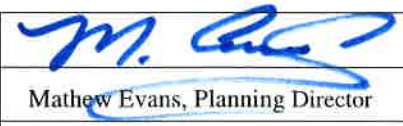
Date: December 3, 2018	**Time**: 6:00 - 7:00 PM	**Location**:	March Joint Powers Authority Meridian Conference Room 14205 Meridian Parkway, Suite 140 Riverside, CA 92518

Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Please send your response to Mathew Evans, Planning Director, at the address shown above by Wednesday, December 19, 2018. We will need the name of a contact person in your agency.

Project Title:	K4 Warehouse and Cactus Channel Improvements Project
Project Location – Specific: Identify street address and cross street or attach a map showing project site (preferably a U.S.G.S. 15' or 7 ½' topographical map identified by quadrangle name):	The approximately 35.4-acre Project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The Project site is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California (Figure 1, Project Location). The Interstate 215 Freeway (I-215) is located approximately 0.8 mile east of the Project site. The Project site is currently undeveloped and comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The latitude and longitude of the approximate center of the site is 33°909101 North and 117°263507 West. The Project site sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.
Project Description:	The proposed Project collectively involves the development of the five (5) parcels on approximately 35.4-acre site with 718,000 square foot building and the installation of a box culvert within the Cactus Channel. The proposed site plan for development on the K4 Parcel with a proposed e-commerce/fulfillment center, which is the most intense use that could operate on the Project site is shown in Figure 4, K4 Warehouse Site Plan. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Once constructed, the e-commerce/fulfillment center use occupying the Project site could potentially be used up to 7 days per week and 24 hours per day. Use of the building would entail storage of smaller products and packages for direct distribution of e-commerce product to end users. Additionally, the Project would include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The current drainage ditch is proposed to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District, the City of Moreno Valley, the United States Department of Agriculture (USDA), the Western Riverside County Regional Conservation Authority, and other agencies and

	landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) because portions of the work would be done within jurisdictions that are permittees to the MSHCP. The following approvals may be required for the proposed Project: • **General Plan Amendment:** The Project site has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change. • **Zoning Designation:** As the Project site has not previously been given a zoning designation, to be consistent with the requested General Plan land use designations of Industrial, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site. • **Plot Plan:** A plot plan approval is required to construct the 718,000 square foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls. • **Tentative Parcel Map:** A tentative parcel map is required to merge the five separate parcels on the Project site into one 35.4-acre parcel.
Project Applicant:	Meridian Park, LLC
California Environmental Protection Agency Hazardous Waste List:	Not Applicable

Date: 11/14/2018	Signature:	
	Title:	Mathew Evans, Planning Director
	Telephone:	(951) 656-7000

Consulting firm retained to prepare the Draft EIR (if applicable):

Name:	Dudek
Address:	38 North Marengo Avenue
City/State/Zip:	Pasadena, CA 91101
Contact Person:	Nicole Cobleigh, Senior Project Manager

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: K4 Warehouse and Cactus Channel Improvements Project

Lead Agency: March Joint Powers Authority | Contact Person: Mathew Evans
Mailing Address: 14205 Meridian Parkway, Suite 140 | Phone: 951-656-7000
City: Riverside | Zip: 92518 | County: Riverside

Project Location: County: Riverside | City/Nearest Community: March JPA/Moreno Valley
Cross Streets: Frederick Street/Cactus Avenue | Zip Code: 92553
Longitude/Latitude (degrees, minutes and seconds): 33 ° 91 ′ ″ N / -117 ° 261 ′ ″ W | Total Acres: 35.4
Assessor's Parcel No.: 297-150-006-8 + 4 more | Section: 13-14 | Twp.: 3S | Range: 4W | Base: Riverside
Within 2 Miles: State Hwy #: I-215 | Waterways: Cactus Drainage Channel, Heacock Drainage Channel
Airports: March Air Reserve Base | Railways: Metrolink RR | Schools: Badger MS, Creekside E

Document Type:

CEQA: ☒ NOP ☐ Draft EIR | NEPA: ☐ NOI | Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR | ☐ EA | ☐ Final Document
☐ Neg Dec (Prior SCH No.) | ☐ Draft EIS | ☐ Other:
☐ Mit Neg Dec ☐ Other: | ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☒ Rezone ☐ Annexation
☒ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☒ Use Permit ☐ Coastal Permit
☐ Community Plan ☒ Site Plan ☐ Land Division (Subdivision, etc.) ☐ Other:

Development Type:

☐ Residential: Units ____ Acres ____
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☒ Industrial: Sq.ft. 718,000 Acres 35.4 Employees 900
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☒ Other: Install 7,900 linear foot box culvert in drainage channel

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Fiscal ☒ Recreation/Parks ☒ Vegetation
☒ Agricultural Land ☒ Flood Plain/Flooding ☒ Schools/Universities ☒ Water Quality
☒ Air Quality ☒ Forest Land/Fire Hazard ☒ Septic Systems ☒ Water Supply/Groundwater
☒ Archeological/Historical ☒ Geologic/Seismic ☒ Sewer Capacity ☒ Wetland/Riparian
☒ Biological Resources ☒ Minerals ☒ Soil Erosion/Compaction/Grading ☐ Growth Inducement
☐ Coastal Zone ☒ Noise ☒ Solid Waste ☒ Land Use
☒ Drainage/Absorption ☒ Population/Housing Balance ☒ Toxic/Hazardous ☐ Cumulative Effects
☐ Economic/Jobs ☒ Public Services/Facilities ☒ Traffic/Circulation ☐ Other:

Present Land Use/Zoning/General Plan Designation:

Land Use Designation: Business Park; Zoning Designation - None

Project Description: *(please use a separate page if necessary)*

The proposed Project collectively involves the development of the five (5) parcels on approximately 35.4-acre site with 718,000 square foot building and the installation of a box culvert within the Cactus Channel. The proposed site plan for development on the K4 Parcel includes a proposed e-commerce/fulfillment center, which is the most intense use that could operate on the Project site.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X	Air Resources Board	S	Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
S	California Highway Patrol		Pesticide Regulation, Department of
X	Caltrans District #8		Public Utilities Commission
S	Caltrans Division of Aeronautics	S	Regional WQCB #
S	Caltrans Planning	S	Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of	S	SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region #6		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	S	Toxic Substances Control, Department of
S	Forestry and Fire Protection, Department of	S	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other:
	Housing & Community Development		Other:
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date November 19, 2018 Ending Date December 19, 2018

Lead Agency (Complete if applicable):

Consulting Firm: Dudek
Address: 38 N. Marengo Ave
City/State/Zip: Pasadena, CA 91103
Contact: Nicole Cobleigh
Phone: 626-204-9829

Applicant: Timothy Reeves
Address: 1156 N. Mountain Ave.
City/State/Zip: Upland, CA 91785
Phone: 909-579-1294

Signature of Lead Agency Representative: _____ **Date:** Nov 14, 2018

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

DRAFT

INITIAL STUDY
K4 AND CACTUS CHANNEL IMPROVEMENTS PROJECT

Prepared for:

March JPA
14205 Meridian Parkway, Suite 140
Riverside, California 92518
Contact: Mathew Evans, Planning Director

Prepared by:

DUDEK
38 North Marengo Avenue
Pasadena, California 91101
Contact: Nicole Cobleigh

NOVEMBER 2018

Printed on 30% post-consumer recycled material.

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
AB	Assembly Bill
AFB	Air Force Base
ALUC	Airport Land Use Commission
APN	Assessor's Parcel Number
AQMP	Air Quality Management Plan
ARB	Air Reserve Base
BP	Business Park
CalEEMod	California Emissions Estimating Model
CBC	California Building Code
CEQA	California Environmental Quality Act
COCs	Contaminants of concern
DIF	Development impact fee
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GHG	Greenhouse gases
GP	General Plan
HRA	Health Risk Assessment
IND	Industrial
IS	Initial Study
JD	Jurisdictional Delineation
JPA	Joint Powers Authority
LSTs	Localized Significance Thresholds
MSHCP	Multiple Species Habitat Conservation Plan
NAHC	Native American Heritage Commission
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	Operable Unit
RTA	Riverside Transportation Authority
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCH	State Clearinghouse
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board

Acronym/Abbreviation	Definition
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
WMWD	Western Municipal Water District
WQMP	Water Quality Management Plan
WSA	Water Supply Assessment

1 INTRODUCTION

1.1 Project Background

In 1993, the federal government mandated the realignment of March Air Force Base (AFB) and a substantial reduction in its military use. In April 1996, March AFB was re-designated an Air Reserve Base (ARB). Approximately 4,400 acres of land that had historically supported March AFB was no longer needed to support the ARB. The cities of Moreno Valley, Perris, and Riverside, and the County of Riverside formed the March JPA to oversee the dispensation and management of the surplus land. A General Plan (GP) and Master Environmental Impact Report (EIR) were prepared and adopted/certified in 1999 for the JPA planning area, which includes the March ARB.

Concurrent with the U.S. Air Force's preparation of the EIS, the March JPA and the March Joint Powers Redevelopment Agency prepared an EIR for the proposed March ARB Redevelopment Project. The project evaluated in this EIR considered the development of approximately 7,250 acres. The area evaluated including 6,782 acres comprising the boundaries of March ARB, of which approximately 4,524 acres would fall under the authority of March JPA. The remaining 2,258 acres would remain under the control of the military. Additionally, 467 acres within the City of Moreno Valley were included in the EIR evaluation.

Upon approval by the federal government for the realignment of March ARB and the transfer of excess property from March ARB to March JPA, March JPA prepared a General Plan and certified a Master EIR for the General Plan in 1999 (SCH#97071095). The proposed Project site was grouped in the Northeast Planning Subarea and assigned a land use designation of Business Park (BP).

Meridian Park K4, LLC is now pursuing development of the K4 Parcel Project site as well as the proposal to convert the existing Cactus open-air channel into a box culvert. The focus of this Initial Study is specifically on the proposed Project. While the Project site was previously conceptually considered for development in the Disposal of Portions of March AFB EIS, the March AFB Redevelopment Project EIR, and the Master EIR for March JPA, with a specific development plan identified, the analysis in this Initial Study addresses the proposed build-out of the Project site.

1.2 Project Overview

1.2.1 Project Location

The approximately 35.4-acre Project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The Project site is located within the March Joint Powers Authority (JPA) jurisdiction, which is within unincorporated Riverside County, California (Figure 1, Project Location). The Interstate 215 Freeway (I-215) is located approximately 0.8 mile east of

the Project site. The Project site is currently undeveloped and comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The latitude and longitude of the approximate center of the site is 33°909101 North and 117°263507 West. The Project site sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.

According to the March JPA General Plan (GP) Land Use Plan, the site's land use designation is Business Park (BP), as shown in Figure 2, General Plan Land Use Designations. The site has not previously been given a zoning designation per the official March JPA Zoning Map, as shown in Figure 3, March JPA Zoning Designations.

Currently, the Project site is undeveloped and surrounded by March ARB to the south, east and west, and the City of Moreno Valley and business park and industrial land uses to the north. Along the Cactus Avenue corridor, on which the Project site is located, are a variety of industrial and business park warehouse uses mixed with supporting commercial uses such as fueling stations, convenience stores and restaurants.

1.2.2 Project Components

The proposed Project collectively involves the development of the five (5) parcels on approximately 35.4-acre site with 718,000 square foot building and the installation of a box culvert within the Cactus Channel. The proposed site plan for development on the K4 Parcel with a proposed e-commerce/fulfillment center, which is the most intense use that could operate on the Project site is shown in Figure 4, K4 Warehouse Site Plan. The maximum exterior building height would be 46 feet at the parapet. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Once constructed, the e-commerce/fulfillment center use occupying the Project site could potentially be used up to 7 days per week and 24 hours per day. Use of the building would entail storage of smaller products and packages for direct distribution of e-commerce product to end users.

Additionally, the Project would include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The current drainage ditch is proposed to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width).

This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District, the City of Moreno Valley, the United States Department of Agriculture (USDA), the Western Riverside County Regional Conservation Authority, and other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) because portions of the work would be done within jurisdictions that are permittees to the MSHCP.

Project construction would occur over a 12-month period of time, commencing in Quarter 1 of 2020 and completing in Quarter 1 of 2021. Generally, Project construction would include site grading, utility relocation/installation, and building construction. Rough grading and utility installation would last approximately 25 days, and building construction, including pad/site-specific grading activities, would occur over approximately 11 months. Heavy equipment to be used on site during construction include flat beds, dozers, scrapers, graders, track hoes, dump trucks, forklifts, cranes, cement trucks, pavers, rollers, water trucks, rolling container trucks, and bobcats. Heavy equipment will be delivered and removed from the site throughout the construction phase. As most heavy equipment is typically not authorized to be driven on a public roadway, most of the equipment will be delivered and removed from the site via large flatbed trucks. It is anticipated that delivery of heavy equipment would not occur on a daily basis, but rather periodically throughout the construction phase based on need. During summer months, concrete pours could begin as early as 3:00 a.m.; during the remainder of the year, concrete pours would occur after 4:00 a.m. All other deliveries would occur at any time during the day. Any early morning concrete pours would comply with existing noise limitations identified in March JPA Development Code Sections 9.10.140 and 9.10.030.

The delivery and removal of heavy equipment would occur outside of the morning and evening peak hours (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.) to minimize impacts to traffic and circulation near the vicinity of the Project.

The installation of the box culvert would require trenching through the existing swale behind the Cactus right-of-way. A conceptual plan for the proposed Cactus Channel box culvert is shown in Figure 5, Cactus Channel Overview. Currently it is anticipated that there would be some utility relocations for existing crossings in record plans as well as removal of some existing roadway culverts and extending existing storm drain connections to the earth swale.

1.2.3 Requested Approvals and Entitlements

To facilitate Project approval, the following would be required:

- **General Plan Amendment:** The Project site has a land use designation of Business Park within the existing March JPA General Plan. The Project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.
- **Zoning Designation:** As the Project site has not previously been given a zoning designation, to be consistent with the requested General Plan land use designations of Industrial, the proposed Project is pursuing a zoning designation of Industrial (IND) for the 35.4-acre site.
- **Plot Plan:** A plot plan approval is required to construct the 718,000 square foot building, 289 automobile parking stalls, and 317 truck trailer parking stalls.
- **Tentative Parcel Map:** A tentative parcel map is required to merge the five separate parcels on the Project site into one 35.4-acre parcel.

1.3 California Environmental Quality Act Compliance

The baseline for a project is typically the physical environmental condition that exists in the vicinity of a project when the Notice of Preparation (NOP) is published (14 California Code of Regulations, Section 15125(a)). The NOP for the Project was published on November 19, 2018, which will thus be the environmental baseline for the Project. Currently the site is flat land that is vacant and undeveloped.

1.4 Discretionary Actions

The following additional permits, approvals and discretionary actions will be necessary as part of Project approval.

a. United States Army Corps of Engineers (USACE) – A Jurisdictional Determination (JD) will be required to identify and locate the boundaries of jurisdictional Waters of the United States on the Project site, and if found, will be regulated by USACE under Section 404 of the Clean Water Act.

b. State Water Resources Control Board (SWRCB) – A National Pollutant Discharge Elimination System (NPDES) Construction General Permit will need to be obtained from the SWRCB. Permit registration documents include a Stormwater Pollution Prevention Plan (SWPPP).

c. SWRCB – A NPDES Industrial General Permit may need to be obtained from the SWRCB, depending on the type of facility ultimately built, consistent with the requested General Plan land use designations of Industrial (IND).

d. Regional Water Quality Control Board (RWQCB), Santa Ana Region – 401 Water Quality Certification – A Waste Discharge Requirement Permit will need to be obtained from the RWQCB.

e. South Coast Air Quality Management District (SCAQMD) – A Dust Control Plan will need to be approved by the SCAQMD.

f. Federal Aviation Administration (FAA) – A Form 7460-1 will need to be approved by the FAA.

g. Riverside County Airport Land Use Commission (ALUC) – A consistency finding with Riverside County Land Use Plan will be required by Riverside County Airport Land Use Commission.

h. Western Riverside County Regional Conservation Authority

1.5 Public Review Process

Once the lead agency releases the Notice of Preparation (NOP) and the Initial Study (IS), the public has 30 days to provide the lead agency with comments on the Project. During this time, a scoping meeting will be held Thursday, November 15, 2018. The comments received on the NOP during the public comment period and scoping meeting will be considered and included in the Draft EIR.

INTENTIONALLY LEFT BLANK

2 ENVIRONMENTAL CHECKLIST FORM

1. **Project Title:**

   K4 and Cactus Channel Improvements Project

2. **Lead Agency Name and Address:**

   March Joint Powers Authority
   14205 Meridian Parkway, Suite 140
   Riverside, California 92518

3. **Contact Person and Phone Number:**

   Mathew Evans: (951) 656-7000

4. **Project Location:**

   The approximately 35.4-acre Project site is located on the south side of Cactus Avenue and extends from the terminus of Veterans Way at Cactus Avenue to the west to the terminus of Frederick Street at Cactus Avenue to the east. The Project site is located within the March Joint Powers Authority (JPA) jurisdiction which is within unincorporated Riverside County, California (Figure 1, Project Location).

   The latitude and longitude of the approximate center of the site is 33°909101 North and 117°263507 West. The Project site sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey.

5. **Project Sponsor's Name and Address:**

   Meridian Park K4, LLC
   Attn: Timothy Reeves
   1156 N. Mountain Avenue
   Upland, California 91786

6. **General Plan Designation:**

   Existing: Business Park
   Proposed: Industrial

7. **Zoning:**

   Existing: None
   Proposed: Industrial

8. **Description of Project:**

   See Section 1.2 above.

9. **Surrounding Land Uses and Setting:** (Briefly describe the project's surroundings.)

   The proposed Project site is currently undeveloped and is surrounded by existing development to the north, south and west. These surrounding uses include commercial, industrial and military land uses in the local vicinity. Parcels located to the east of the Project site are designated as Public Facility, and to the south is designated as March Air Reserve Base. The proposed Project is on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. Interstate 215 (I-215) is located approximately 0.8 mile east of the Project site.

10. **Other public agencies whose approval is required** (e.g., permits, financing approval, or participation agreement):

    The following additional permits, approvals and discretionary actions will be necessary as part of Project approval.

    a. USACE – A JD will be required to identify and locate the boundaries of jurisdictional Waters of the United States on the Project site, and if found, will be regulated by USACE under Section 404 of the Clean Water Act.

    b. SWRCB – A NPDES Construction General Permit will need to be obtained from the SWRCB. Permit registration documents include a SWPPP.

    c. SWRCB – A NPDES Industrial General Permit may need to be obtained from the SWRCB, depending on the type of facility ultimately built, consistent with the requested General Plan land use designations of Industrial (IND).

    d. RWQCB, Santa Ana Region – 401 Water Quality Certification – A Waste Discharge Requirement Permit will need to be obtained from the RWQCB.

    e. SCAQMD – A Dust Control Plan will need to be approved by the SCAQMD.

    f. FAA – A Form 7460-1 will need to be approved by the FAA.

    g. Riverside County ALUC – A consistency finding with Riverside County Land Use Plan will be required by Riverside County Airport Land Use Commission.

    h. Western Riverside County Regional Conservation Authority

11. **SB-18/AB-52 Tribal Consultations:** Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?

    Consultation with tribes has been initiated, and the results of the consultation process will be included in the EIR prepared for the proposed Project.

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3 ENVIRONMENTAL DETERMINATION

On the basis of this initial evaluation:

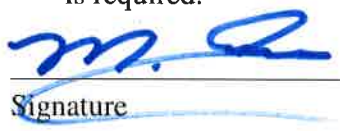
☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed Project MAY have a "potentially significant" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.



Signature

Nov. 14, 2018

Date

Mathew Evans, Planning Director

Printed Name

March Joint Powers Authority

For

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4 INITIAL STUDY CHECKLIST

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact," as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Agriculture/ Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology/Soils
☒ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials	☒ Hydrology/Water Quality
☒ Land Use/Planning	☐ Mineral Resources	☒ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☒ Transportation/Traffic	☒ Tribal Cultural Resources	☒ Utilities/Service Systems
☒ Mandatory Findings of Significance		

EVALUATION OF ENVIRONMENTAL IMPACTS:

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.
4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
    a. Earlier Analysis Used. Identify and state where they are available for review.
    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
    c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or

refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
   a. The significance criteria or threshold, if any, used to evaluate each question; and
   b. The mitigation measure identified, if any, to reduce the impact to less than significance.

4.1 Aesthetics

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AESTHETICS – Would the project**:**				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☒	☐	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☒	☐	☐	☐

a) Would the project have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. The March JPA's GP designates the area looking east and northeast of the March JPA Planning Area toward the Box Springs Mountains and San Jacinto Mountains as a scenic vista (Exhibit 5-5, Scenic & View Shed Areas, March JPA 1999).

While distant scenic vistas of the Box Springs Mountains and San Jacinto Mountains are visible from the Project site, north and northeast of the Project site are existing warehouse developments within the City of Moreno Valley. Viewers to the south and west of the Project site would be people located on the March ARB. The construction of a new 46-foot tall warehouse building on this site would introduce a new warehouse building closer to the ARB, but given that there are existing warehouse developments immediately north and northeast of the Project site, the introduction of this new warehouse building would not significantly obstruct distant views of the Box Springs Mountains and San Jacinto Mountains. Additionally, according to the City of Moreno Valley General Plan Conservation Element, no corridors within the western portion of the city boundary (which abuts the Project site to the north) are designated as scenic view areas (Moreno Valley 2006). Installation of the proposed box culvert within the Cactus Channel would require the placement of the culvert below grade and as such, the improvements within the Channel would not be visible or affect scenic vistas. As such, impacts to scenic vista would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The Project site is located on vacant, previously disturbed land. There are no state scenic highways near the Project site as identified by the California Scenic Highway Mapping System (Caltrans 2011). The Project site does not contain substantial shrubbery or canopy. As such, Project implementation would not damage any scenic resources within a state scenic highway; no impacts would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Potentially Significant Impact. The proposed Project would result in the construction of a 718,000 square-foot building, with 289 automobile parking stalls, 317 truck trailer parking stalls, and 105 loading dock positions for trucks. The maximum exterior building height would be 46 feet at the parapet. Additionally, the Project would include improvements to the drainage ditch that runs along the south side of Cactus Avenue from just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The drainage improvements are proposed to be an underground box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). Implementation of these proposed improvements would require coordination between the

Project Applicant, Riverside County Flood Control District, March JPA, March ARB, USDA, March Life Care, and the City of Moreno Valley.

The Project site is currently vacant; however, the site was previously disturbed with buildings and unpaved roads utilized as part of the former March Air Force Base. The properties to the north across Cactus Avenue are located in the City of Moreno Valley. These properties are commercial and industrial in nature. To the west and south the subject site is surrounded by the March ARB. To the east, the Project site is bordered by vacant land that was formerly part of the March Air Reserve Base and is currently owned by the USDA (Leighton 2018). As such, the visual character of the site would change compared to its existing undeveloped nature. As such, there is the potential for the Project to degrade the visual character of the site. This issue will be analyzed further in the EIR prepared for the proposed Project.

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Potentially Significant Impact. The proposed Project would result in the construction a 718,000 square-foot, 46-foot tall warehouse building with minimal window coverage. During construction, nighttime lighting would exist on the Project site for security purposes, and during the early-morning concrete pours, lighting would be required for construction workers to complete tasks. However, the Project site is located along the Cactus Avenue corridor, which includes nighttime street lighting and contains warehouse and business park buildings with similar nighttime lighting.

Once operational, the proposed Project would introduce similar lighting and glare from security and perimeter lighting as the warehouse buildings in the vicinity. However, as part of the Project, solar panels would likely be constructed on the roof, if approved by ALUC, thereby introducing a new potential source of glare for aircraft landing and departing from the adjacent March ARB. As such, there is the potential for the Project to introduce a new source of glare that would adversely affect day or nighttime views in the area. This issue will be further evaluated in the EIR prepared for the proposed Project.

4.2 Agriculture and Forestry Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AGRICULTURE AND FORESTRY RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. The Project site is located in an area designated as Urban and Built-Up Land, not Prime Farmland, Unique Farmland, or Farmland of Statewide Importance by the California Department of Conservation (DOC) Farmland Mapping and Monitoring Program (DOC 2016). Additionally, the Project site is not utilized for agricultural purposes. As such, the proposed Project would not convert Prime Farmland, Unique Farmland, or

Farmland of Statewide Importance. No impact would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The proposed Project site is located in an area designated as Urban and Built-Up Land, under the Williamson Act. Therefore, the proposed Project would not conflict with zoning for agricultural use. No impact would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

c) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

No Impact. The proposed Project site is not currently zoned and is not utilized for forest land, timberland, or within a designated Timberland Production area. The proposed Project would change the Project site's General Plan land use designation from Business Park to Industrial use and would similarly assign an Industrial zoning designation to the site. As such, the proposed Project would not conflict with zoning of forest land, timberland, or timberland production. No impacts would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The proposed Project is located on vacant previously disturbed land with no forest resources. The proposed Project is identified as Urban and Built-Up Land. As such, Project implementation would not convert forest land to non-forest use. No impact would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

e) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

No Impact. Neither the Project site nor surrounding land uses are located in an area designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (DOC 2016), nor is the site utilized for agricultural purposes. As such, the proposed Project would not result in conversion of Farmland. No impact would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.3 Air Quality

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☒	☐	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☒	☐	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☒	☐	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☒	☐	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

Potentially Significant Impact. The Project site is located within the South Coast Air Basin (SCAB), under the jurisdiction of the SCAQMD, which is principally responsible for air pollution control. The SCAQMD has adopted a series of Air Quality Management Plans (AQMPs) to meet the state and federal ambient air quality standards. Construction of the proposed Project could result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. The California Emissions Estimation Model (CalEEMod) land use and air emissions model will be used to estimate emissions associated with the construction and operation of the proposed Project. The analysis of air quality impacts, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant. This topic will be analyzed further in the EIR prepared for the proposed Project.

b) Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Potentially Significant Impact. Project construction could result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Project operations could introduce additional truck trips and employee vehicle trips with the potential to add pollutants to the local airshed. Thus, the proposed Project could potentially violate an air quality standard or contribute substantially to an existing or projected air quality violation. Impacts would be potentially significant. As such, this topic will be analyzed further in the EIR prepared for the proposed Project.

c) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Potentially Significant Impact. Project construction could result in a temporary addition of pollutants to the local airshed caused by soil disturbance, fugitive dust emissions, and combustion pollutants from on-site construction equipment, as well as from off-site trucks hauling construction materials. Construction emissions can vary substantially day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. During operations, the Project could introduce new sources of vehicle emissions. Thus, the proposed Project has the potential to result in a cumulatively considerable net increase of a criteria pollutant for which the region is non-attainment under federal or state ambient air quality standard. Impacts are potentially significant. As such, this topic will be analyzed further in the EIR prepared for the proposed Project.

d) Would the project expose sensitive receptors to substantial pollutant concentrations?

Potentially Significant Impact. The proposed Project has the potential to create air emissions in quantities that could violate air quality standards. Exposure of nearby sensitive receptors (e.g., neighboring residents) to substantial pollutant concentrations will be evaluated as part of the air quality assessment prepared for the Project. The SCAQMD localized significance thresholds (LSTs) will be evaluated to determine whether the proposed Project would cause or contribute to exceedances of ambient air quality standards at sensitive receptors near the Project site. Additionally, a health risk assessment (HRA) will be performed to evaluate diesel particulate matter emissions associated with the proposed Project and potential cancer risk to existing sensitive receptors within an approximately 1,000-foot radius. The analysis of air quality and SCAQMD CEQA

Regional Significance Thresholds, the LSTs, HRA, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR. Therefore, the EIR prepared for the proposed Project will include an air quality assessment that addresses whether the proposed Project would expose sensitive receptors to substantial pollutant concentrations.

e) Would the project create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. Odors would be generated from vehicles and/or equipment exhaust emissions during construction of the Project. Odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment and to architectural coatings associated with building painting during construction. Most of the people within the Project area that could be subject to odors would include employees and visitors at nearby Business Park and Industrial uses. The land uses most proximate to the Project site, which include Business Park, Industrial, and March ARB uses, do not encourage people to be outdoors for long periods of time where they would be exposed to construction odors. Therefore, impacts associated with odors during construction would be less than significant.

Land uses and industrial operations that are typically associated with odor complaints include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting facilities, refineries, landfills, dairies, and fiberglass molding. The Project entails construction of a new industrial building to be occupied by an e-commerce/fulfillment center use. Fulfillment centers are not a use typically associated with generating odor or odor compliances. As such, Project operations would not have the potential to result in significant odor impacts. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.4 Biological Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☒	☐	☐	☐

a) Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Potentially Significant Impact. A biological technical report is being prepared for the Project, and the results of this report will be included within the EIR. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. As such, the potential for the Project to adversely affect species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (formerly California Department of Fish and Game) or U.S. Fish and Wildlife Service is considered significant. The analysis of biological resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore

is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Potentially Significant Impact. A biological technical report is being prepared that would address if the proposed Project would affect riparian habitat or sensitive communities, as there are several drainage features that traverse the Project site, including the existing Cactus Channel. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. The analysis of biological resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Potentially Significant Impact. The Project site itself is relatively flat. A portion of the Project would potentially involve channelizing the existing Cactus Channel into a box culvert. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. As such, the Project does have the potential to affect waters protected under Section 404 of the Clean Water Act. The biological technical report and jurisdictional delineation report prepared for the Project will address if these drainage features are subject to Section 404 permitting. The analysis of resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Potentially Significant Impact. The proposed Project site is currently undeveloped and is surrounded by existing development to the west, north, and south. The March JPA General Plan does not designate the Project area or adjacent properties as open space areas (March

JPA 2010). The Project site is generally surrounded by existing development and existing infrastructure. However, because the Project site is vacant and undeveloped, the analysis of biological resources, along with the potential for feasible mitigation measures, requires additional study and analysis, and therefore is considered potentially significant. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. The EIR prepared for the Project will include a biological technical report that will address whether the proposed Project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. As such, this issue will be evaluated in the EIR prepared for the proposed Project.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Potentially Significant Impact. A biological technical report is being prepared that addresses whether or not the proposed Project would conflict with any local policies or ordinances protecting biological resources. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. The analysis of whether the proposed Project would conflict with any local policies or ordinances protecting biological resources, along with the potential for feasible mitigation measures, requires additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Potentially Significant Impact. The proposed Project site is located within the Western Riverside County MSHCP. However, the March JPA is not a permittee to the MSHCP and would be required to comply with the Reserve Assembly goals of the MSHCP or other MSHCP requirements (County of Riverside 2003). However, the Cactus Channel, which is currently open but is proposed to be converted to a box culvert as part of Project development, may be subject to actions by Riverside County Flood Control District and the City of Moreno Valley which are signatories to the MSHCP. As such, the EIR prepared for the Project will discuss impacts and mitigation if needed. The analysis as to whether or not the Project conflicts with the MSHCP, along with the potential for feasible mitigation measures, requires additional study and analysis. Therefore, this impact is considered potentially significant and will be analyzed fully in the EIR prepared for the proposed Project.

4.5 Cultural Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☒	☐	☐	☐
d) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Potentially Significant Impact. A cultural resources technical report is being prepared for the proposed Project that will identify potential impacts to historical resources/properties under both CEQA and Section 106 of the National Historic Preservation Act. A California Historical Resources Information Systems (CHRIS) records search of the Project area and a 1-mile radius at the Eastern Information Center (EIC) will be conducted to identify any previously recorded cultural resources that may be located within the Project area. The California Native American Heritage Commission (NAHC) will also be contacted for a review of its Sacred Lands File. Additionally, an intensive-level pedestrian survey of the proposed Project area will be conducted to identify any observed cultural resources (including both prehistoric and historic archaeological resources and potential historic built environment resources, such as culverts). T It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. he analysis of impacts to historical resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Potentially Significant Impact. A cultural resources technical report is being prepared for the Project that will identify potential impacts to archaeological resources. A CHRIS records search of the Project area and a 1-mile radius at the EIC will be conducted to identify any Archaeological Determinations of Eligibility. An intensive-level pedestrian survey of the proposed Project area will be conducted to identify any observed cultural resources (including both prehistoric and historic archaeological resources and potential historic built environment resources, such as culverts). The Senate Bill (SB) 18 consultation process will be initiated by the March JPA with the NAHC-listed tribes for the Project provided by the NAHC response. Additionally, in accordance with Assembly Bill (AB) 52, agency-to-agency consultation by the March JPA will be conducted by sending a formal notice to inform California Native American tribes that have requested such notice of a Project application within a geographic area with which the tribe is traditionally and culturally affiliated. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. The analysis of impacts to archaeological resources, consultation with tribes, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

c) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Potentially Significant Impact. According to the Map My County – Riverside County database (County of Riverside 2018), the Project site is located within an area designated as high paleontological sensitivity. Although the proposed Project does not anticipate destroying any paleontological resource or unique geologic feature, a cultural resources technical report is being prepared for the EIR that will identify potential impacts to paleontological resources. It should be noted that all construction and fencing would be within the property line along the eastern, southern and western edges of the K4 site, and potential edge effects within the Cactus Channel will be evaluated. The analysis of paleontological resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

d) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Less Than Significant Impact. Based on records searches completed for the proposed Project, as discussed above, the Project site is not known to be an informal or formal cemetery. The Project site is currently undeveloped. In the unlikely event that human remains are discovered, state and local laws require that the County Coroner be notified. California Public Resources Code Section 5097.98 addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a Project; and establishes the NAHC to resolve disputes regarding the disposition of such remains. The proposed Project will be required to comply with California Public Resources Code Section 5097.98 should any unknown human remains be discovered during site disturbance. Additionally, Sections 7050.5, 7051, 7052, and 7054 of the California Health and Safety Code collectively address the illegality of interference with human burial remains, as well as the disposition of Native America burials in archaeological sites. The law protects such remains from disturbance, vandalism, or inadvertent destruction and establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a Project, including the treatment of remains prior to, during, and after evaluation, and reburial procedures. As such, through the inclusion of appropriate mitigation measures and through compliance with state and local laws in the event human remains are discovered, impacts would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.6 Geology and Soils

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
iii) Seismic-related ground failure, including liquefaction?	☒	☐	☐	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☒	☐	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☒	☐	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Less Than Significant Impact. According to the most recent Alquist-Priolo Earthquake Fault Zoning Map, the Project area is not located within an Alquist-Priolo fault zone. The nearest fault zone, the San Jacinto fault zone, is located approximately 9 miles east (DOC 2015) of the Project site. Construction of the Project would be required to meet California Building Code (CBC) standards. Additionally, the March JPA would review and approve the plans and specifications of the proposed Project to ensure compliance with the provisions of the CBC and Title 24, which regulates building standards. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. Because the Project site is not within an Alquist-Priolo Earthquake Fault Zone, pursuant to the Department of Conservation's Fault Activity Map of California,

and given that the Project is required to comply with the provisions of the CBC and Title 24, the potential for exposing people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving rupture of a known Alquist-Priolo earthquake fault is low. Therefore, a less than significant impact is expected and this issue will not be further addressed in the EIR prepared for the proposed Project.

ii) Strong seismic ground shaking?

Potentially Significant Impact. According to the Geotechnical Exploration, prepared by Leighton and included as Appendix A to this Initial Study, strong ground shaking can be expected at the site during moderate to severe earthquakes in this general Southern California region (Leighton 2018a). This is common to virtually all of Southern California. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The site-specific seismic coefficients identify the Project site as a Class D. A Class D site is characterized by high seismic vulnerability that is expected to experience severe and destructive ground shaking. Given the potential for the Project to be subject to strong seismic ground shaking, impacts are potentially significant and this issue will be further evaluated in the EIR prepared for the proposed Project.

iii) Seismic-related ground failure, including liquefaction?

Potentially Significant Impact. According to the Map My County – Riverside County database (County of Riverside 2018), the Project site contains a high liquefaction susceptibility, as well as susceptible to subsidence. However, according to the Geotechnical Exploration prepared by Leighton (Appendix A), liquefaction-induced or dynamic dry settlement is not expected to be a significant hazard at this site due to the absence of near surface saturated sand layers and underlying dense older alluvium (Leighton 2018a). Nonetheless, because this geotechnical exploration does not address the Cactus Channel, this issue will be further evaluated in the EIR prepared for the proposed Project.

iv) Landslides?

Less Than Significant Impact. The proposed Project site is relatively flat, varying in grade up to approximately 6 feet across the entire site 35.4-acre site. The nearest hilly terrain to the Project site, which has the potential to cause landslides, is located approximately 1.5 miles to the west of the Project site, on the western side of I-215

andnd March ARB. Therefore, due to the flat topography of the Project area, the proposed Project site itself, and the Cactus Channel, the Project site would not be susceptible to landslides. Additionally, the proposed Project would undergo staff review with the March JPA to ensure that Project grading activities would not be subject to, or result in, landslides. As such, the proposed Project would not expose people to the risk of landslides. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. The proposed Project would result in the construction of a 718,000 square-foot warehouse building, 289 automobile parking stalls, 317 truck trailer parking stalls, and 105 loading dock positions for trucks. Additionally, the Project includes proposed improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue. The drainage improvements are proposed to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). Short-term erosion effects during construction of the Project would be prevented through implementation of a SWPPP as required in compliance with the NPDES program and through incorporation of best management practices intended to reduce soil erosion. The SWPPP would include standard construction methods such as temporary detention basins to control on-site and off-site erosion. The SWPPP is required by the March JPA during plan review and approval of Project improvement plans. Upon completion of Project construction, the warehouse portion of the Project site would be completely paved, thereby preventing any soil erosion or loss of topsoil from occurring. The box culvert within the Cactus Channel would control flowing water through the Channel such that the potential for erosion would also be reduced and limited. As such, impacts related to soil erosion or the loss of topsoil would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

c) Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Potentially Significant Impact. The Project site is not located within an earthquake fault zone or in an area with steep slopes having the potential to result in landslides. According to Riverside County's Map My County, the Project site is however, located on areas of high liquefaction potential, as well as susceptible to subsidence (County of Riverside 2018). However, according to the Geotechnical Exploration (Appendix A), laboratory testing indicates that the on-site soils (older alluvium) are expected to possess a slight

collapse potential (<1%). Based on the remedial grading recommendations to remove and compact the near surface soils (Leighton 2018a) on the warehouse site, this geologic hazard on this site is considered very low. However, the geotechnical exploration did not address the Cactus Channel. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

d) Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

Potentially Significant Impact. According to the U.S. Department of Agriculture Natural Resources Conservation Services Web Soil Survey, the soil underlain the proposed Project area is comprised of Monserate sandy loam, which has low water storage ability, naturally drains well, and has a low capacity of transmitting water, thus a low expansive potential (USDA 2017). According to the Geotechnical Exploration, limited laboratory testing indicated that on-site soils generally possess a low expansion potential. The Geotechnical Exploration includes recommendations related to the geologic hazard of expansive soils. However, the geotechnical exploration did not address the Cactus Channel. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. Use of septic tanks or other alternative wastewater disposal systems would not be a part of the proposed Project. The Project would be connected to the existing sewer system. Therefore, no impacts would occur, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

4.7 Greenhouse Gas Emissions

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☒	☐	☐	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☒	☐	☐	☐

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Potentially Significant Impact. The proposed Project has the potential to generate greenhouse gas emissions that may have a significant impact on the environment, both during construction and operation of the Project. The analysis of greenhouse gas emissions, along with the potential for feasible mitigation measures, requires additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR. Therefore, the EIR prepared for the proposed Project will include an assessment of the Project in relation to the potential impacts on global climate change.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Potentially Significant Impact. See response a) above. The proposed Project has the potential to generate greenhouse gas emissions that may have a significant impact on the environment, both during construction and operation of the proposed Project. Therefore, the EIR prepared for the proposed Project will identify how the proposed Project would relate to any plan, policy, or regulation adopted to address greenhouse gas emissions.

4.8 Hazards and Hazardous Materials

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☒	☐	☐	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☒	☐	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☒	☐	☐	☐
d) Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☒	☐	☐	☐

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☒	☐	☐	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Potentially Significant Impact. According to the Phase I Environmental Site Assessment (ESA) Report, prepared by Leighton, and included as Appendix B to this Initial Study, the subject site is located in the northern area within the former boundaries of the March ARB (Leighton 2018). Due to the facility's purpose in national defense, there were a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil when the ARB was in operation. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Potentially Significant Impact. According to the Phase I ESA Report (Appendix B), a review of historic aerial photographs show that the Project site has been vacant since 1901; prior to 1901 it is unknown whether or not the Project site was developed. The Phase I ESA Report also stated that no hazardous substances, chemical containers, or aboveground and underground storage tanks were observed on the Project site. Evidence of pesticide use was not observed on the Project site. One pad mounted transformer was observed on the eastern portion of the Project site, adjacent to the large, off-site electrical substation located near the eastern boundary of the Project site. The transformer appeared in good condition and

no evidence of staining or leakage was observed. The soils appeared to be clean and locally derived (Leighton 2018).

The Project site is located in the northern area of the former boundaries of the March ARB. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. Additionally, there is the potential for unexploded ordnance to be located on the Project site. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Potentially Significant Impact. The Cactus Channel component of the Project is located within proximity of several schools. As such, there is the potential for hazardous materials to be handled within one-quarter mile of an existing school. This issue will be further evaluated in the EIR prepared for the proposed Project.

d) Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Potentially Significant Impact. California Government Code Section 65962.5 combines several regulatory lists of sites that may pose a hazard related to hazardous materials or substances. The Department of Toxic Substances Control's (DTSC's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. A review of the Envirostor database has revealed that there are three cleanup sites within approximately 1 mile of the Project site. The nearest cleanup site is located at 14420 Elsworth Street, located approximately 0.12 miles northwest from the Project site. This site is identified as an evaluation site. The next site is located approximately 0.3 mile south of the Project site, at 14310 Frederick Street. This site is within the March ARB, and is listed as "Military Evaluation" (DTSC 2018). The next furthest site is located approximately 0.6 mile south of the Project site, also at 14130 Fredrick Street, within the March Air Reserve Base, and also listed as "Military Evaluation."

According to the Environmental Data Resource (EDR) Radius Report included in Appendix B, March ARB was reported on multiple hazardous waste sites databases. The

former March Air Force Base was historically used to train pilots during World War I, and by 1938, it became the central location for west-coast bombing and gunnery training. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. By November 1989, March Air Force Base was added to the National Priorities List (NPL) due to the contamination of the groundwater. According to the EDR radius map report the facilities status is "currently on the Final NPL." Operational Units (OU) were identified on the facility based on the groundwater plumes. There were numerous contaminants of concern (COCs) detected in the groundwater at the OUs including trichloroethylene (TCE), perchloroethylene (PCE), vinyl chloride, and fuel. The OU areas that require groundwater remediation include the southern and eastern boundary of March Air Force Base and extend 1,500 feet south of the base property, and does not include the current subject site boundary (Appendix B; Geotracker, 2018). However, this does encompass areas where planned improvements to the Cactus Channel are located. As such, this issue requires further evaluation in the EIR prepared for the proposed Project.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Potentially Significant Impact. The proposed Project is located within the March ARB Land Use Plan, in the C1 Primary Approach/Departure Zone and would ultimately require approval from the ALUC due to the site's proximity to the March Inland Port Airport (approximately 4,500 feet from the north end of the runway). The C1 zone is subject to moderate to high noise and moderate accidental potential risk (Riverside County ALUC 2014). Uses prohibited within Zone C1 include children's schools, day care centers, libraries, hospitals, congregate care facilities, places of assembly, noise-sensitive outdoor nonresidential uses, and hazards to flight. The proposed Project is intended to serve e-commerce/fulfillment center uses, which does have the potential to expose people to safety hazards. As such, this issue will be evaluated further in the EIR prepared for the proposed Project.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The proposed Project site is not located within the vicinity of a private airstrip but is located in close proximity to the March Inland Port Airport (approximately 4,500 feet from the north end of the runway), as discussed above. The Project site is located

within the March ARB Land Use Plan, in the C1 Primary Approach/Departure Zone, as discussed above. However, given that the Project site is not located within the vicinity of a private airstrip, no impacts would occur and this issue will not be further evaluated in the EIR prepared for the proposed Project.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The Project site is located within the March JPA Planning Area emergency response plan. The proposed Project is located along Cactus Avenue, approximately 0.7 mile east of Interstate 215 (I-215). Access driveways would be provided on Cactus Avenue. According to the March GPA General Plan's Circulation Plan and Roadway Classifications, Cactus Avenue is considered an Arterial/Urban Arterial Highway which allows access to I-215, an Arterial Highway to the west, and Heacock Street a Secondary Highway to the east (March JPA 2010). Additionally, the proposed site plan, including the access driveways, would be reviewed and approved by the March JPA, police, and fire department during plan review to ensure emergency access would be provided at all times. During construction of the proposed Project, no lane closures are anticipated. As such, adequate emergency access during construction and operation of the proposed Project would be maintained, and the Project would not physically interfere with an adopted emergency response plan or emergency evacuation plan. Impacts would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Less Than Significant Impact. According to the Map My County – Riverside County database (County of Riverside 2018), the Project site is not within a designated fire hazard area. Additionally, the Project site is surrounded by development to the north, west, and south. Therefore, the risk of a large, high-intensity wildland fire impacting the site is low. Impacts would be less than significant, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

4.9 Hydrology and Water Quality

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☒	☐	☐	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f) Otherwise substantially degrade water quality?	☒	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☒	☐	☐	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

a) Would the project violate any water quality standards or waste discharge requirements?

Potentially Significant Impact. The proposed Project involves the construction of a warehouse building. Additionally, the Project would include improvements to the Cactus

Channel drainage ditch that runs along the south side of Cactus Avenue. The proposed improvements include undergrounding a box culvert that would vary in width. A hydrology study and water quality management plan (WQMP) will be prepared for the Project. It is not presumed that Project implementation would have a substantial impact on water quality standards or waste discharge requirements; however, this issue will be analyzed and discussed further in the EIR prepared for the Project. In the event that impacts are identified, feasible mitigation measures from the hydrology study and WQMP will be identified. This issue is considered potentially significant until it can be fully analyzed in the EIR prepared for the proposed Project.

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

Potentially Significant Impact. The proposed Project involves the construction of an approximately 718,000-square foot warehouse building and the installation of a new box culvert within the existing earthen Cactus Channel. The EIR will analyze the potential source(s) of water for the site and address whether or not groundwater resources could be depleted as a result of the Project implementation on the undeveloped Project site. This issue will also be addressed in the WQMP and Water Supply Assessment (WSA) prepared for the Project. The analysis of groundwater resources, along with the potential for feasible mitigation measures, requires additional study and therefore, is considered potentially significant until it can be fully analyzed in the EIR prepared for the proposed Project.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Potentially Significant Impact. The proposed Project would result in the construction of an approximately 718,000-square foot warehouse building. Additionally, the Project would include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue. The proposed Project has the potential to modify the existing drainage pattern of the site by constructing a new warehouse building and undergrounding a box culvert that would run approximately 7,900 linear feet and would vary in width on the Project site where no structures are located currently. Although the Project site is relatively flat, a hydrology study and WQMP is being prepared, and results and any identified mitigation will be included within the EIR prepared for the Project. The analysis of the drainage patterns, along with the potential for feasible mitigation measures, requires

additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Potentially Significant Impact. See response c) above.

e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Potentially Significant Impact. The analysis of the proposed Project's potential to contribute runoff and create an additional source of polluted runoff, along with the potential for feasible mitigation measures, requires additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR. A hydrology study and WQMP is being prepared for the Project, and the findings and recommendations will be incorporated into the EIR prepared for the proposed Project.

f) Would the project otherwise substantially degrade water quality?

Potentially Significant Impact. See responses a) through e) above. This issue will be evaluated in the EIR prepared for the proposed Project.

g) Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. Implementation of the proposed Project would not result in the development of housing. Additionally, the Project site is not located within a 100-year flood hazard area (FEMA 2008). Therefore, no housing would be placed within a 100-year flood hazard area. No impact would result, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

h) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Potentially Significant Impact. The Project site is not located within a 100-year flood hazard area (FEMA 2008). However, the proposed Project would not place structures

within an existing drainage channel and would have the potential to alter flood flows. As such, impacts to flood flows are potentially significant, and this issue will be further evaluated in the EIR prepared for the proposed Project.

i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam or inundation by seiche, tsunami or mudflow?

Less Than Significant Impact. According to the Geotechnical Exploration prepared for the proposed Project (Appendix A), due to the site location and lack of nearby open bodies of water, the potential for seiches or tsunami is considered very low. The Perris Reservoir Dam is located approximately 4.9 miles southeast of the Project site as well as downstream; therefore, the Project site would not be subject to inundation by dam failure at Perris Reservoir. Therefore, the potential for inundation at the site as a result of an earthquake-induced dam for levee failure is considered low. Impacts related to exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of a failure of a levee or dam, is considered less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.10 Land Use and Planning

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
LAND USE AND PLANNING – Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☒	☐	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☒	☐	☐	☐

a) Would the project physically divide an established community?

No Impact. The Project site is located on an approximately 35.4-acre site within the northern portion of the jurisdiction of March JPA. Cactus Avenue and north of Cactus Avenue are development within the City of Moreno Valley. This development primarily consists of warehouse and commercial development. West and south of the Project site is

March ARB, which includes military uses and an active airfield. East of the Project site is an undeveloped parcel owned by the USDA. The Cactus Channel drainage ditch fronts the northern boundary of the Project site. Build-out of the proposed warehouse on this vacant parcel as well as installation of a box culvert within the Cactus Channel abutting March ARB, the City of Moreno Valley, and vacant land owned by USDA would not physically divide an established community given that the site is adjacent to a variety of uses and jurisdictions. As such, no impacts would occur and this issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Potentially Significant Impact. As shown on Figure 2, General Plan Land Use Designations, the site's land use designation is Business Park (BP). The site is not yet zoned per the March JPA Zoning Map, as shown in Figure 3, March JPA Zoning Designations. The proposed Project would include the construction of a 718,000 square foot building on the approximately 35.4-acre site as well as the installation of a box culvert within the Cactus Channel. The site would also include automobile and truck trailer parking, loading dock positions, and improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue. To facilitate Project approval, a General Plan Amendment would be required to change the existing Business Park land use designation to Industrial. In addition, because the Project site is not yet zoned, a Change of Zone to allow for an Industrial land use would need to be approved for the site.

The proposed Project is located in the C1 Primary Approach/Departure Zone for the March Air Reserve Base. The C1 zone is subject to a moderate to high noise impact, which may be disruptive to noise-sensitive land use activities. The constructed warehouse building would have a maximum building height of 46 feet. The installation of the box culvert within the Cactus Channel would not introduce any above-ground structures with the potential to affect airspace or result in land use conflicts. However, an airspace review would be required for the proposed building (Riverside County Airport Land Use Commission 2014). Given that numerous approval actions are required, impacts are considered potentially significant until this issue can be further evaluated in the EIR prepared for the proposed Project.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

Potentially Significant Impact. As discussed in Section 3.4 Biological Resources, the proposed Project site is located within the Western Riverside County MSHCP. However, the March JPA is not a permittee to the MSHCP and would not be required to comply with the Reserve Assembly goals of the MSHCP or other MSHCP requirements (County of Riverside 2003). However, the Cactus Channel, which is currently open but is proposed to be converted to a box culvert as part of the Project, may be located within jurisdictions of Riverside County Flood Control District and the City of Moreno Valley, who are subject to the MSHCP. As such, the EIR prepared for the Project will discuss impacts and mitigation if needed. The analysis whether or not the Project conflicts with the MSHCP, along with the potential for feasible mitigation measures, requires additional study and analysis. Therefore, this impact is considered potentially significant and will be analyzed fully in the EIR prepared for the proposed Project.

4.11 Mineral Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☒	☐
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Less Than Significant Impact.

As previously stated in Section 3.10, the site's land use designation is Business Park and is proposed as Industrial under the Project. These land use designations do not allow for mining activities (March JPA 2016). Additionally, the Project site is surrounded by commercial, industrial and military land uses in the local vicinity that would be incompatible with a mining operation on the Project site. Therefore, impacts to known

mineral resources would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

No Impact. As previously stated, the site's land use designation is Business Park and is proposed as Industrial under the Project. These land use designations do not allow for mining activities (March JPA 2016). Additionally, the Project site is surrounded by commercial, industrial and military land uses in the local vicinity that would be incompatible with a mining operation on the project site. Therefore, the proposed Project would not result in the loss of availability of a locally important mineral resource recovery site. No impact would occur, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

4.12 Noise

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☒	☐	☐	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially Significant Impact. There are no sensitive receptors such as homes, schools, or daycare facilities located immediately adjacent to the warehouse site; however, sensitive receptors may be located adjacent to the Cactus Channel portion of the Project. Noise levels are regulated by the March JPA's Development Code and March ARB's Air Installation Compatible Use Zone. During Project construction activities, the proposed Project would result in a temporary increase in noise levels due to the use of construction equipment. The Project would also generate additional traffic on local streets generally from employees, trucks delivering or transporting goods, and the public. The additional traffic may impact the existing noise level of the area. A noise impact analysis will be prepared for the Project to analyze the potential impacts from construction and operation of the proposed Project on neighboring land uses. The analysis of noise levels, along with the potential for feasible mitigation measures, requires additional study and, therefore, is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

b) Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Potentially Significant Impact. The proposed Project would involve earthwork to produce finish grades and provide proper recompacting, resulting in temporary groundborne vibration and noise levels. A noise impact analysis is being prepared and will analyze level of vibration and groundborne noise associated with Project construction activities. Once completed, operation of the Project would not expose persons to or generate groundborne vibration or groundborne noise. The analysis of groundborne noise levels, along with the potential for feasible mitigation measures outlined in the noise impact analysis, requires additional study and, therefore, is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

c) Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Potentially Significant Impact. The Project would involve the introduction of a noise source associated with an increase in traffic on the Project site and adjacent roadways, thereby potentially changing the ambient noise levels in the Project vicinity such that significant noise impacts could occur. The noise impact analysis will evaluate the extent of this increase and level of impact. The analysis of ambient noise levels, changes in ambient conditions, and the potential for noise impacts requires additional study and, therefore, is

considered potentially significant. This issue will be evaluated further in the EIR prepared for the proposed Project.

d) Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Potentially Significant Impact. The proposed Project has the potential to temporarily increase ambient noise levels during construction. A noise impact analysis is being prepared for the Project. The analysis of ambient noise levels, changes in ambient conditions, and the potential for noise impacts, is being further evaluated and will be discussed in the EIR prepared for the proposed Project.

e) Would the project be located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Potentially Significant Impact. The Project site is located immediately adjacent to the March ARB and is also within the March ARB land use plan area. Specifically, the Project site is located within the C1 compatibility zone, as depicted in the March ARB/Inland Port Airport Land Use Compatibility Plan (Mead & Hunt 2014). Zone C1, Primary Approach/Departure Zone, encompasses areas of moderate to high noise and moderate accidental potential risk. Locating residential uses within these zones is not permitted; therefore, no individuals will be residing in the Project site. However, Project implementation does have the potential to expose people working in the Project area to excessive noise levels. Impacts are potentially significant, and this issue will be further evaluated and discussed in the EIR prepared for the proposed Project.

f) Would the project be within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The Project site is not within the vicinity of a private airstrip. March Inland Port Airport is considered a joint-use airport utilized for both commercial and military purposes. As such, no impacts associated with exposing people residing or working within the vicinity of a private airstrip to excessive noise levels would result from Project implementation. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.13 Population and Housing

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

Less Than Significant Impact. The proposed Project involves the construction of a 718,000 square-foot warehouse building to be occupied by e-commerce/fulfillment center use. No housing is being proposed with this Project; therefore, the Project would not directly generate substantial population growth. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. While the end tenant for the proposed warehouse building is not yet known, it is assumed that the proposed Project would generate a maximum number of 900 jobs during operations. Because the tenant is not yet known, the number of jobs that the Project would generate is based off the *Institute of Transportation Engineers (ITE) Trip Generation Manual* and the ITE trip generation rates for the Project in order to be consistent with the traffic impact analysis.

According to the SCAG Growth Forecast (Appendix to the *2016–2040 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS); SCAG 2016), employment is anticipated to grow from 70,500 in 2012 to 156,600 in 2040 in unincorporated Riverside County (SCAG 2016a, p. 28). Total employees/staff for the Project is estimated to be 900, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. As such, it is anticipated that these new jobs would be filled by the existing residential population in the greater Riverside County area. Therefore, the proposed Project

would not generate substantial population growth. Infrastructure improvements would include the improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, connections to existing utilities serving areas surrounding the Project site. The infrastructure improvements implemented by the proposed Project would not encourage population growth, as they would be limited to just the Project site and flows within the existing Cactus Channel. Based on the above, no adverse impacts related to population growth would result from the Project; impacts would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. The Project site is undeveloped and does not currently support any housing; therefore, substantial numbers of existing housing would not be displaced and the construction of replacement housing elsewhere would not be necessary as a result of the proposed Project. No impact would occur, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. The Project site is undeveloped does not currently support any housing or population; therefore, substantial numbers of people would not be displaced, necessitating the construction of replacement housing elsewhere, as a result of the proposed Project. Therefore, no impacts would occur, and this issue will not be further addressed in the EIR prepared for the proposed Project.

4.14 Public Services

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

Fire protection?

Less Than Significant Impact. The Project would be served by the Riverside County Fire Department. The closest fire station to the Project site is Station 65 Moreno Valley Station (15111 Indian Street, Moreno Valley), which is approximately 2 miles to the south and east of the Project site. As part of standard development practices, prior to construction, Project plans would be reviewed by the Riverside County Fire Department, and the Project would be required to incorporate the Riverside County Fire Department's recommendations into the final Project design. The Riverside County Fire Department review and approval of plans would ensure that the Project complies with the California Fire Code (24 CCR, Part 9). The Project applicant would be required to install fire safety devices, such as fire alarms and sprinklers, in order to improve emergency-related problems for the proposed development. Zoned fire sprinkler systems would be installed throughout the building.

The Project is subject to the payment of a development impact fee (DIF) related to fire protection. The Project DIF amount for fire protection facility fees is determined based on Ordinance No. JPA 15-01(March JPA 2015). The payment of these fees would provide funding for capital improvements such as land, equipment purchases, and fire station construction. Operations of the proposed warehouse would generate approximately 900 jobs, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, it is anticipated that these new jobs would be filled by the existing residential population in the greater Riverside County area. Therefore, Project employment would not result in substantial population growth within the fire station jurisdictions as it is expected that jobs would be filled by the existing residential population in the greater Riverside County area. The proposed Project would comply with applicable fire codes, is consistent with the land use types and activities envisioned, and would pay the required DIF fees; therefore, the Project would not result in the need for new or expanded fire protection facilities, and impacts would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

Police protection?

Less Than Significant Impact. The Project would be served by the Riverside County Sheriff's Department. The closest police station to the Project site is the Riverside Sheriff's Department (22850 Calle San Juan De Los Lagos, Moreno Valley, California 92553), located approximately 0.3 mile north of the Project site. The proposed industrial development would bring an additional 900 employees, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, it is anticipated that these jobs would be filled by existing residential population in the greater Riverside County area. Project implementation could result in additional enforcement calls and emergency responses to this location but is not anticipated to increase the overall demand for law enforcement personnel and services in the Project area such that new or improved facilities would be required. Any additional personnel (officers, supervisors, or support staff), equipment, and vehicles necessary to service calls to the new industrial use could be accommodated at existing facilities. The proposed Project would also be required to pay the criminal justice public facilities DIF. Therefore, with payment of fees, impacts to police protection services as a result of Project implementation would be less than significant. This issue will not be further evaluated in the EIR prepared for the proposed Project.

Schools?

Less Than Significant Impact. The Project would result in the construction of a 718,000 square-foot warehouse building. No housing is being proposed with this Project; therefore, the Project would not generate substantial population growth. The proposed industrial development would bring an additional 900 employees, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, it is anticipated that these new jobs could be filled by the existing residential population in the greater Riverside County area. As such, the proposed Project would not generate substantial population growth, thus there would be no substantial impact to school facilities in the area. This issue will not be further evaluated in the EIR prepared for the proposed Project.

Parks?

Less Than Significant Impact. The Project would result in the construction of a 718,000 square-foot warehouse building. No housing is being proposed with this Project; therefore, the Project would not generate substantial population growth. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. It is anticipated that these new jobs could be filled by the existing residential population in the greater Riverside County area. Therefore, the proposed Project would not generate substantial population growth, thus there would be no substantial impact to park facilities in the area. This issue will not be further evaluated in the EIR prepared for the proposed Project.

Other public facilities?

Less Than Significant Impact. No housing is being proposed with this Project; therefore, the Project would not generate substantial population growth. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. It is anticipated that these new jobs could be filled by the existing residential population in the greater Riverside County area. Therefore, the proposed Project would not generate substantial population growth, thus there would be no substantial impact to library or other public facilities in the area. This issue will not be further evaluated in the EIR prepared for the proposed Project.

4.15 Recreation

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact. The March JPA General Plan does not designate the Project area or adjacent properties as open space areas (March JPA 1999). The proposed Project involves the development of a warehouse building, and improvements to the drainage ditch that runs along the south side of Cactus Avenue. No housing is being proposed with this Project, and the proposed industrial development would bring an additional 900 employees, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, Project implementation would not directly or indirectly increase the use of existing parks or recreational facilities, and thus no deterioration of existing facilities would occur. There would not be an increase in use of the parks and recreational facilities from this Project, and thus no deterioration of existing facilities. Therefore, no signification impacts would occur. This issue will not be further evaluated in the EIR prepared for the proposed Project.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

Less Than Significant Impact. The proposed Project involves the development of a warehouse building and improvements to the drainage ditch that runs along the south side of Cactus Avenue. No housing is being proposed with this Project; therefore, the Project would not generate substantial population growth. The Project would enhance the jobs/housing balance of the March JPA Planning Area and adjacent jurisdictions at full buildout. The proposed Project would generate a maximum number of 900 jobs during operations, which would be less than 1% of the total employment in SCAG's Growth Forecast in 2040. The increase in employment would be minimal in comparison to the anticipated increase of the SCAG Growth Forecast. Therefore, the Project would not stimulate population growth or a population concentration above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Therefore, it is anticipated that these new jobs would be filled by the existing residential population in the greater Riverside County area. Therefore, the proposed Project would not require the construction or expansion of recreational facilities, and impacts would be less than significant. This issue will not be further discussed in the EIR prepared for the proposed Project.

4.16 Transportation and Traffic

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
TRANSPORTATION/TRAFFIC – Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☒	☐	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☒	☐	☐	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☒	☐	☐	☐
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☒	☐	☐	☐

a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

Potentially Significant Impact. A traffic impact analysis is being prepared for the Project that will identify any potential impacts associated with consistency with the March JPA's traffic and circulation policies. The traffic impact analysis will evaluate the circulation system with the development of the proposed Project. The analysis of the circulation system, potential impacts associated with the Project, and potential feasible mitigation

measures will be identified in the traffic impact analysis and incorporated into the EIR. As such, traffic impacts are considered potentially significant and will be further evaluated in the EIR prepared for the proposed Project.

b) Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Potentially Significant Impact. A traffic impact analysis is being prepared for the Project that will identify the potential for congestion as a result of Project implementation. The proposed Project would generate a maximum number of 900 jobs during operations, thus bringing in more vehicle trips to the Project area from the greater Riverside County area. The analysis of the congestion management plan, with the potential for feasible mitigation measures outlined in the traffic impact analysis, requires additional study and therefore would be considered potentially significant until it can be analyzed fully in the EIR. As such, the EIR prepared for the Project will include a traffic impact analysis that identifies congestion impacts associated with the development of the proposed Project.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Potentially Significant Impact. The Project site is located within the March ARB land use plan area. Specifically, the Project site is located within the C1 compatibility zone. Zone C1, Primary Approach/Departure Zone, encompasses areas subject to moderate to high noise and moderate accidental potential risk. Generally, uses prohibited within Zone C1 include children's schools, day care centers, libraries, hospitals, congregate care facilities, places of assembly, noise-sensitive outdoor nonresidential uses, and hazards to flight. The Project's compliance with the March ARB/Inland Port Airport Land Use Compatibility Plan will be addressed in the Hazards and Hazardous Materials section in the EIR prepared for the proposed Project, as the intent of the compatibly plan is to protect people and the environment from impacts due to proximity to the airport. As such, this threshold will be further evaluated in the EIR prepared for the proposed Project.

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less Than Significant Impact. Regional access to the Project site is provided via I-215, with local access via Cactus Avenue. Vehicular access points and circulation outside/inside the Project site, including the Project's parking lots, would be reviewed and approved by the March JPA's planning and engineering staff. The Project does not

include any non-standard design features, nor does it have any hazardous elements. Impacts would be less than significant, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

e) Would the project result in inadequate emergency access?

Less Than Significant Impact. The proposed Project would result in the development of a currently undeveloped site, including the development of site access roadways. Access to the Project site would be provided via two driveways located along Cactus Avenue. Access to the Project site would be designed according to March JPA standards and all applicable emergency access standards. Additionally, through March JPA's site plan review, March JPA would ensure that the proposed industrial warehouse building and the improvements to the drainage ditch that runs along the south side of Cactus Avenue meet code requirements related to emergency access. Impacts would be less than significant, and this issue will not be further evaluated in the EIR prepared for the proposed Project.

f) Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Potentially Significant Impact. The Riverside Transit Agency (RTA) provides bus service within the March JPA (RTA 2014). The nearest bus stop is located at the northeast intersection of Fredrick Street and Cactus Avenue. There is an existing Class II bike lane along Cactus Avenue. Bicycle racks would be included as part of the proposed Project and would be reviewed as part of March JPA's design review process. A traffic impact analysis is being prepared that will address consistency with adopted policies, plans, or programs regarding public transit and bicycle and pedestrian facilities. The analysis of the alternate modes of transportation, including public transit and bicycle and pedestrian facilities requires additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR. This issue will be further evaluated in the EIR prepared for the proposed Project.

4.17 Tribal Cultural Resources

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
TRIBAL CULTURAL RESOURCES				
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☒	☐	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☒	☐	☐	☐

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Potentially Significant Impact. A cultural resources technical report is being prepared for the proposed Project that will identify potential impacts to tribal resources/properties under both CEQA and Public Resources Code (PRC) 5020.1(k). The analysis of tribal resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR prepared for the proposed Project.

ii) ***A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?***

Potentially Significant Impact. March JPA has initiated consultation efforts with California Native American tribes. Through consultation efforts, March JPA and Native American tribes will determine the Project's potential to affect tribal cultural resources. This issue will be evaluated further in the EIR prepared for the proposed Project.

4.18 Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☒	☐	☐	☐
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☒	☐	☐	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? In making this determination, the Authority shall consider whether the project is subject to the water supply assessment requirements of Water Code Section 10910, et. seq. (SB 610), and the requirements of Government Code Section 664737 (SB 221).	☒	☐	☐	☐
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☒	☐	☐	☐
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☒	☐	☐	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☒	☐	☐	☐

a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

Potentially Significant Impact. The Project site is currently undeveloped and not connected to water or wastewater infrastructure. As such, Project implementation would require the construction of new water and wastewater connections in order to connect to Western Municipal Water District (WMWD0 water and wastewater collection and treatment systems. The proposed Project would generate a maximum of 900 jobs during operations. Due to the size of the Project and the potential for the Project to require water and generate wastewater in quantities beyond those currently handled by WMWD's service infrastructure, potentially significant impacts could result. As such, this issue will be further evaluated in the EIR prepared for the proposed Project..

b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. The Project site is currently undeveloped and not connected to water or wastewater infrastructure. As such, Project implementation would require the construction of new water and wastewater connections in order to connect to WMWD water and wastewater collection and treatment systems. The proposed Project would generate a maximum of 900 jobs during operations. Due to the size of the Project and the potential for the Project to require water and generate wastewater in quantities beyond those currently handled by WMWD's service infrastructure, potentially significant impacts could result. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

c) Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Potentially Significant Impact. The Project site is currently undeveloped and not connected to any stormwater infrastructure or facilities. The Project would retain all post development flow on site; however, the Riverside County Flood Control District may allow minimal drainage into the proposed improvements to the existing open Cactus Channel drainage. The Project would be required to comply with all rules, regulations, and other requirements of the March JPA for use of stormwater facilities. A WQMP will be prepared for the Project, and the impacts and mitigation identified within the WQMP will be incorporated into the EIR prepared for the Project. While no significant stormwater drainage facility impacts are anticipated, further detailed analysis will be performed to confirm whether or not significant impacts would result from Project implementation. As such, this issue will be evaluated further in the EIR prepared for the Project.

d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

Potentially Significant Impact. The Project site is located within the WMWD service area. The proposed Project would generate a maximum number of 900 jobs during operations. A Water Supply Assessment (WSA) will be prepared and approved by WMWD to provide an analysis as to whether WMWD will have sufficient water supplies available to serve the Project in normal, dry, or multiple dry years. The analysis in the WSA may result in the need for mitigation measures. This issue requires additional analysis and is therefore considered potentially significant until it can be analyzed fully in the EIR. This issue will be further evaluated in the EIR prepared for the proposed Project.

e) Would the project result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Potentially Significant Impact. See discussion b) above. The Project site is located within WMWD's service area. Prior to Project approval, a will-serve letter must be obtained by WMWD to determine whether WMWD can serve the Project. Wastewater generated would be discharged to the City of Riverside's Wastewater Treatment Plant located at the Regional Water Quality Control Plant. This topic requires additional analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR. This issue will be further evaluated in the EIR prepared for the proposed Project.

f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Potentially Significant Impact. The amount of solid waste generated during construction would be limited to excess construction debris, as the site is currently undeveloped. However, during operation, a maximum of 900 employees would be on site. Therefore, solid waste quantities would exceed the amount being generated currently on site. As such, impacts to solid waste are potentially significant, and this issue will be further evaluated in the EIR prepared for the proposed Project.

g) Would the project comply with federal, state, and local statutes and regulations related to solid waste?

Potentially Significant Impact. The analysis of the federal, state, and local statues and regulations related to solid waste, with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR. Therefore, the EIR prepared for the proposed

Project will identify the solid waste provider and discuss how that provider complies with federal, state, and location statutes regarding solid waste.

4.19 Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☒	☐	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Potentially Significant Impact. The Project site is currently undeveloped. A biological technical report is being prepared to identify whether the proposed Project would substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or an endangered plant or animal. A cultural resources report is also being prepared to evaluate whether the proposed Project would result in adverse impacts to cultural, archaeological, or paleontological resources. The analysis of the proposed Project's potential for environmental effects related

to biological and cultural resources, along with the potential for feasible mitigation measures, requires additional study and analysis and therefore is considered potentially significant until it can be analyzed fully in the EIR. These issues will be further evaluated in the EIR prepared for the proposed Project.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

Potentially Significant Impact. The proposed Project has the potential to result in significant impacts, and as such has the potential to result in and/or contribute to cumulatively significant impacts. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Potentially Significant Impact. Based on the analysis above, Project implementation could result in potentially significant adverse effects on human beings. The analysis of the proposed Project's potential for environmental effects that can cause substantial adverse effects on human beings requires additional study and therefore is considered potentially significant until it can be analyzed fully in the EIR. As such, this issue will be further evaluated in the EIR prepared for the proposed Project.

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5 REFERENCES AND PREPARERS

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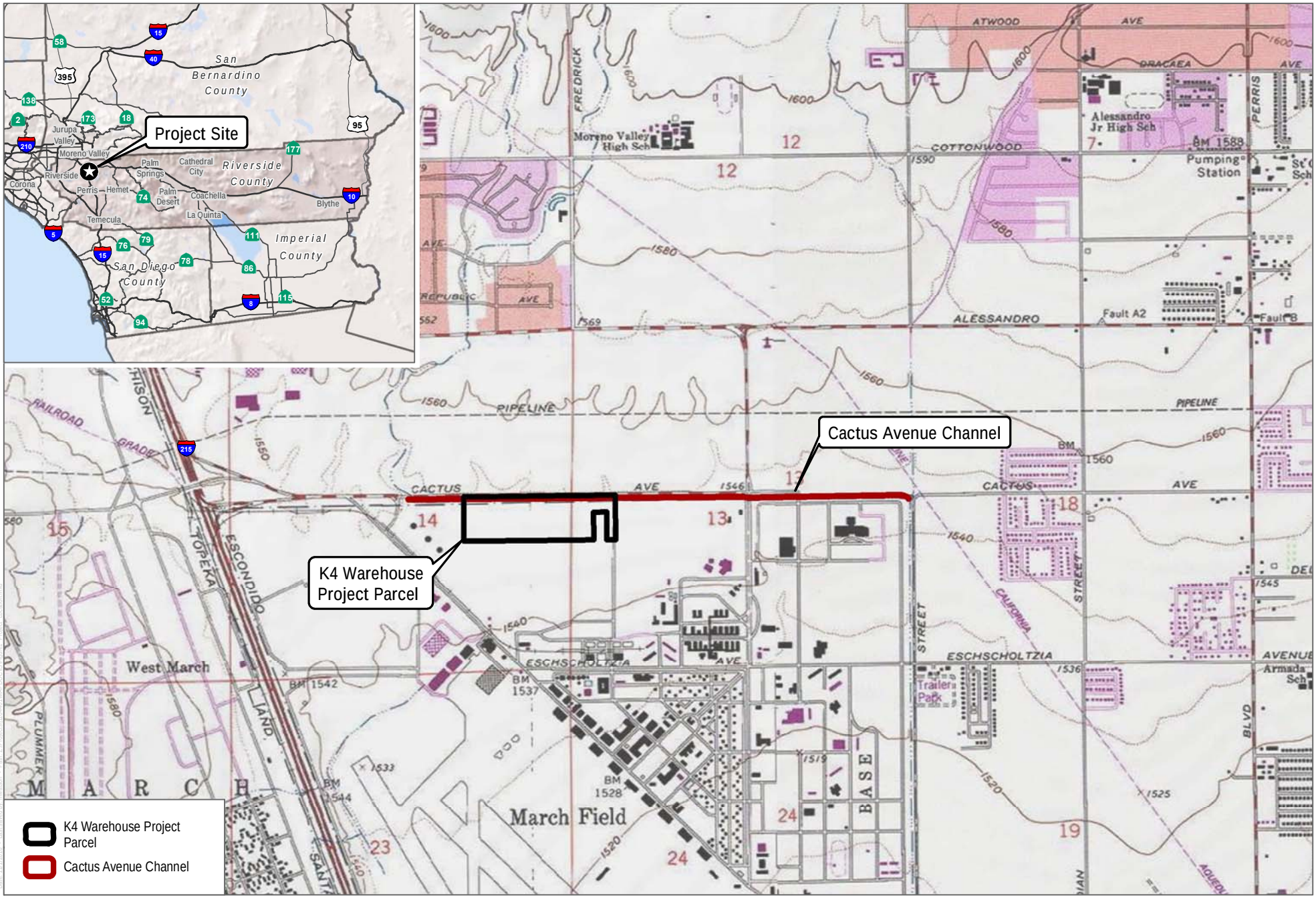
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5.2 List of Preparers

Nicole Cobleigh, Project Manager
Shannon Baer, Environmental Analyst



SOURCE: USGS 7.5-Minute Series Riverside East Quadrangle

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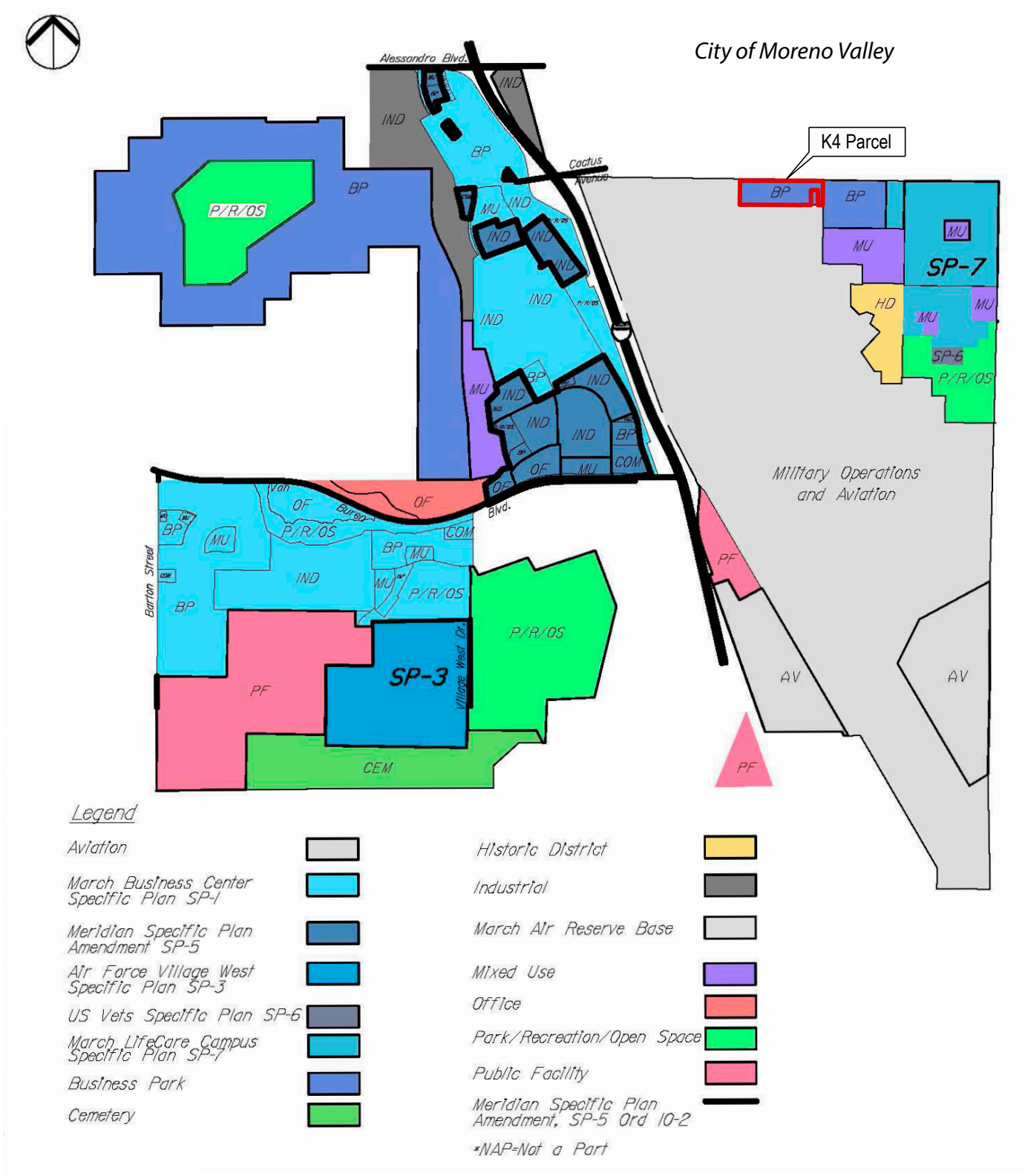
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FIGURE 1

Project Location

K4 and Cactus Channel Improvements Project Initial Study

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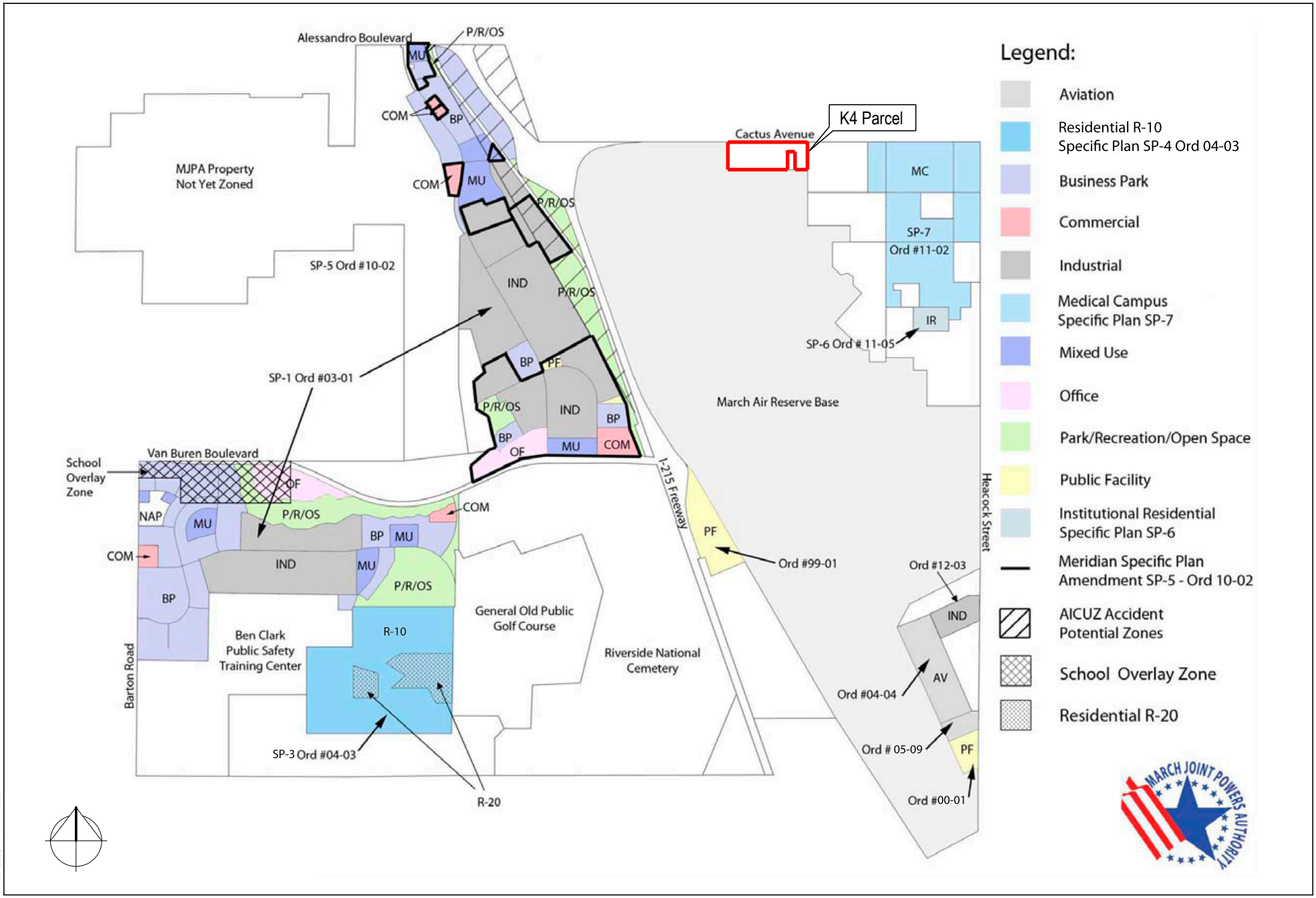
SOURCE: March Joint Powers Authority (2017-10-06)

FIGURE 2

March JPA General Plan Land Use Designations

K4 and Cactus Channel Improvements Project Initial Study

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SOURCE: March Joint Powers Authority (2014-03-24)

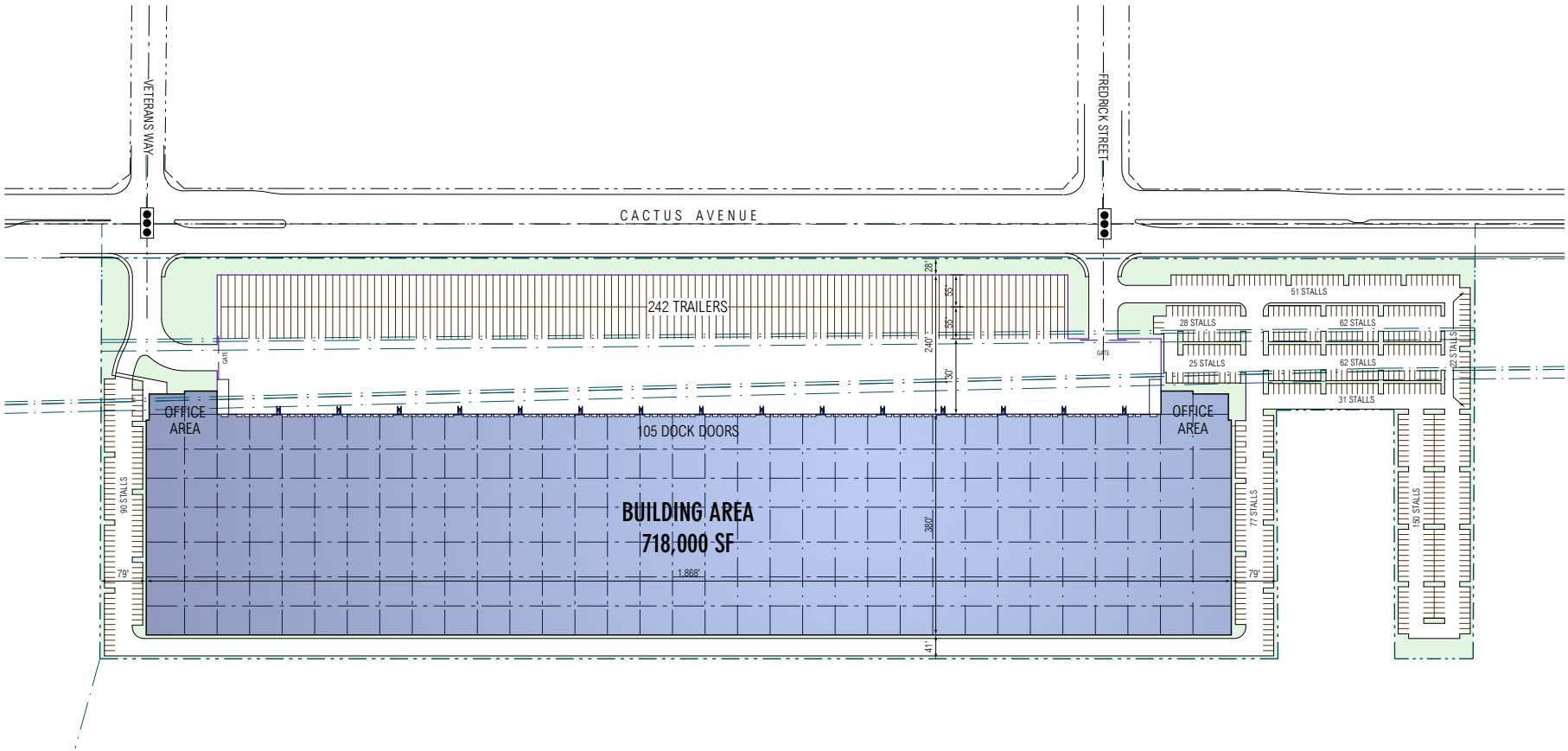
FIGURE 3

March JPA Zoning Designations

K4 and Cactus Channel Improvements Project Initial Study

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SOURCE: RGA 2018

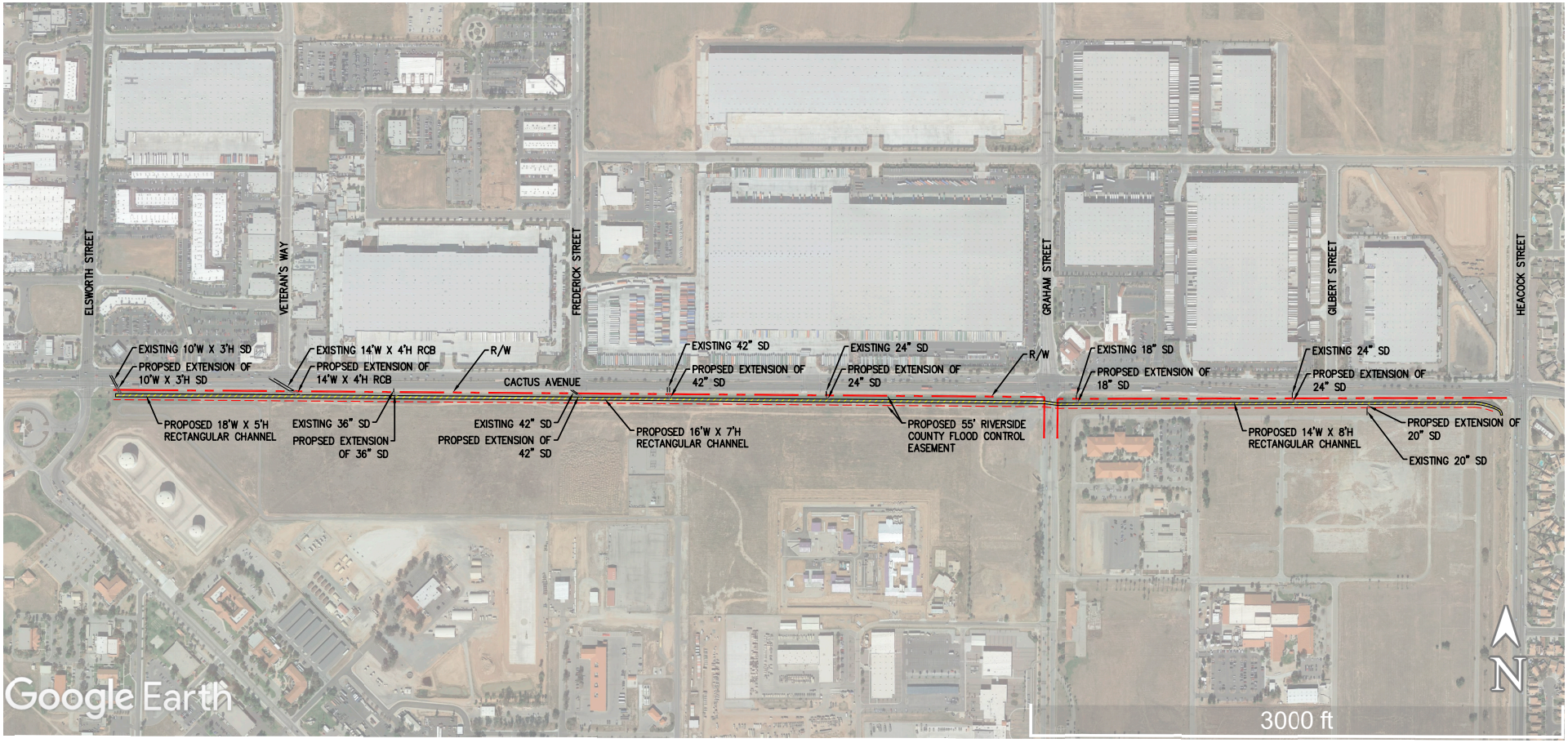
FIGURE 4

K4 Warehouse Site Plan

K4 and Cactus Channel Improvements Project Initial Study

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SOURCE: DRC Engineering 2018

FIGURE 5

Cactus Channel Overview

K4 and Cactus Channel Improvements Project Initial Study

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APPENDIX A

Geotechnical Investigation

APPENDIX B

Phase I
Environmental Site Assessment

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WESTERN MUNICIPAL WATER DISTRICT

Securing Your Water Supply

December 3, 2018

Matthew Evans
Planning Director
March Joint Powers Authority
14205 Meridian Parkway, Suite 140
Riverside, CA 92518

CONDITIONS OF APPROVAL FOR K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

Thank you for giving Western Municipal Water District (Western) the opportunity to review the initial study for K4 and Cactus Channel Improvements project. We have completed our review and have the following conditional approval for the K4 project:

1. Compliance with water efficient landscape requirements per the March Joint Powers Authority Ordinance is required.

2. All applicable Added Facilities Charges (for water facilities), Sewer Connection Fees, and Meter Installation Fees must be paid as well as Cross Connection Testing, and regulatory compliance approved prior to the installation of any water meter.

3. Proposed facilities for water and sewer must be designed by a registered Civil Engineer, and reviewed and approved by Western. Deposit for Plan Check must be received prior to plan submittal and Deposit for Inspection must be submitted to Western prior to approval of the plans.

4. Western, as a member agency of Metropolitan Water District of Southern California (MWD) will enforce MWD's Plan for Water Use Efficiency Guideline requirements for water conservation.

5. The project site is currently undeveloped and it is not connected to a water and sewer system. As such, project implementation would require the construction of new water and sewer pipelines from Riverside Avenue along Cactus Avenue to provide adequate capacity to serve the K4 warehouse development. A water and sewer study needs to be prepared by the developer to address on-site and off-site improvements. In addition the interconnection between Western and Eastern

Municipal Water District (EMWD) must be constructed prior to connecting the system to the water pipeline. Water service to K4 will be via Western pipes extended to the parcel by off-site developer paid design and construction.

6. The Channel Improvements shall be made in such a way to avoid conflicts with the approved plans for the construction of interconnection PRV vale and appurtenances between EMWD and Western. The Channel box culvert or pipe must be designed and constructed such that it is not an obstacle to existing or planned sanitary sewer or potable water service laterals.

7. Prior to issuance of will-serve letter, water and sewer study shall be completed. A water supply assessment shall also be completed and approved by Western.

8. Developer shall submit a detailed engineer's construction cost estimate to Western for review and approval. Once approved, developer shall make a deposit for plan checking services for Water, Sewer and/or Recycled Water Improvement Plans.

9. Water, Sewer and/or Recycled Water Improvement Plans shall be designed per Western's Standard Specifications. Please review Western's Developer Handbook for submittal formats and requirements online at:

   http://www.wmwd.com/162/Developer-Handbook

10. Water, Sewer and Recycled Water Commercial Plans for connections only shall be designed per Western's Standards and Specifications. Please review Western's Commercial Plan Check Package for submittal formats and requirements online at:

    http://www.wmwd.com/DocumentCenter/Home/View/237

11. Developer shall submit grading plans for Western's review and approval before a grading permit is issued.

12. Water, Sewer and/or Recycled Water Improvement Plans or Commercial Plans shall not be approved until all items mentioned above are received and approved by Western.

13. The developer is responsible for installing, paying all costs, and obtaining an encroachment permit from the local jurisdiction having authority over installation of water, sewer and/or recycled water facilities including laterals in the public right-of-way. If the customer chooses to cross private property then the customer is responsible to obtain private easements from adjacent property owners. Proof of an officially recorded private easement must be provided to Western prior to plan approval.

14. For water, sewer and/or recycled water service by Western, the developer shall comply with the "Standard Conditions," and all applicable Rules, Regulations, and General Policies of Western at the time of construction.

15. Modify Section 4.18, Paragraph e, page 59 of the draft initial study to read, wastewater generated would be treated by Western.

16. Contact Western's Development Services Department at (951) 571-7100 for further information.

Thank you for giving Western the opportunity to submit these items as part of the study.

DEREK E. KAWAII, P.E.
Director of Engineering

DEK:hj:sc

South Coast
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SENT VIA USPS AND E-MAIL: December 7, 2018

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Notice of Preparation of a Draft Environmental Impact Report for the K4 and Cactus Channel Improvements Project[1]

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document. SCAQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (EIR). Please send SCAQMD a copy of the Draft EIR upon its completion. Note that copies of the Draft EIR that are submitted to the State Clearinghouse are not forwarded to SCAQMD. Please forward a copy of the Draft EIR directly to SCAQMD at the address shown in the letterhead. **In addition, please send with the Draft EIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files**[2]**. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, SCAQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from SCAQMD's Subscription Services Department by calling (909) 396-3720. More guidance developed since this Handbook is also available on SCAQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). SCAQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

SCAQMD has also developed both regional and localized significance thresholds. SCAQMD staff requests that the Lead Agency quantify criteria pollutant emissions and compare the results to

[1] The Proposed Project would include construction of a 718,000-square-foot warehouse on 35.4 acres.
[2] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

SCAQMD's CEQA regional pollutant emissions significance thresholds to determine air quality impacts. SCAQMD's CEQA regional pollutant emissions significance thresholds can be found here: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. In addition to analyzing regional air quality impacts, SCAQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LSTs can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the Proposed Project, it is recommended that the Lead Agency perform a localized analysis by either using the LSTs developed by SCAQMD staff or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis.

In the event that the Proposed Project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

In addition, guidance on siting incompatible land uses (such as placing homes near freeways) can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. Guidance[3] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

SCAQMD Staff's Recommendation for Truck Trip Rates for High Cube Warehouse Projects

SCAQMD staff recommends the use of truck trip rates from the Institute of Transportation Engineers (ITE) for high cube warehouse projects located in SCAQMD (i.e. 1.68 average daily vehicle trips per 1,000 square feet and 0.64 average daily truck trips per 1,000 square feet). Consistent with CEQA Guidelines, the Draft EIR for the Proposed Project may use a non-default trip rate if there is substantial evidence supporting another rate is more appropriate for the air quality analysis.

[3] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

For high cube warehouse projects, SCAQMD staff has been working on a Warehouse Truck Trip Study to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. Details regarding this study can be found online here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/high-cube-warehouse.

Mitigation Measures

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project, including:

- Chapter 11 of SCAQMD's CEQA Air Quality Handbook
- SCAQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- SCAQMD's Mitigation Monitoring and Reporting Plan (MMRP) for the 2016 Air Quality Management Plan (2016 AQMP) available here (starting on page 86): http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2017/2017-mar3-035.pdf
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Additional mitigation measures for operational air quality impacts from mobile sources that the Lead Agency should consider in the Draft EIR may include the following:

- Require zero-emissions or near-zero emission trucks, if and when feasible. Consider measures such as incentives, phase-in schedules for clean trucks, etc. At a minimum, require that the operator commit to using 2010 model year and newer trucks (e.g., material delivery trucks and soil import/export)[4].
- Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.
- Limit the daily number of trucks allowed at the Proposed Project to levels analyzed in the CEQA document. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the Proposed Project through CEQA prior to allowing this land use or higher activity level.
- Provide electric vehicle (EV) Charging Stations (see the discussion below regarding EV charging stations).
- Should the Proposed Project generate significant regional emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in health risks, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Final CEQA document, the Lead

[4] Based on a review of the California Air Resources Board's diesel truck regulations, 2010 model year diesel haul trucks should have already been available and can be obtained in a successful manner for the project construction California Air Resources Board. March 2016. Available at: http://www.truckload.org/tca/files/ccLibraryFiles/Filename/000000003422/California-Clean-Truck-and-Trailer-Update.pdf (See slide #23).

Agency should require a phase-in schedule for these cleaner operating trucks to reduce any significant adverse air quality impacts. SCAQMD staff is available to discuss the availability of current and upcoming truck technologies and incentive programs with the Lead Agency.

- Trucks that can operate at least partially on electricity have the ability to substantially reduce the significant NOx impacts from this project. Further, trucks that run at least partially on electricity are projected to become available during the life of the project as discussed in the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy (2016-2040 RTP/SCS)[5]. It is important to make this electrical infrastructure available when the project is built so that it is ready when this technology becomes commercially available. The cost of installing electrical charging equipment onsite is significantly cheaper if completed when the project is built compared to retrofitting an existing building. Therefore, SCAQMD staff recommends the Lead Agency require the Proposed Project and other plan areas that allow truck parking to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in. Similar to the City of Los Angeles requirements for all new projects, SCAQMD staff recommends that the Lead Agency require at least 5% of all vehicle parking spaces (including for trucks) include EV charging stations[6]. Further, electrical hookups should be provided at the onsite truck stop for truckers to plug in any onboard auxiliary equipment. At a minimum, electrical panels should be appropriately sized to allow for future expanded use.
- Design the industrial building such that entrances and exits are such that trucks are not traversing past neighbors or other sensitive receptors.
- Design the industrial building such that any check-in point for trucks is well inside the Proposed Project site to ensure that there are no trucks queuing outside of the facility.
- Design the industrial building to ensure that truck traffic within the Proposed Project site is located away from the property line(s) closest to its residential or sensitive receptor neighbors.
- Restrict overnight parking in residential areas.
- Establish overnight parking within the industrial building where trucks can rest overnight.
- Establish area(s) within the Proposed Project site for repair needs.
- Develop, adopt and enforce truck routes both in and out of city, and in and out of facilities.
- Create a buffer zone of at least 300 meters (roughly 1,000 feet), which can be office space, employee parking, greenbelt, etc. between the Proposed Project and sensitive receptors.

Additional mitigation measures for operational air quality impacts from other area sources that the Lead Agency should consider in the Draft EIR may include the following:

- Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on the building roofs and/or on the Project site to generate solar energy for the facility.
- Maximize the planting of trees in landscaping and parking lots.
- Use light colored paving and roofing materials.
- Utilize only Energy Star heating, cooling, and lighting devices, and appliances.
- Install light colored "cool" roofs and cool pavements.
- Require use of electric or alternatively fueled sweepers with HEPA filters.
- Use of water-based or low VOC cleaning products.

[5] Southern California Association of Governments. Accessed at: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx.
[6] City of Los Angeles. Accessed at: http://ladbs.org/LADBSWeb/LADBS_Forms/Publications/LAGreenBuildingCodeOrdinance.pdf.

Alternatives

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires the consideration and discussion of alternatives to the project or its location which are capable of avoiding or substantially lessening any of the significant effects of the project. The discussion of a reasonable range of potentially feasible alternatives, including a "no project" alternative, is intended to foster informed decision-making and public participation. Pursuant to CEQA Guidelines Section 15126.6(d), the Draft EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project.

Permits

In the event that the Proposed Project requires a permit from SCAQMD, SCAQMD should be identified as Responsible Agency for the Proposed Project in the Draft EIR. For more information on permits, please visit SCAQMD webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to SCAQMD's Engineering and Permitting staff at (909) 396-3385.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available at SCAQMD's webpage at: http://www.aqmd.gov.

SCAQMD staff is available to work with the Lead Agency to ensure that project air quality impacts are accurately evaluated and any significant impacts are mitigated where feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov or call me at (909) 396-3308.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
RVC181127-07
Control Number

Nicole Cobleigh

From: Mathew Evans <evans@marchjpa.com>
Sent: Tuesday, January 15, 2019 5:19 PM
To: Nicole Cobleigh
Cc: Danielle Griffith
Subject: FW: "K4 and Cactus Channel Improvements Project - EIR"

FYI – Comments (late) from Moreno Valley.

From: Claudia Manrique <claudiam@moval.org>
Sent: Tuesday, January 15, 2019 9:20 AM
To: Mathew Evans <evans@marchjpa.com>
Subject: "K4 and Cactus Channel Improvements Project - EIR"

Dear Mr. Evans:

The City of Moreno Valley appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the proposed industrial warehouse project. The notice describes the proposal as the development of 718,000 square feet of industrial/warehouse buildings on approximately 35 acres along with improvements to the neighboring Cactus Channel drainage ditch. The proposed project's close proximity to Moreno Valley gives us keen interest in the project to ensure it is successful without causing adverse impacts to Moreno Valley.

In reviewing the Notice of Preparation of a DEIR and related Initial Study, we have the following comments for your consideration:

- The City of Moreno Valley is concerned that the proposed zone change to allow for a 718,000 square foot industrial building is more intensive than the current land use designation of Business Park. The land use change and the corresponding development would likely create increased intensity and environmental concern, including increased truck traffic and air quality impacts to the area and adjacent City of Moreno Valley roadways; these impacts should be addressed in the environmental document.

- Cumulative impacts of the project shall be considered along with other recently approved industrial projects and other projects under consideration in the vicinity, including the approximately 700,000 square foot logistics warehouse building proposed southwesterly of Alessandro Boulevard and the Old 215 Frontage Road within the March Joint Powers Authority area.

- The City of Moreno Valley requests that project plans be provided for review when complete. A full set of project plans including the site plan and building elevations should be provided in both hard copy and electronic format for ease of review and distribution to other City staff.

- The City of Moreno has concerns regarding existing drainage and infrastructure on Cactus Avenue adjacent to the project site. Include information in the DEIR and corresponding Drainage Study demonstrating that the project would not further be impacting drainage for the area, including properties to the south of the project site located in the City of Moreno Valley.

- General transportation impacts would need to be reviewed in the future environmental document. A traffic study should be prepared that analyzes project access and traffic operations at adjacent and nearby intersections. Information shall include the number of trucks/vehicles generated by the project, any proposed bicycle lanes and bus or shuttle connections provided to service the Metrolink Station located westerly of Interstate 215. The City of Moreno Valley requests an opportunity to review the draft traffic study when complete.

- With the proposed project's close proximity to the City of Moreno Valley and prominent location close to a major entry point into the City of Moreno Valley, it is important that the project is compatible with surrounding land uses and design along Cactus Avenue. All four sides of the project building elevations should be addressed, and color elevations that depict actual paint selection colors for all proposed buildings should be provided for review.

- The project and associated DEIR should address roof top equipment screening from the Cactus Avenue right of way and the adjacent City of Moreno Valley.

- With the location of the proposed project adjacent to the City, project landscaping must be compatible with the aesthetic character of the area. Landscapes and streetscapes shall be compatible to developments adjacent in the City of Moreno Valley. The City has designated the African Sumac/*Rhus lancea* as the street tree for Cactus Avenue. Conceptual landscape plans would be necessary to determine the type of landscape and street trees provided. The City of Moreno Valley would encourage coordination with your staff on the landscape plan to ensure a unified streetscape.

- Site Plan details are not specifically provided with the NOP submittal. Project details should include decorative screen walls for all loading areas adjacent to Cactus Avenue, with details providing information including height, design and color. A sight line distance exhibit should be provided to determine the height of the walls provided for full screening of any truck loading and trailer storage areas from the right of way and the City of Moreno Valley. Consistent with the City of Moreno Valley Municipal Code, decorative screening walls with pilasters equal in height to or exceeding a truck trailer and compatible with design/colors of the proposed buildings would be recommended. The City of Moreno Valley would encourage coordination with City staff on all proposed screening walls to ensure a unified streetscape.

- It is recommended that project conditions of approval identify the need to ensure that graffiti abatement will occur on any exposed perimeter walls.

- Initial Study Page 40, Sections 4.9 g, h, i shows no impact due to flooding. Per FEMA FIRM 06065C0745G dated 8/28/08, the project site falls within Zone D (flood hazards undetermined, but possible). As part of the project development, the base flood elevation should be determined and a CLOMR/LOMR should be submitted to FEMA for review and approval.

- Initial Study Figure 5 shows Cactus Channel as a proposed rectangular channel. Per the project description, Cactus Channel is proposed as a box culvert. Documents within the EIR should be consistent on what is being proposed for the channel. Furthermore, the study area limits of the EIR should extend to cover the entire reach of the proposed Cactus Channel improvements, not just limited to the project's frontage along Cactus Avenue.

- The City of Moreno Valley Noise Ordinance should be addressed in the Noise analysis in addition to MJPA Noise regulations.

- The project and associated DEIR should address required street lighting on the south side of Cactus Ave.

- The project and associated DEIR should address requirements to repair any damage made to existing landscape areas maintained by the City.

- The project and associated DEIR should address bringing existing median(s) up to current City Standards.

- The project and associated DEIR should address the need to enter into an agreement to fund the ongoing operation and maintenance for its share of street lighting costs and median landscape maintenance.

The City of Moreno Valley looks forward to working with the March Joint Powers Authority team as this project progresses through the environmental review process and prior to the public hearing. We respectfully request that the City of Moreno Valley receive copies of the appropriate environmental documents and all related technical studies when available. The City of Moreno Valley would also request early coordination and review of the site plan and other project components noted in this letter prior to public review. Please include the City on any future mailing lists regarding the DEIR documents as well as for future notification of meetings and public hearings associated with the project.

Thank you again for the opportunity to provide comments on the NOP. We look forward to working with you as the DEIR is being finalized and reviewing all environmental documents when complete.

Sincerely,

Claudia Manrique
Associate Planner
Community Development
City of Moreno Valley
p: 951.413.3225 | e: claudiam@moval.org w: www.moval.org
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Prepared for
K4 and Cactus Channel Improvement Project
Riverside County, California

Prepared by
Ramboll US Corporation
Irvine, California

Project Number
1690008459

Date
December 2018

AIR QUALITY TECHNICAL REPORT

K4 AND CACTUS CHANNEL IMPROVEMENT PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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RAMBOLL

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Appendix A: CalEEMod® Output Files

Appendix B: EMFAC2017 Model Outputs

Appendix C: Traffic Volumes at Affected Intersections

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ACC	Advanced Clean Cars
ADT	average daily traffic
AQMP	Air Quality Management Plan
ARB	Air Resources Board
BACT	Best Available Control Technology
CalEEMod®	California Emissions Estimator Model
CAAQS	California Ambient Air Quality Standards
CAP	criteria air pollutant
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CRRC	Cool Roof Rating Council
EIR	Environmental Impact Report
EMFAC	EMission FACtors model
EPA	Environmental Protection Agency
ES	Executive Summary
EV	electric vehicles
g/L	gram per liter
GHG	greenhouse gas
HI	hazard index
HVAC	Heating, Ventilation and Air Conditioning
JPA	Joint Powers Authority
LOS	Level of Service
LST	Localized Significance Threshold
NAAQS	National Ambient Air Quality Standards
NHTSA	National Highway Traffic Safety Administration
NO_2	Nitrogen Dioxide
NO_X	Oxides of Nitrogen
O_3	Ozone
PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 Microns in diameter

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ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

$PM_{2.5}$	Particulate Matter less than 2.5 Microns in diameter
ROG	reactive organic gasses
RTP	Regional Transportation Plan
SCS	Sustainable Communities Strategy
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Government
SCAQMD	South Coast Air Quality Management District
SCS	Sustainability Communities Strategy
SEER	Seasonal Energy Efficiency Ratio
SO_2	Sulfur Dioxide
SO_x	Sulfur Oxides
SRA	Source Receptor Area
TAC	Toxic Air Contaminants
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

K4 and Cactus Channel Improvement Project proposes a warehouse for industrial use in Riverside County, California, known as the K4 Parcel Project (the Project). The Project is an approximately 718,000 square feet building on an approximately 35.4-acre site that includes surface parking areas for automobiles and truck trailers, and a 7.0-acre drainage channel (Cactus Avenue Channel) bordering the parcel to the north (south side of Cactus Avenue). The warehouse development will be used up to 7 days per week and 24 hours per day. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site.

The Project will result in emissions of criteria air pollutants, such as nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOCs), sulfur oxides (SO_X), and particulate matter (PM) of aerodynamic radius less than 10 micrometers (PM_{10}) or less than 2.5 micrometers ($PM_{2.5}$). This report provides an inventory surveying the emissions that would result from the Project.

This analysis primarily utilized the California Emission Estimator Model version 2016.3.2 (CalEEMod®)[1] to assist in quantifying the criteria air pollutant emissions for both construction and operation of the Project. CalEEMod® incorporates EMFAC2014 to calculate mobile source emissions. EMFAC2014 has been superseded by EMFAC2017.[2] In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology along with Project-specific values where available. The maximum daily emissions are estimated for the criteria air pollutants. The localized criteria air pollutant concentrations were evaluated using the mass-based Localized Significance Thresholds (LSTs) to evaluate ambient air impacts associated with construction and operation of the Project.

For construction, the maximum daily unmitigated criteria air pollutant emissions (lbs/day) are less than the South Coast Air Quality Air Management District (SCAQMD) CEQA significance thresholds for CO, SO_x, PM_{10} and $PM_{2.5}$, and greater than the significance thresholds for VOC and NO_X as shown in **Table ES-1**. The unmitigated NO_X emissions are estimated to exceed the significance threshold during construction due to a combination of haul truck activities and the operation of on-site construction equipment during the grading phase. The unmitigated VOC emissions are estimated to exceed the significance threshold during construction primarily due to the use of architectural coatings. The Project will comply with SCAQMD Rule 403 to minimize fugitive dust during construction.[3] The Project will mitigate the VOC emissions by utilizing Super Compliant coatings with a VOC content less than 10

[1] California Air Pollution Control Officers Association (CAPCOA). 2017. California Emissions Estimator Model. Available at: http://www.CalEEMod.com/. Accessed: August 2018.

[2] EMFAC2017 was initially released by the California Air Resources Board (CARB), which establishes California's air quality regulations, on December 22, 2017 and then updated on March 1, 2017. USEPA is currently reviewing this model to determine if it can be used in State Implementation Plans and conformity modeling. Since this report has been prepared for CEQA purposes, and CEQA is a state regulation, EMFAC2017 (the most current version of the model released by CARB) was used.

[3] SCAQMD. 2005. Rule 403. Fugitive Dust. Available at: http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/rule-403.pdf. Accessed: August 2018.

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grams per liter (g/L) VOC[4] to reduce VOC emissions to below the applicable significance threshold as shown in **Table ES-1**. The Project has also committed to use 50% Tier 3 construction equipment and 50% Tier 4 equipment, based on number of pieces of construction equipment. This mitigation measure will reduce NO_X emissions to below the applicable significance threshold as shown in **Table ES-1**.

For operational emissions, the maximum daily criteria air pollutant emissions for the Project are estimated to be less than the significance thresholds for CO, SO_X, PM_{10}, $PM_{2.5}$, and VOC, and greater than the significance thresholds for NO_X as shown in **Tables ES-2**. The primary source of the operational emissions is the traffic related mobile sources. While the emissions from mobile sources are expected to decline in the future as vehicles are required to become more fuel efficient due to existing regulations (i.e., EPA and NHTSA Phase 1 and Phase 2 greenhouse gas emissions and fuel efficiency standards), this analysis conservatively does not incorporate reductions from these regulatory changes as the emission factors from EMFAC2017 do not account for the benefits from these regulatory programs for criteria pollutants. The Project will not exceed the CO hotspots significance thresholds at any intersection affected by the Project.

Localized air quality impacts of Project construction and operational activities were evaluated using SCAQMD's LST methodology. As shown in **Tables ES-3 and Table ES-4,** Project related emissions from on-site construction and operation would not result in an exceedance of SCAQMD LSTs for nitrogen dioxide (NO_2), CO, PM_{10}, and $PM_{2.5}$. Emissions from both the construction and operational activities were estimated based on conservative assumptions to represent the maximum level of activity that may occur on the Project Site. Furthermore, the LST analysis assumes that the maximum daily emissions would occur during the worst-case meteorological conditions, which is not likely.

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[4] SCAQMD. 2018. Super-Compliant Coating Manufacturers. Available at: http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/super-compliant-manf-list.pdf?sfvrsn=19. Accessed: August 2018.

1. INTRODUCTION

The purpose of this technical report is to present the quantitative analyses that were used to evaluate the Project's air quality impacts. Emissions during both construction and operations of the Project were quantified and compared to the South Coast Air Quality (SCAQMD) daily mass significance thresholds. In addition, on-site construction and operational emission estimates were used to evaluate ambient air impacts of the Project on the residences and sensitive receptors located in the vicinity of the Project.

1.1 Project Description

K4 and Cactus Channel Improvement Project (the Project) proposes an industrial use warehouse development in Riverside County, California. The Project is a building consisting of approximately 718,000 square feet on an approximately 35.4-acre site that includes surface parking areas for automobiles and truck trailers. The warehouse development will be used up to 7 days per week and 24 hours per day. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the Riverside County Flood Control District and Water Conservation District ("District") and it would either be constructed contemporaneously with the project or built separately depending on permitting and timing. The channel would function as part of the District's Master Plan and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site. The closest residential land uses are located approximately 0.5 miles to the north and southeast of the Project Site. The proposed Project area is shown in **Figure 1** and the land use summary is presented in **Table 1.**

Analysis of the Project's criteria air pollutant (CAP) emissions incorporates the following regulatory measures and mitigation measures.

Regulatory Measures

Construction

- Compliance with SCAQMD Rule 403 regarding fugitive dust. The analysis quantifies the emission reductions associated with of watering active construction areas at least twice daily to minimize fugitive dust emissions;[5]

[5] Note that the control efficiency of watering is dependent on numerous variables such as soil/ground conditions, temperature, and vehicle travel specifics. For unpaved roads, increased frequency and/or water amounts are expected to improve the control efficiency.

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– Compliance with SCAQMD Rule 1113 regarding Architectural Coatings. This rule limits the VOC content of architectural coatings used in the SCAQMD. The rule provides various standards for the coating category;[6]

Operational

– Compliance with the California Energy Commission's (CEC) 2016 Building Energy Efficiency Standards (Title 24) are included in the energy use and emissions estimate for the Project.

Mitigation Measures

This Section provides a list of mitigation measures MM-AQ-1 through MM-AQ-8 that would help reduce CAP and greenhouse gas (GHG) emissions associated with the Project construction and operation. As a conservative approach, the reductions from MM-AQ-3, MM-AQ-4, MM-AQ-5, and MM-AQ-6 were not quantified due to the lack of clarity on the quantity of reductions associated with these mitigation measures.

MM-AQ-1 (Construction Equipment Emission Standards): During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the United States Environmental Protection Agency (USEPA). In addition, the construction contractor shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment.

MM-AQ-2 (Low-VOC Architectural Coatings): The construction contractor shall be required to utilize Super-Compliant VOC interior and exterior paints, which are defined by SCAQMD as meeting the "super-compliant" VOC standard of 10 grams per liter (g/L), during construction and long-term operations.[7]

MM-AQ-3 (Construction Relations Officer): The Project will provide a construction relations officer to act as a community liaison to oversee on-site construction activity and all emissions and congestion related matters. A phone number and email contact information for the construction relations officer shall be posted on signage at construction site entrance points.

MM-AQ-4 (Improved Energy Efficiency and Water Reduction):

- The Project will install approximately 4.5 MW of solar photovoltaic electricity generation.
- The Project will install Energy Star certified light bulb and lighting fixtures.
- The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation as required by 2016 Title 24 and consistent with the Riverside County Climate Action Plan criteria.
- Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof, defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of HVAC equipment with a

[6] Available at: http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf. Accessed: August 2018.

[7] SCAQMD. Super-Compliant Architectural Coatings. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings. Accessed: August 2018.

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SEER of 14 or higher; Installation of water heaters with an energy factor of .92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project.

- The Project will provide electrical outlets at building exterior areas.
- The Project landscape non-potable water system will meet "purple" pipe standards.
- The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers.
- The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations.

MM-AQ-5 (Commute Trip Reduction):

- Five percent (5%) of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools.
- Tenants with more than 10,000 square feet of office space shall provide video conferencing facilities. Tenant spaces below 10,000 square feet may pursue video conferencing as feasible.
- The Project will provide plentiful short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces).
- The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80-employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).
- Each tenant will provide on-site food vending machines or refrigerator, microwave oven, and mail facilities (i.e., drop box) at the Project site. Each tenant with over 5,000 square feet of office space shall provide an on-site computer, internet connection, and other services for personal employee use. Projects will also consider the provision of an ATM machine as feasible.

MM-AQ-6 (Truck Requirements):

- For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks.[8] The March JPA will require evidence of compliance prior to issuance of a certificate of occupancy for any warehouse use.

[8] USEPA, SmartWay Basic Information. Available: http://www3.epa.gov/smartway/about/. Accessed: August 2018.

Regulatory Measures – Non-quantified Reductions

A few regulations adopted on the federal and/or state level were not incorporated due to the difficulty in quantifying the CAP reductions. They are:

- Phase 1 of the Heavy-duty Engines and Vehicles Fuel Efficiency Standards adopted by the United States Environmental Protection Agency (USEPA) and the National Highway Traffic Safety Administration (NHTSA) for model year 2014-2018.
- Phase 2 of the Heavy-duty Engines and Vehicles Fuel Efficiency Standards adopted by the USEPA and the NHTSA for model year 2018-2027.

Incorporating these regulations would further reduce the Project's emissions.

1.2 Existing Conditions

As noted above, the Project site is currently vacant land. The plot of land is located with a United States Air Force base to the south and an industrial area to the north.

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2. SIGNIFICANCE THRESHOLDS

The Project is located in Riverside County and is; therefore, required to comply with the policies in the Riverside General Plan. The Riverside General Plan requires compliance with SCAQMD regulations and thresholds.[9] The SCAQMD has established significance thresholds[10] to assess the impacts of project-related construction and operational emissions on regional and local ambient air quality. **Table 2** shows the mass daily thresholds for construction and operations as adopted by the SCAQMD for criteria air pollutant emissions. The analysis summarized in this report estimates project-related construction and operational mass emissions and compares the emissions to these mass daily significance thresholds. This report also evaluates the localized ambient air quality impacts from on-site construction and operation activities for NO_2, CO, PM_{10}, and $PM_{2.5}$ emissions using SCAQMD's LST methodology.[11] If emission estimates for the proposed project activities are below the LST emission levels found in the LST mass look-up tables, the proposed construction or operational activity is not significant for air quality. The LST emission levels are presented in **Table 2**.

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[9] Riverside County Planning Department. 2018. Riverside County General Plan. July. Available at: https://planning.rctlma.org/ZoningInformation/GeneralPlan.aspx. Accessed: November 2018.

[10] SCAQMD. 2015. Air Quality Significance Thresholds. March. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

[11] SCAQMD. 2008. Final LST Methodology Document. Available at: http://www.aqmd.gov/ceqa/handbook/lst/lst.html. Accessed: August 2018.

3. CRITERIA AIR POLLUTANT EMISSION INVENTORIES

This section describes the methodology that Ramboll US Corporation (Ramboll) used to develop the criteria air pollutant emissions inventories associated with the Project, which include construction emissions and operational emissions. Sub-categories of the operational emissions include: area sources, energy use, and mobile sources.

3.1 Methodology for Calculating Mass Emissions

This analysis focuses on the potential change in air quality due to implementation of the Project. The Project would result in criteria air pollutant emissions from construction and operational sources. Construction activities would generate emissions at the site from on-site construction equipment, and on roadways resulting from construction-related truck hauling, vendor deliveries, and worker commuting. Operational activities would also generate emissions from both on-site and off-site sources, including worker commuting, truck traffic, truck idling, and area sources, such as architectural coating and landscaping.

To estimate the criteria air pollutant emissions from the Project, Ramboll directly or indirectly relied primarily on emissions estimation guidance from government-sponsored organizations, Project specific resource management studies (e.g., Traffic Impact Analysis), and emission estimation software.

CalEEMod®

Ramboll primarily utilized the California Emission Estimator Model version 2016.3.2 (CalEEMod®)[12] to assist in quantifying the criteria air pollutant emissions in the inventories presented in this report for the Project. CalEEMod® is a state-wide program designed to calculate both criteria and greenhouse gas (GHG) emissions from development projects in California.

CalEEMod® is based upon California Air Resources Board (ARB) approved Off-Road and On-Road Mobile-Source Emission Factor models (OFFROAD and EMFAC, respectively), and is designed to estimate construction and operational emissions for land use development projects and allows for the input of project specific information. OFFROAD2011[13] is an emissions factor model used in CalEEMod® to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment). EMFAC2014[14] is the emissions factor model used in CalEEMod® to calculate emissions rates from on-road vehicles (e.g., passenger vehicles, haul trucks). EMFAC2014 has been superseded by EMFAC2017. In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, operational mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology and defaults along with Project specific values where available.

[12] CAPCOA. 2017. California Emissions Estimator Model. Version 2016.3.2. Available at: http://www.caleemod.com/. Accessed: August 2018.

[13] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 7. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: July 2018. Available at: https://www.arb.ca.gov/msei/offroad/pubs/offroad_overview.pdf. Accessed: August 2018.

[14] ARB. 2014. EMFAC2014 Volume I - User's Guide. Available at: https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol1-users-guide-052015.pdf. Accessed August 2018.

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CalEEMod® provides a simple platform to calculate both construction emissions and operational emissions from a land use project. It calculates both the maximum daily and annual average emissions for criteria air pollutants as well as total or annual GHG emissions. The model also provides default values for water and energy use.

CalEEMod® contains default values and existing regulation methodologies to use in each specific local air district regions. Appropriate state-wide default values can be utilized if regional default values are not defined. Ramboll used default factors for the Riverside County area that is within the SCAQMD jurisdiction for the emission inventory, unless otherwise noted in the methodology descriptions below. Details regarding the specific methodologies used by CalEEMod® can be found in the CalEEMod® User's Guide and associated appendices.[15] The CalEEMod® output files are provided for reference in **Appendix A** to this report.

3.2 Construction Emissions

This section describes the estimation of emissions from construction activities at the Project Site. The proposed plan for the Project anticipates that warehouse construction will occur across five phases, beginning in 2020. This analysis assumes construction begins in mid-2019. This is conservative, as emission factors improve in future years and; therefore, actual construction emissions will be lower than shown in this report. Construction for the Cactus Channel improvements could occur contemporaneously with the project or separately depending on permitting and timing. For purposes of this analyses we have conservatively assumed that construction associated with Cactus Channel would occur at the same time as the warehouse construction in 2019 and 2020.[16]

The major construction phases for the Project warehouse included in this analysis are:

- Site Preparation: involves clearing vegetation (grubbing and tree/stump removal) and stones prior to grading. It also involves some rough grading and utility installation.
- Grading: involves the cut and fill of land to ensure the proper base and slope for the construction foundation.
- Building Construction: involves the construction of structures and buildings.
- Architectural Coating: involves the application of coatings to both the interior and exterior of buildings or structures.
- Paving: involves the laying of concrete or asphalt such as in parking lots or roads.

There will not be a demolition phase for this development since the construction will occur on previously undeveloped land. Emissions from these construction phases are largely attributable to fuel use from construction equipment and workers commuting to the Project site.

The construction for Cactus Channel improvements is classified as site preparation in CalEEMod® and will include excavation and box culvert installation activities.

[15] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Version 2016.3.2. November. Available at: http://www.caleemod.com/. Accessed: August 2018.

[16] The emissions analysis assumed a construction start year of 2019; therefore, emissions presented in this report conservatively represent emissions for the actual construction in 2019 and 2020.

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Construction-related emissions of ROGs, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ were estimated using CalEEMod®. PM emissions are composed of exhaust emissions and fugitive emissions. Exhaust emissions are typically given out by a combustion engine of on-road vehicles and/or off-road equipment. Fugitive emissions are PM dust suspended in the air by wind action and construction related activities. Default on-site equipment lists in CalEEMod® supplemented with Project specific grading equipment were used for the various construction phases.

Ramboll's analysis was based on a mix of project specific estimates including the numbers and types of equipment that will be used in the construction of the Project as well as the duration of the different construction phases. The construction equipment parameters (horsepower, load factor, and hours of operation) and worker/vendor trip amounts were based on CalEEMod® default data. Vendor trips include vehicles such as water trucks and concrete trucks. The hauling trip amounts were estimated using project specific data for volume of soil imported/exported and the CalEEMod® default assumption for haul truck capacity of 16 cubic yards per truck. Worker and vendor trip distances are based on CalEEMod® default assumptions. The haul trip distance for the warehouse construction soil import is 3 miles, based on Project specific data. The haul trip distance for Cactus Channel construction soil export is based on CalEEMod® default assumptions. The Project area was assumed to be developed over a two-year time frame commencing in 2020. This analysis assumes construction begins in mid-2019. This is conservative, as emission factors improve in future years and; therefore, actual construction emissions will be lower than shown in this report. The construction schedule and equipment lists are shown in **Tables 3 and 4**, respectively. The CalEEMod® output files are i`ncluded in **Appendix A**.

3.2.1 Emissions from Construction Equipment

The emission calculations associated with construction equipment are from off-road equipment engine use based on the equipment list and phase length. The fugitive emissions from off-road equipment performing work are also included in this analysis.

Since the majority of the off-road construction equipment used for construction projects are diesel-fueled, CalEEMod® assumes all of the equipment operates on diesel fuel. The calculations associated with construction equipment include the running exhaust emissions from off-road equipment. Since the equipment is assumed to be diesel, there are no starting or evaporative emissions associated with the equipment as these are *de minimis* for diesel-fueled equipment. CalEEMod® calculates the exhaust emissions based on default values for horsepower and load factor from ARB's OFFROAD2011 model.[17]

CalEEMod® was also used to calculate fugitive dust associated with the site preparation and grading phases from three major activities: haul road grading, earth bulldozing, and truck loading. For fugitive dust calculations during grading and site preparation, the maximum number of acres graded in a day is determined by the number of grading equipment, which is assumed to operate for 8 hours. PM_{10} and $PM_{2.5}$ emissions from fugitive dust will be controlled by watering the construction site twice daily in accordance with the construction regulatory measures. CalEEMod® defaults assume watering the construction site twice a day reduces the fugitive dust emissions by 55%.

[17] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 32. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: August 2018.

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3.2.2 Emissions from On-Road Trips

Construction generates on-road vehicle exhaust (including evaporative emissions) and entrained road dust emissions from personal vehicles for worker/vendor commuting and trucks for soil/material hauling. These emissions are calculated in CalEEMod® based on the number of trips and vehicle miles traveled (VMT) along with emission factors from EMFAC2014. The numbers of worker and vendor trips represent defaults from CalEEMod® based on the construction equipment to be used. The number of haul trips was estimated based on the volume of soil to be imported (220,000 cubic yards) and exported (60,000 cubic yards) the CalEEMod® default assumption for haul truck capacity of 16 cubic yards per truck.

The mobile source emissions were calculated using trip rates and lengths, as well as emission factors from EMFAC2014 as outlined in the CalEEMod® user's guide.[18] Details regarding on-road trips generated during the construction phase are presented in **Table 5**.

3.2.3 Emissions from Architectural Coating

VOC or ROG off-gassing emissions result from evaporation of solvents contained in surface coatings, such as paint. CalEEMod® calculates the VOC evaporative emissions from application of residential and non-residential surface coatings.

Unmitigated emissions for coating categories were calculated based on default VOC content data from CalEEMod®, which was provided by the air districts, including SCAQMD where the Project would be located. The CalEEMod® default VOC content for SCAQMD is based on SCAQMD Rule 1113. Mitigated emissions reflect the use of Super Compliant coatings with a VOC content less than 10 g/L VOC (MM-AQ-2).[19]

3.2.4 Emissions from Paving

CalEEMod® estimates VOC off-gassing emissions associated with asphalt paving of parking lots.

3.2.5 Maximum Daily Emissions from Project Construction

The daily unmitigated and mitigated emissions estimated due to construction of the Project are summarized in **Tables 6a and 6b**, respectively. The estimated emissions show that the regional daily emissions for unmitigated construction are less than the SCAQMD mass daily significance thresholds for CO, SO_X, PM_{10}, and $PM_{2.5}$, and greater than the SCAQMD mass daily significance thresholds for VOC and NO_X. The Project will utilize Super Compliant coatings with a VOC content less than 10 g/L VOC[20] as a mitigation measure (MM-AQ-2) to reduce VOC emissions to below the applicable significance threshold as shown in **Table 6b**. The Project will also use Tier 3 equipment and up to 50% Tier 4 Final equipment as a mitigation measure (MM-AQ-1) to reduce NO_X emissions to below the applicable significance threshold as shown in **Table 6b**. Therefore, under the mitigated scenario, the project's construction impacts are all below SCAQMD mass daily significance thresholds for all pollutants.

[18] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 37. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: August 2018.

[19] SCAQMD. Super-Compliant Coating Manufacturers. Available at: http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/super-compliant-manf-list.pdf?sfvrsn=19. Accessed: August 2018.

[20] ibid.

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The construction emission estimates are assumed to conservatively represent the maximum emissions for the Project because the calculation accounts for the overlapping construction phases as discussed above. The maximum daily emissions are not expected to be higher than that estimated given the conservative assumptions included in this analysis.

3.3 Maximum Daily Emissions from Project Operation

Operational emissions are emissions that would occur after build-out of the Project. This analysis identifies operational emissions for source categories including area sources, energy use, and mobile sources. The criteria air pollutant operational mass emissions of VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ from area sources and energy use were estimated using CalEEMod®. The CalEEMod® output can be found in **Appendix A**. Mobile source emissions associated with employee commute and truck deliveries were estimated using project-specific traffic data and emission factors from EMFAC2017. There is no operational activity associated with the Cactus Channel, hence operational emissions are zero.

3.3.1 Area Sources

Area sources are those emissions that are generally too small to be uniquely identified as point sources, and are thus generally aggregated as a group. CalEEMod® estimates emissions for the following sources, which are included under the category of "area" sources: landscaping equipment (e.g., lawn mowers), consumer products, and architectural coatings. Criteria air pollutant emissions due to natural gas combustion in buildings, could also be considered area sources, but are reported by CalEEMod® in the emissions associated with building energy use (described below). The criteria air pollutant emissions generated by the Project were calculated using CalEEMod® defaults. Unmitigated and mitigated project area source emissions are presented in **Tables 7a and 7b**. Mitigated emissions reflect the use of Super Compliant coatings with a VOC content less than 10 g/L VOC[21] for architectural coatings (MM-AQ-2).

3.3.1.1 Landscaping Equipment

Landscape maintenance includes fuel combustion emissions from equipment such as lawnmowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. The mass emissions of VOC, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ associated with landscaping equipment were calculated using the CalEEMod® default emission factors (i.e., grams per square foot per day for non-residential buildings), which were processed using OFFROAD 2011 and ARB's Technical Memo: Change in Population and Activity Factors for Lawn and Garden Equipment.[22] Based on CalEEMod® defaults, all operational days (i.e., 250 days per year) were assumed to be summer days, with no snow days. Therefore, the emission factors were multiplied by the total building square footage and the number of summer days. Pieces of equipment that would typically be used in snow conditions, such as snow blowers, were assumed to have no operational days.

[21] SCAQMD. Super-Compliant Coating Manufacturers. Available at: http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/super-compliant-manf-list.pdf?sfvrsn=19. Accessed: August 2018.

[22] ARB. 2003. Change in Population and Activity Factors for Lawn and Garden Equipment. Available at: http://www.arb.ca.gov/msprog/offroad/sore/lawn-and-garden-activity.pdf. Accessed: August 2018.

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3.3.1.2 Consumer Products

Consumer products are chemically formulated products used by institutional consumers, including, but not limited to, detergents; cleaning compounds; polishes; floor finishes; lawn and garden products; disinfectants; sanitizers; aerosol paints; and automotive specialty products; but does not include other paint products, furniture coatings, or architectural coatings. SCAQMD did an evaluation of consumer product use compared to the total square footage of buildings using data from ARB consumer product Emission Inventory. VOC emissions from consumer product use were estimated based on the Project building area along with the default VOC emission rate in CalEEMod®[23] for Architectural Coatings.

VOC off-gassing emissions result from evaporation of solvents contained in surface coatings such as in paints and primers. The operational emission methodology for architectural coating is the same as the construction emission methodology. All land use buildings are assumed to be repainted at a rate of 10% of area per year, based on CalEEMod® default assumptions. Mitigated emissions reflect the use of Super Compliant coatings with a VOC content less than 10 g/L VOC (MM-AQ-2).[24]

3.3.2 Building Energy Use

Criteria air pollutants are emitted as a result of activities in buildings for which natural gas is typically used as an energy source. Combustion of any type of fuel emits criteria air pollutants directly into the atmosphere; when this occurs in a building, this is a direct emission source associated with that building. Unless otherwise noted, CalEEMod® default parameters were used. Climate zone 10, which best represents the County of Riverside, was selected based on the CalEEMod® forecast climate zone map. In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting.[25] The Project's criteria air pollutant emissions calculations reflect that the Project is meeting the 2016 Title 24 Part 6 Building Code[26] for nonresidential construction.

Tables 7a and 7b summarize the energy-related criteria air pollutant emissions for the Project.

3.3.3 Mobile Source Emissions

The criteria air pollutant emissions associated with on-road mobile sources are generated by employees and trucks visiting the proposed Project. The emissions associated with on-road mobile sources includes running and starting exhaust emissions, evaporative emissions, brake and tire wear, and entrained road dust. Starting and evaporative emissions are associated with the number of starts or time between vehicle uses and the assumptions used in determining these values are described below. All of the other emissions are dependent on VMT. Ramboll estimated traffic emissions using the trip rates specified in the Project's Traffic

[23] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 41. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: August 2018.

[24] SCAQMD. Super-Compliant Coating Manufacturers. Available at: http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/super-compliant-manf-list.pdf?sfvrsn=19. Accessed: August 2018.

[25] Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/. Accessed: August 2018.

[26] The Title 24 2016 Building Energy Efficiency Standards. Available at: http://www.energy.ca.gov/title24/2016standards. Accessed: August 2018.

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Impact Analysis[27] and trip length as noted below. Emission factors were obtained from EMFAC2017 for Riverside County. EMFAC2017 model outputs are included in **Appendix B**.

This analysis is based on EMFAC2017, which does not quantify CAP emission reductions from the EPA and NHTSA Phase 1 and Phase 2 Heavy-duty Engines and Vehicles Fuel Efficiency Standards. These standards are expected to reduce the emissions estimated from mobile sources. EMFAC2017 only accounts for reductions in GHG associated with these standards. Criteria air pollutant emissions from mobile sources are presented in **Tables 7a and 7b.**

3.3.3.1 Trip Rates

Trip rates are one factor used to calculate Project mobile source emissions. CalEEMod® relies upon trip generation rates by land use types and associated average trip length by trip type to estimate the criteria air pollutant emissions. Urban Crossroads provided trip rates for the Project, as presented in **Table 8.**[28]

3.3.3.2 Trip Length

Trip lengths are another factor used to calculate Project mobile source emissions. Total VMT by mobile sources is estimated as a product of trip rates and the average trip length. The default CalEEMod® trip length of 16.6 miles for commercial-work trips (i.e., trips made by someone who is employed by the commercial land use sector) for Riverside County located within SCAQMD jurisdiction were used for passenger vehicles that represent vehicles used by employees. The trip length for trucks was assumed to be 60 miles based on likely geographical travel by trucks in the South Coast Air Basin.[29, 30] The default commercial-nonwork trip length for trucks in CalEEMod® is 6.9 miles. Therefore, the use of a 60-mile trip length is conservative assumption. Trip lengths and total VMT are presented in **Table 9**.

3.3.3.3 Vehicle Fleet Mix

Vehicle fleet mix is another parameter used to estimate mobile source emissions from Project operation. Each vehicle type has a different emission factor for each pollutant, so CalEEMod® relies upon vehicle fleet mixes by land use type to estimate the criteria air pollutant emissions for each land use. The fleet mix for passenger vehicles was calculated based on the CalEEMod® default fleet mix for the Unrefrigerated Warehouse – No Rail land use in Riverside County (South Coast). Passenger vehicles represent vehicles used by employees to commute to work. The fleet mix for trucks was estimated based on trip rates from the Urban Crossroads Traffic Impact Analysis, with 2-axle trucks further distributed into LHD1 and LHD2 based on the ratio of their CalEEMod® defaults. The vehicle fleet mix is presented in **Table 10**.

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[27] Urban Crossroads. 2018. K4 Parcel Traffic Impact Analysis. July 20. Table 4-1 [Project Trip Generation Rates] and Table 4-2 [Project Trip Generation Summary].

[28] Urban Crossroads. 2018. K4 Parcel Traffic Impact Analysis. July 20. Table 4-1 [Project Trip Generation Rates] and Table 4-2 [Project Trip Generation Summary].

[29] Modular Logistics Center EIR, Technical Appendix B1. Available at: http://www.moval.org/cdd/pdfs/projects/mv-logistics/draft-eir.pdf. Accessed: September 2018.

[30] Integra Perris Distribution Center Project Draft EIR. Available at: http://www.cityofperris.org/departments/development/IntegraDistCenter/DEIRIntegraPerrisDistributionCenter0814.pdf. Accessed: September 2018.

3.3.3.4 Mobile Source Emission Factors

Emission factors were obtained from EMFAC2017 for Riverside County. The emission factors used to estimate mobile emissions from running exhaust, running losses, tire wear, and brake wear are presented in **Table 11.** These emission factors are on a "per mile" basis and thus the emissions were calculated by multiplying these factors by the estimated VMT for each vehicle type listed in **Table 9**. The emission factors for starting exhaust and non-running evaporative processes are presented in **Table 12**. These emission factors are on a "per trip" basis and thus the emissions were calculated by multiplying these factors by the estimated number of trips for each vehicle type listed in **Table 8**. The emission factors used to estimate criteria air pollutant emissions from truck idling are presented in **Table 13.** These emission factors are on a "per minute of idling" basis and thus the emissions were calculated by multiplying these factors by the estimated idle duration of 15 minutes per round trip (5 minutes at entry gate, 5 minutes at dock, and 5 minutes at exit gate) for each truck type.[31] Please note that the trip counts shown in **Table 8** are one-way trips; hence these trip counts were divided by two to estimate the number of round trips. Estimated emissions from entrained road dust are presented in **Table 14.** These emissions were calculated by first estimating entrained road dust emission factors for PM_{10} and $PM_{2.5}$ based on the methodology presented in the Paved Roads chapter of USEPA's AP-42 and then multiplying these emissions factors by the total VMT for passenger vehicles and trucks.[32] A summary of the estimated average daily criteria air pollutant emissions is presented in **Table 15**.

3.3.4 Operational Emissions Results

The mitigated and unmitigated maximum regional daily emissions estimated due to Project operations are summarized in **Tables 7a and 7b**. These emissions were estimated using the methodology described above. The estimated emissions sources include area sources (landscaping equipment, consumer products, and architectural coatings), building energy use, and mobile sources (vehicle trips for employee commute and truck deliveries). The primary source of the operational emissions are mobile sources for all pollutants except VOC, where both mobile sources and area sources are the primary contributors to the total emissions. The emissions from mobile sources are expected to gradually decline in the future, as cars become more fuel-efficient due to existing regulations (i.e., EPA and NHTSA Phase 1 and Phase 2 fuel efficiency standards).[33]

The estimated operational emissions show that regional operational maximum daily emissions for the Project in both the unmitigated and mitigated scenarios are less than the SCAQMD mass daily significance thresholds for all criteria air pollutants except NO_X. The primary source of NO_X emissions are mobile sources which include passenger vehicles and trucks. As stated in Section 1.1, the Project will implement a Commute Trip Reduction

[31] Idle duration at any one location is limited to 5 minutes, based on CARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://www.arb.ca.gov/regact/idling/idling.htm. Accessed: February 2019.

[32] United States Environmental Protection Agency. 2011. AP-42: Compilation of Air Emissions Factors. Chapter 13.2.1: Paved Roads. Page 4. January. Available at: https://www3.epa.gov/ttnchie1/ap42/ch13/final/c13s0201.pdf. Accessed: August 2018.

[33] This analysis is based on EMFAC2017, which does not quantify criteria air pollutant emission reductions from the fuel efficiency benefits of Phase 1 and Phase 2 of the Heavy-duty Engines and Vehicles Fuel Efficiency Standards. These standards are expected to reduce the emissions estimated from mobile sources. EMFAC2017 only accounts for reductions in GHG associated with these standards.

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Program under MM-AQ-5 which will help reduce NO_X emissions from passenger vehicles; however, these reductions would not reduce NO_X emissions to levels below the SCAQMD mass daily significance threshold. Mobile sources are regulated by California Air Resources Board (CARB) and EPA. As stated earlier emissions from these sources are expected to decline in the future, as mobile sources become more fuel-efficient due to existing regulation.

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4. LOCALIZED AMBIENT AIR QUALITY IMPACTS

4.1 Localized Significance Thresholds

As discussed in Section 2, LSTs are used to evaluate the localized ambient air quality impacts of on-site Project construction and operational activities. The on-site construction and operational emissions for NO_X, CO, PM_{10}, and $PM_{2.5}$ are compared to their respective LSTs as provided in Appendix C of SCAQMD's LST Methodology.[34] Based on the Project location, the applicable Source Receptor Area (SRA) was identified as SRA No. 23, Metropolitan Riverside County.[35] The thresholds were chosen assuming a Project site area of 5 acres for the total Project emissions (Cactus Channel and warehouse) and a Project site area of 1 acre for Cactus Channel. This is a conservative assumption since the Project site is approximately 35.4 acres and project activities would be spread out across the site and/or further from nearby receptors. The nearest receptor to the Project site is the March Air Reserve Base, located approximately 30 meters south of the site (**Figure 2**). Therefore, the thresholds for receptor distances of 25 meters for each pollutant were used.

Both the estimated maximum unmitigated and mitigated on-site daily emissions for construction are below the SCAQMD mass-rate LSTs for NO_X, CO, PM_{10}, and $PM_{2.5}$. The unmitigated and mitigated construction emissions are compared against the LSTs in **Tables 16a and 16b**. While the exact construction schedule and equipment mix may vary from the current analysis, the maximum daily emissions are not expected to be higher than that estimated, given the conservative assumptions included in this analysis. The unmitigated and mitigated operational emissions are compared against the LSTs in **Table 17**. As summarized in **Table 17**, the estimated operational emissions are also below the LSTs for NO_X, CO, PM_{10}, and $PM_{2.5}$ including the estimated LST related to the 1-hour federal NO_2 standard (0.100 parts per million [ppm]).[36] Since the screening analysis shows that operational and construction emissions are below the mass-rate LSTs, further air dispersion modeling was not required.

The construction emissions are based on conservative assumptions to represent the maximum level of construction activity that may occur on the Project site on a given day. Both the construction and operational LST analyses are based on the combination of maximum emissions that may occur with the worst-case meteorological conditions. Thus, these are conservatively high estimates and may never occur.

4.2 Localized Carbon Monoxide Impacts

Based on the analysis presented below, a CO "hot spots" analysis is not needed to determine whether the change in the level of service (LOS) of an intersection in the Project would have the potential to result in exceedances of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS).

[34] SCAQMD, 2008. Final Localized Significance Threshold Methodology. Appendix C. July. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/appendix-c-mass-rate-lst-look-up-tables.pdf?sfvrsn=2http://www.aqmd.gov/ceqa/handbook/lst/appC.pdf. Accessed: August 2018.

[35] ibid.

[36] The allowable emissions threshold for comparison to the federal NO_2 standard was calculated by scaling the NO_2 LST by the ratio of the federal to state 1-hour NO_2 standards (i.e., LST x [0.10/0.18]).

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It has long been recognized that CO exceedances are caused by vehicular emissions,[37] primarily when idling at intersections.[38, 39] Accordingly, vehicle emissions standards have become increasingly more stringent. Before the first vehicle emission regulations, cars in the 1950's were typically emitting about 87 grams of CO per mile.[40] Since the first regulation of CO emissions from vehicles (model year 1966) in California, vehicle emissions standards for CO applicable to light duty vehicles have decreased by 96% for automobiles,[41, 42] and new cold weather CO standards have been implemented, effective for the 1996 model year.[43] Currently, the CO standard in California is a maximum of 3.4 grams/mile for passenger cars (with provisions for certain cars to emit even less).[44] With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations in the SCAQMD have steadily declined.

The analysis prepared for CO attainment in the South Coast Air Basin (SCAB) by the SCAQMD can be used to assist in evaluating the potential for CO exceedances in the South Coast Air Basin. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan).[45] As discussed in the 1992 CO Plan, peak carbon monoxide concentrations in the South Coast Air Basin are due to unusual meteorological and topographical conditions, and not due to the impact of particular intersections. Considering the region's unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of 1992 CO Plan and subsequent plan updates and air quality management plans.

In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: Long Beach Blvd. and Imperial Highway (Lynwood); Wilshire Blvd. and Veteran Ave. (Westwood); Sunset Blvd. and Highland Ave. (Hollywood); and La Cienega Blvd. and Century Blvd. (Inglewood). These analyses did not predict a violation of CO standards. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which had a daily

[37] USEPA. 2010. Air Quality Criteria for Carbon Monoxide. EPA 600/P-099/001F. June. Available: http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=218686. Accessed: August 2018.

[38] SCAQMD. 1993. CEQA Air Quality Handbook. Section 4.5. April.

[39] SCAQMD. 2003. Air Quality Management Plan. August. Available at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/2003-aqmp. Accessed: August 2018.

[40] USEPA. Available at: https://www.epa.gov/air-pollution-transportation/timeline-major-accomplishments-transportation-air-pollution-and-climate. Accessed: August 2018.

[41] National Academy Board on Energy and Environmental Systems. 2008. Review of the 21st Century Truck Partnership. Appendix D: Vehicle Emission Regulations [excerpt from http://www.nap.edu/read/12258/chapter/13]. Accessed: August 2018.

[42] Kavanagh, Jason. 2008. Untangling U.S. Vehicle Emissions Regulations. Available at: http://www.edmunds.com/car-technology/untangling-us-vehicle-emissions-regulations.html. Accessed: August 2018.

[43] Title 13. California Code of Regulations. Section 1960.1(f)(2) [for 50,000 mile half-life]. Available at: https://govt.westlaw.com/calregs/Document/I6F63A8502DDD11E197D9B83B68A61150?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default). Accessed: August 2018.

[44] ARB. 2010. Available at: http://www.arb.ca.gov/msprog/levprog/cleandoc/ldtps_clean_complete_warranty_12-10.pdf. Accessed: May 2018.

[45] SCAQMD. 1992. Federal Attainment Plan for Carbon Monoxide.

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traffic volume of approximately 100,000 vehicles per day. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm[46]. The most recent three years (2014 through 2016) of background 1-hour CO concentrations in the project vicinity range from 1.7 to 2.5 ppm.[47] This indicates that the most stringent 1-hour CO standard (20.0 ppm) would likely not be exceeded until the daily traffic at the intersection exceeded more than 380,000 vehicles per day.[48] The Los Angeles County Metropolitan Transportation Authority evaluated the LOS in the vicinity of the Wilshire Blvd./Veteran Ave. intersection[49] and found it to be Level E at peak morning traffic and Level F at peak afternoon traffic.[50]

At buildout of the Project, the highest average daily trips at an intersection would be approximately 228,500 at the Trautwein Road/Alessandro Boulevard intersection, which is below the daily traffic volumes that would be expected to generate CO exceedances as evaluated in the 2003 AQMP. This daily trip estimate is based on the average daily traffic (ADT) rate conditions of the intersection. There is no reason unique to SCAB meteorology to conclude that the CO concentrations at the Trautwein Road/Alessandro Boulevard intersection would exceed the 1-hour CO standard if modeled in detail, based on the studies undertaken for the 2003 AQMP. The supporting data for this analysis is included in **Appendix C**.

4.3 Odors

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source, the wind speeds and direction, and the sensitivity of the receiving location each contribute to the intensity of the impact. While offensive odors rarely cause any physical harm, they can be unpleasant and cause distress among the public, and generate citizen complaints. According to the SCAQMD, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The Project does not include any uses identified by the SCAQMD as being associated with odors, and thus the Project does not anticipate any odor impacts.

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[46] It is conservatively assumed that 4.6 ppm does not account for background CO concentration.

[47] SCAQMD Historical Data by Year for Source/Receptor Area 23. Available at: https://www.aqmd.gov/home/air-quality/air-quality-data-studies/historical-data-by-year. Accessed: November 2018.

[48] Based on the ratio of the CO standard (20.0 ppm) minus background (2.5 ppm) and the modeled value (4.6 ppm).

[49] The Metropolitan Transportation Authority measured traffic volumes and calculated the LOS for the intersection Wilshire Blvd/Sepulveda Ave. which is a block west along Wilshire Blvd., still east of Highway 405.

[50] Metropolitan Transportation Authority. 2004. Congestion Management Program for Los Angeles County. Exhibit 2-6 and Appendix A. July 22.

5. CUMULATIVE ANALYSIS

The cumulative air quality impacts analysis is based on the guidance provided by SCAQMD.[51] "As Lead Agency, the [SCAQMD] uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."

5.1 Construction Impacts

As discussed above, if the Project exceeds the SCAQMD's recommended significance thresholds for project-specific construction air emissions, then the Project would have a cumulatively considerable increase in emissions for those pollutants.

Construction of the Project would generate VOC and NO_x emissions that would exceed the SCAQMD's emission-based significance threshold (**Table 6a**). MM-AQ-1 and MM-AQ-2 would reduce NO_x and VOC emissions to less than significant levels (**Table 6b**). Therefore, the Project would not have a considerable contribution to the SCAB's nonattainment designation for O_3 and would not cause a new cumulatively significant impact.

Localized air quality impacts of NO_2, CO, PM_{10}, and $PM_{2.5}$ emissions associated with the construction of the Project are expected to be less than significant (**Table 16a and 16b**). Therefore, according to SCAQMD's guidance, the Project's contribution to cumulative localized air quality concentrations of these pollutants would not be cumulatively considerable and; therefore, less than significant.

5.2 Operational Impacts

As discussed above, if the Project exceeds the SCAQMD's recommended significance thresholds for project-specific operational air emissions, then the Project would have a cumulatively considerable increase in emissions for those pollutants. The Project operational emissions would be less than the SCAQMD's threshold for CO, SO_2, PM_{10}, $PM_{2.5}$, and VOC (**Table 7a** and **Table 7b**). For the Project, operational emissions would exceed the SCAQMD's threshold for NO_X emissions, which is attributed to the vehicular source emissions from trucks traveling to the Project site. MM-AQ-2 would be required to reduce VOC emissions from architectural coatings and MM-AQ-5 and MM-AQ-6 would reduce mobile source emissions during Project operations, but not to a level of less than significant. Thus, the Project would have a cumulatively considerable increase in emissions due to operational-related NO_X emissions and the impacts would be significant and unavoidable.

Localized air quality impacts of NO_2, CO, PM_{10}, and $PM_{2.5}$ emissions associated with Project operation would be less than significant (**Table 17**). Therefore, according to SCAQMD's guidance, the Project's contribution to cumulative localized air quality impacts of these

[51] SCAQMD. White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution. Appendix D. Available at: http://www.aqmd.gov/docs/default-source/Agendas/Environmental-Justice/cumulative-impacts-working-group/cumulative-impacts-white-paper-appendix.pdf. Accessed: August 2018.

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pollutants during operation would not be cumulatively considerable and; therefore, less than significant.

5.3 Odor Impacts

With respect to potential odor impacts, the Project does not have a high potential to generate odor impacts during construction or operations. As discussed above, construction and operations within the Project Site are not expected to be a source of odors. Furthermore, the Project would be required by SCAQMD Rule 402 (Nuisance) to implement BACT requirements to limit potential objectionable odor impacts to a less-than-significant level. Thus, potential odor impacts from the Project are anticipated to be less than significant and, consistent with the SCAQMD approach to assessing cumulative impacts, the Project would not result in a cumulative impact for odors.

5.4 AQMP Consistency

The cumulative analysis can also be evaluated in terms of consistency with SCAQMD's AQMP. SCAQMD and the Southern California Association of Governments (SCAG) are jointly responsible for formulating and implementing the AQMP for the SCAB. SCAG's Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) form the basis for the land use and transportation control portion of the AQMP. SCAG's 2016-2040 RTP/SCS was adopted in April 2016. Thus, consistency with the RTP/SCS would demonstrate consistency with SCAQMD's 2016 AQMP.[52]

The SCAG RTP is a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for transportation investments throughout the region. Using growth forecasts and economic trends that project out over a 20-year period, the RTP considers the role of transportation in the broader context of economic, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address our mobility needs. The Sustainable Communities Strategy (SCS) is a newly required element of the RTP. The SCS will integrate land use and transportation strategies that will achieve ARB emissions reduction targets.[53]

The Project lies entirely within Traffic Analysis Zone (TAZ) 43268200. The 2016 RTP/SCS projects that within TAZ 43268200, there will be a total of 8,755 jobs by 2020 and 22,196 by 2045[54]. As of 2016, there are 4,531 jobs in the March JPA jurisdiction. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Adding jobs consistent with 2016 RTP/SCS projections supports SCAG's achievement of ARB emissions reductions targets.

The SCS also indicates that this is a jobs poor area so providing more jobs will actually reduce GHG emissions and reduce VMT as it will provide local jobs to achieve a more favorable jobs housing balance.

Additionally, the March JPA Draft General Plan[55] discusses the need to create more jobs, as described below:

[52] SCAQMD. Final 2016 AQMP – CARB/EPA/SIP Submittal. Available at: https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/final-2016-aqmp. Accessed: August 2018.

[53] 2016. The 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy. April. Available at: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed: December 2018.

[54] Jobs data provided by March JPA.

[55] General Plan of the March Joint Powers Authority. Available at: https://www.marchjpa.com/documents/docs_forms/general_plan_updt_011718.pdf. Accessed: December 2018.

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- March JPA has a stated goal of providing 38,000 jobs, through development of its Planning Area, to the western Riverside County area thereby creating a much-needed job center. The creation of a job center is important to reduce the existing jobs/housing imbalance that exists in this region such that it can help reduce traffic congestion, pollution, fossil fuel dependence and improve the overall quality of life for the residents of western Riverside County. (p. 1-11)
- March JPA has a mission to replace regional economic benefit that was lost with the realignment of the active duty March Air Force Base into a Reserve Base in April 1996. The quantified benefits are the creation of at least 38,000 jobs, and more that $500 million annual economic contribution to the Riverside County region. (p. 5-4)

The Project is expected to generate 900 jobs. This is approximately 21% of the projected job growth in TAZ 43268300 in 2020 as compared to 2016, and approximately 5.1% of projected job growth in 2045 as compared to 2016. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Since the jobs created by the Project are within the job growth projections in the 2016 RTP/SCS, the Project would not conflict with the 2016 AQMP and, as such, would not jeopardize attainment of State and national ambient air quality standards in the area under the jurisdiction of the SCAQMD.

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6. SUMMARY OF RESULTS

For construction, the maximum daily unmitigated criteria air pollutant emissions for the Project are estimated to be less than the significance thresholds for CO, SO_2, PM_{10}, and $PM_{2.5}$, and greater than the significance thresholds for VOC and NO_X (**Table 6a**). The Project will utilize Super Compliant coatings with a VOC content less than 10 g/L VOC[56] as a mitigation measure (MM-AQ-2) to reduce VOC emissions to below the applicable significance threshold as shown in **Table 6b**. The Project will also utilize Tier 3 off-road equipment and up to 50% Tier 4 Final off-road equipment as a mitigation measure (MM-AQ-1) to reduce NO_X emissions to below the applicable significance threshold as shown in **Table 6b**. The Project will also minimize fugitive PM emissions by complying with the requirements of SCAQMD Rule 403. Fugitive PM emissions reductions from compliance with SCAQMD Rule 403 are quantified in both the unmitigated and mitigated scenarios.

For operational emissions, the maximum daily unmitigated and mitigated criteria air pollutant emissions for the Project are less than the significance thresholds for CO, SO_2, PM_{10}, $PM_{2.5}$, and VOC and greater than the significance thresholds for NO_X (**Tables 7a and 7b**). The primary source of the operational emissions are mobile sources. The emissions from mobile sources are expected to decline in the future as cars become more fuel efficient due to existing regulations (i.e., NHTSA Phase 1 and Phase 2 standards), but this analysis does not incorporate reductions due to these regulatory changes.

The Project would not exceed the CO NAAQS at any intersection affected by Project operation (Section 4.2) and localized air quality impacts of CO, NO_X, PM_{10}, and $PM_{2.5}$ emissions associated with Project construction and operation will be less than significant (**Tables 16a, 16b, and 17**).

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[56] SCAQMD. Super-Compliant Coating Manufacturers. Available at: http://www.aqmd.gov/docs/default-source/planning/architectural-coatings/super-compliant-manf-list.pdf?sfvrsn=19. Accessed: July 2018.

TABLES

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Table ES-1. Maximum Daily Criteria Air Pollutant Emission Estimates for Project Construction
K4 and Cactus Channel Improvement Project
Riverside County, California

Emission Type	Year[1]	Maximum Daily Criteria Air Pollutant Emission Estimates[1]					
		VOC[2]	NO_x	CO	SO_x	PM_{10}[3]	$PM_{2.5}$[3]
		lb/day					
Unmitigated Emissions	2019	7.7	125.8	55.9	0.2	11.8	6.8
	2020	527.4	44.7	42.5	0.1	9.2	3.3
Mitigated Emissions	2019	5.2	94.4	60.2	0.2	10.0	4.7
	2020	53.3	35.6	43.8	0.1	8.7	2.8
Maximum Mitigated Emissions		53.3	94.4	60.2	0.21	10.0	4.7
SCAQMD Significance Thresholds[4]		**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Threshold for any Year of Construction?[5]		NO	**NO**	NO	NO	NO	NO

Notes:

[1] Emissions shown here are based on Project-specific construction schedule, equipment list, and amount of hauling material. CalEEMod® defaults were used for on-site construction equipment horsepower and load factors, and on-road vehicle trips. Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs. The unmitigated emissions include on-site fugitive dust control [watering two times daily during construction], as required by SCAQMD Rule 403.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] PM emissions are estimated as a sum of exhaust, tire wear, brake wear, and fugitive emissions.

[4] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

[5] Comparison of mitigated construction emissions against the SCAQMD significance thresholds. Quantified mitigation measures include: (1) half of the off-road construction equipment meets USEPA Tier 3 emission standards and the other half meets USEPA Tier 4 standards; and (2) use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
USEPA - United States Environmental Protection Agency

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Table ES-2. Maximum Daily Criteria Air Pollutant Emission Estimates for Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

Emission Type	Land Use	Maximum Daily Criteria Air Pollutant Emission Estimates					
		VOC[1]	NO_x	CO	SO_x	PM_{10}[2]	$PM_{2.5}$[2]
		(lb/day)					
Unmitigated Emissions	Area[3]	16.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
	Energy[3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
	Mobile[4]	26.3	252	237	1.3	100	30.3
	Total Daily Emissions (lbs/day)	**42.7**	**253**	**238**	**1.4**	**100**	**30.3**
Mitigated Emissions	Area[3]	14.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1
	Energy[3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
	Mobile[4]	26.3	252	237	1.3	100	30.3
	Total Daily Emissions (lbs/day)	**41.0**	**253**	**238**	**1.4**	**100**	**30.3**
SCAQMD Significance Thresholds[5]		55	55	550	150	150	55
Exceeds Threshold?[6]		NO	**YES**	NO	NO	NO	NO

Notes:

[1] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[2] PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.

[3] Emissions estimated using CalEEMod®. Refer to Appendix A for CalEEMod® outputs.

[4] Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018.

[5] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

[6] Comparison of mitigated operational emissions against SCAQMD significance thresholds. Quantified mitigation measure includes the use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CAP - criteria air pollutant
CO - carbon monoxide
EMFAC - EMission FACtors model
lbs - pounds
NO_x - oxides of nitrogen
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SCAQMD - South Coast Air Quality Management District
SO_x - oxides of sulfur
VOC - volatile organic compounds

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Table ES-3. Comparison of Project Construction Emissions to SCAQMD Localized Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Emission Type	Year	Maximum Daily On-Site Construction Emissions[1]			
		NO_x	CO	PM_{10}	$PM_{2.5}$
		lb/day			
Total On-Site					
Unmitigated Emissions	2019	82.6	47.2	10.5	6.4
	2020	19.5	14.7	1.0	0.9
Mitigated Emissions	2019	27.7	50.1	8.0	4.3
	2020	10.4	17.3	0.5	0.5
Maximum Mitigated Emissions		**27.7**	**50.1**	**8.0**	**4.3**
SCAQMD Localized Significance Thresholds[2]		**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?[5]		NO	NO	NO	NO
Warehouse On-Site					
Unmitigated Emissions	2019	67.6	37.4	9.9	5.9
	2020	14.1	14.7	0.8	0.7
Mitigated Emissions	2019	21.6	36.0	7.7	4.0
	2020	7.7	17.3	0.4	0.4
Maximum Mitigated Emissions		**21.6**	**36.0**	**7.7**	**4.0**
SCAQMD Localized Significance Thresholds[2]		**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?[5]		NO	NO	NO	NO
Cactus Channel On-Site					
Unmitigated Emissions	2019	15.0	9.9	0.6	0.5
	2020	5.4	2.1	0.2	0.2
Mitigated Emissions	2019	6.1	14.0	0.3	0.3
	2020	2.7	3.1	0.1	0.1
Maximum Mitigated Emissions		**6.1**	**14.0**	**0.3**	**0.3**
SCAQMD Localized Significance Thresholds[3]		**118** **66[4]**	**602**	**4**	**3**
Exceeds Threshold?[5]		NO	NO	NO	NO

Notes:

[1] Emissions estimated using CalEEMod®. Only on-site emissions are compared with the LSTs.

[2] Total on-site and warehouse on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 5-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[3] Cactus Channel on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 1-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[4] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

[5] Comparison of mitigated construction emissions against the SCAQMD significance thresholds. Quantified mitigation measures include half of the off-road construction equipment meeting USEPA Tier 3 emission standards and the other half meeting USEPA Tier 4 standards.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
lbs - pounds
LST - Localized Significance Threshold
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District

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Table ES-4. Comparison of Project Operational Emissions to SCAQMD Localized Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Operational Year	Maximum Daily On-Site Operational Emissions[1,2]			
	NO_x	CO	PM_{10}	$PM_{2.5}$
	lb/day			
2020	9	13	2.8	0.8
SCAQMD Localized Significance Thresholds[3]	**270** **150[4]**	**1,577**	**4**	**2**
Exceeds Threshold?	NO	NO	NO	NO

Notes:

[1] Project emissions include on-site area, energy, and mobile source emissions. Area source and energy emissions were estimated using CalEEMod®. Mobile source emissions were calculated using emission factors from EMFAC2017 and CalEEMod® methodology for entrained road dust. Emissions shown here are for the first year of Project operation (2020), which is conservative because emissions are expected to decrease in later years.

[2] Onsite mobile emissions are estimated in Table 15.

[3] LST based on the operational Metropolitan Riverside County LSTs for a 5 acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: August 2018.

[4] An approximated LST of 150 lb/day was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST of 270 lb/day that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC -EMission FACtors model
lbs - pounds
LST - Localized Significance Threshold
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District

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Table 1. Project Land Uses
K4 and Cactus Channel Improvement Project
Riverside County, California

Project Land Use	CalEEMod® Land Use Type	CalEEMod® Land Use Subtype[1]	Land Use Unit Amount	Size Metric	Acreage
Warehouse Construction					
Warehouse	Industrial	Unrefrigerated Warehouse - No Rail	718	1000 sqft	20
Parking Lot	Parking	Parking Lot	670	1000 sqft	15.4
Cactus Channel Construction					
Cactus Channel[2]	Parking	Other Non-Asphalt Surfaces	3.45	acres	3.45

Notes:

[1] Land uses as defined in CalEEMod®. Parking – Other Non-Asphalt Surfaces was used as a placeholder land use in CalEEMod, as there is no CalEEMod land use for a drainage channel.

[2] Cactus Channel land use acreage is based on the expected area that will be disturbed during construction.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

sqft - square feet

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Table 2. SCAQMD Air Quality Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Mass Daily Thresholds[1] (lbs/day)			
Pollutant	**Construction**		**Operation**
NO_X	100		55
VOC	75		55
PM_{10}	150		150
$PM_{2.5}$	55		55
SO_X	150		150
CO	550		550
Odor Threshold[1]			
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402		
Ambient Air Quality Standards for Criteria Pollutants[1]			
NO_2 1-hour average Annual Arithmetic Mean	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 (federal)		
PM_{10} 24-hour Average Annual Average	10.4 µg/m^3 (construction) and 2.5 µg/m^3 (operation) 1.0 µg/m^3		
$PM_{2.5}$ 24-hour Average	10.4 µg/m^3 (construction) and 2.5 µg/m^3 (operation)		
CO 1-hour Average 8-hour Average	SCAQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)		
Localized Significance Thresholds[2] (lbs/day)			
Pollutant	**Construction**		**Operation**
	Total Project/ Warehouse	**Cactus Channel**	**Warehouse**
NO_X	270 150[3]	118 66[3]	270 150[3]
PM_{10}	13	4	4
$PM_{2.5}$	8	3	2
CO	1,577	602	1,577

Abbreviations:

µg/m^3 - micrograms per cubic meter
ARB - Air Resources Board
CAAQS - California Ambient Air Quality Standards
CO - carbon monoxide
lbs - pounds
LST - Localized Significance Threshold
MT - metric tonnes
NAAQS - National Ambient Air Quality Standards
NO_x - nitrogen oxides
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
USEPA - United States Environmental Protection Agency
VOC - volatile organic compounds

Notes:

[1] SCAQMD Air Quality Significance Thresholds. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. Accessed: August 2018.

[2] LSTs are based on the Metropolitan Riverside County LSTs for a 5 acre site (total project and warehouse) and 1 acre site (Cactus Channel), at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: August 2018.

[3] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

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Table 3. Construction Schedule Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name[1]	CalEEMod® Phase Type[1]	Start Date[1]	End Date[1]	Phase Duration[2] (days)
Warehouse Construction				
Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	55
Pad/Site-specific Activities	Grading	8/5/2019	8/30/2019	20
Building Construction	Building Construction	9/2/2019	5/22/2020	190
Paving	Paving	5/25/2020	6/11/2020	14
Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	13
Cactus Channel Construction				
Cactus Channel Improvements - Phase 1	Site Preparation	5/20/2019	11/19/2019	132
Cactus Channel Improvements - Phase 2	Site Preparation	11/20/2019	5/19/2020	130

Notes:
[1] Construction phases and duration are based on Project-specific estimates.
[2] The construction work week was assumed to be 5 days per week.

Abbreviations:
CalEEMod® - California Emissions Estimator Model

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Table 4. Construction Equipment Mix Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name	CalEEMod® Phase Type	Equipment Type[1]	Number of Equipment[1]	Hours per day[2]	Horsepower[2] (hp)	Load Factor[2]
Warehouse Construction						
Rough Grading and Utility Installation	Site Preparation	Rubber Tired Dozers	2	8	247	0.4
		Tractors/Loaders/Backhoes	2	8	97	0.37
Pad/Site-Specific Grading Activities	Grading	Excavators/Graders/Scrapers[3]	3	8	367	0.48
		Rubber Tired Dozers	2	8	247	0.4
		Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Building Construction	Cranes	1	7	231	0.29
		Forklifts	2	8	89	0.2
		Tractors/Loaders/Backhoes	2	7	97	0.37
		Welders	2	8	46	0.45
Paving	Paving	Pavers	2	8	130	0.42
		Paving Equipment	2	8	132	0.36
		Rollers	2	8	80	0.38
Architectural Coating	Architectural Coating	Air Compressors	2	6	78	0.48
Cactus Channel Construction						
Cactus Channel Improvements - Phase 1	Site Preparation	Excavators	2	8	158	0.38
		Rubber Tired Loaders	2	8	203	0.36
Cactus Channel Improvements - Phase 2	Site Preparation	Cranes	1	8	231	0.29

Notes:
[1] Equipment type and number of equipment based on Project-specific data.
[2] Operation hours, horsepower, and load factor based on CalEEMod® defaults. Available at: www.caleemod.com. Accessed: August 2018.
[3] Excavators, graders, and scrapers are assumed to be interchangeable equipment. This equipment group was conservatively modeled in CalEEMod® as scrapers.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
hp - horsepower

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Table 5. Construction Trip Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name	Worker Trips per Day[1]	Vendor Trips per Day[1]	Total Hauling Trips[2]
Warehouse Construction			
Rough Grading and Utility	10	0	27,500
Pad/Site-specific Activities	18	0	0
Building Construction	583	227	0
Paving	15	0	0
Architectural Coating	117	0	0
Cactus Channel Construction			
Cactus Channel Improvements - Phase 1	10	0	7,500
Cactus Channel Improvements - Phase 2	3	0	0

Notes:

[1] Trips are presented as one-way trips and are based on CalEEMod® defaults. The one-way trip lengths for worker and vendor trips are also based on CalEEMod® defaults and are 14.7 and 6.9 miles, respectively.

[2] Trips are presented as one-way trips and represent the total trips for the phase. Project specific estimates of the volume of soil imported (220,000 cubic yards) and exported (60,000 cubic yards) were used to estimate the number of haul trips required. The hauling trip distance for warehouse construction is 3 miles, based on Project specific data. The hauling trip distance for Cactus Channel construction is based on the CalEEMod® default of 20 miles.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

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Table 6a. Maximum Daily Criteria Air Pollutant Emissions for Project Construction - Unmitigated
K4 and Cactus Channel Improvement Project
Riverside County, California

Location	Year	Construction Phase	Source	Maximum Daily Unmitigated Emission Estimates[1]					
				VOC[2]	NO_x	CO	SO_x	PM_{10}[3]	$PM_{2.5}$[3]
				lb/day					
Warehouse	2019	Rough Grading and Utility Installation	On-site Equipment	2.7	28.8	13.2	0.02	7.1	4.4
			On-road Trucks and Vehicles	1.6	67.3	9.6	0.12	1.5	0.49
			Phase Total	**4.3**	**96**	**22.8**	**0.15**	**8.7**	**4.9**
		Pad/Site-Specific Grading Activities	On-site Equipment	5.9	67.6	37.4	0.07	9.86	5.9
			On-road Trucks and Vehicles	0.10	0.06	0.80	0.00	0.20	0.05
			Phase Total	**6.0**	**67.6**	**38.2**	**0.07**	**10.1**	**6.0**
		Building Construction	On-site Equipment	1.9	15.5	12.0	0.02	0.92	0.86
			On-road Trucks and Vehicles	0.00	27.9	31.5	0.13	8.2	2.4
			Phase Total	**1.9**	**43.3**	**43.6**	**0.15**	**9.1**	**3.2**
	2020	Building Construction	On-site Equipment	1.7	14.1	11.7	0.02	0.79	0.74
			On-road Trucks and Vehicles	3.6	25.2	28.5	0.12	8.1	2.3
			Phase Total	**5.4**	**39.3**	**40.2**	**0.14**	**8.9**	**3.1**
		Paving	On-site Equipment	1.4	14.1	14.7	0.02	0.75	0.69
			On-road Trucks and Vehicles	0.08	0.0	0.6	0.00	0.17	0.05
			Paving	2.9	0.0	0.0	0.00	0.00	0.00
			Phase Total	**4.3**	**14.1**	**15.3**	**0.02**	**0.92**	**0.74**
		Architectural Coating	On-site Equipment	0.48	3.4	3.7	0.01	0.22	0.22
			On-road Trucks and Vehicles	0.60	0.4	4.7	0.01	1.32	0.35
			Architectural coating	526	--	--	--	--	--
			Phase Total	**527**	**3.7**	**8.4**	**0.02**	**1.54**	**0.58**
Cactus Channel	2019	Phase 1	On-site Equipment	1.3	15.0	9.9	0.02	0.61	0.54
			On-road Trucks and Vehicles	0.39	14.7	2.5	0.04	1.16	0.35
			Phase Total	**1.7**	**29.7**	**12.4**	**0.07**	**1.77**	**0.89**
		Phase 2	On-site Equipment	0.50	6.0	2.3	0.01	0.25	0.23
			On-road Trucks and Vehicles	0.02	0.01	0.13	0.00	0.03	0.01
			Phase Total	**0.52**	**6.0**	**2.4**	**0.01**	**0.29**	**0.24**
	2020	Phase 2	On-site Equipment	0.45	5.4	2.1	0.01	0.22	0.20
			On-road Trucks and Vehicles	0.02	0.0	0.1	0.00	0.03	0.01
			Phase Total	**0.5**	**5.4**	**2.2**	**0.01**	**0.26**	**0.21**
Maximum Daily Emissions									
Period 1	Warehouse Rough Grading and Utility Installation, Cactus Channel Phase 1			6.0	126	35	0.21	10	5.8
Period 2	Warehouse Pad/Site-Specific Grading Activities, Cactus Channel Phase 1			7.7	97	51	0.14	12	6.8
Period 3	Warehouse Building Construction, Cactus Channel Phase 1			3.6	73	56	0.21	11	4.1
Period 4	Warehouse Building Construction, Cactus Channel Phase 2 (2019)			2.5	49	46	0.15	9.4	3.5
Period 5	Warehouse Building Construction, Cactus Channel Phase 2 (2020)			5.8	45	42	0.15	9.2	3.3
Period 6	Warehouse Building Construction			5.4	39	40	0.1	8.9	3.1
Period 7	Warehouse Paving			4.3	14	15	0.02	0.9	0.7
Period 8	Warehouse Architectural Coating			527	3.7	8	0.02	1.5	0.6
SCAQMD Significance Thresholds[4]				**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Threshold for Any Year of Construction?				**YES**	**YES**	NO	NO	NO	NO

Notes:

[1] Emissions shown here are based on Project-specific construction schedule, equipment list, and amount of hauling material. CalEEMod® defaults were used for on-site construction equipment horsepower and load factors, and on-road vehicle trips. Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] PM emissions are estimated a sum of exhaust, tire wear, brake wear, and fugitive emissions. On-site fugitive dust is controlled by watering two times daily during construction, as required by SCAQMD Rule 403.

[4] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
lbs - pounds
NO_x - nitrogen oxide compounds ($NO + NO_2$)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic compounds
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

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Table 6b. Maximum Daily Criteria Air Pollutant Emissions for Project Construction - Mitigated
K4 and Cactus Channel Improvement Project
Riverside County, California

Location	Year	Construction Phase	Source	Maximum Daily Mitigated Emission Estimates[1]					
				VOC[2]	NO_x	CO	SO_x	PM_{10}[3]	$PM_{2.5}$[3]
				lb/day					
Warehouse	2019	Rough Grading and Utility Installation	On-site Equipment[4]	0.4	6.4	13.0	0.02	5.9	3.3
			On-road Trucks and Vehicles	1.6	67.3	9.6	0.12	1.5	0.49
			Phase Total	**2.0**	**74**	**22.6**	**0.15**	**7.5**	**3.8**
		Pad/Site-Specific Grading Activities	On-site Equipment[4]	1.4	21.6	36.0	0.07	7.72	4.0
			On-road Trucks and Vehicles	0.10	0.06	0.80	0.00	0.20	0.05
			Phase Total	**1.5**	**21.7**	**36.8**	**0.07**	**7.9**	**4.1**
		Building Construction	On-site Equipment[4]	0.4	7.7	12.1	0.02	0.37	0.37
			On-road Trucks and Vehicles	4.00	27.9	31.5	0.13	8.2	2.4
			Phase Total	**4.4**	**35.6**	**43.6**	**0.15**	**8.6**	**2.7**
	2020	Building Construction	On-site Equipment[4]	0.4	7.7	12.1	0.02	0.37	0.37
			On-road Trucks and Vehicles	3.6	25.2	28.5	0.12	8.1	2.3
			Phase Total	**4.1**	**32.9**	**40.6**	**0.14**	**8.5**	**2.7**
		Paving	On-site Equipment[4]	0.4	6.3	17.3	0.02	0.32	0.32
			On-road Trucks and Vehicles	0.08	0.0	0.6	0.00	0.17	0.05
			Paving	2.9	0.0	0.0	0.00	0.00	0.00
			Phase Total	**3.4**	**6.3**	**17.9**	**0.02**	**0.49**	**0.37**
		Architectural Coating	On-site Equipment[4]	0.09	1.5	3.7	0.01	0.10	0.10
			On-road Trucks and Vehicles	0.60	0.4	4.7	0.01	1.32	0.35
			Architectural coating[5]	53	--	--	--	--	--
			Phase Total	**53**	**1.9**	**8.4**	**0.02**	**1.41**	**0.45**
Cactus Channel	2019	Phase 1	On-site Equipment[4]	0.4	6.1	14.0	0.02	0.28	0.25
			On-road Trucks and Vehicles	0.39	14.7	2.5	0.04	1.16	0.35
			Phase Total	**0.8**	**20.8**	**16.5**	**0.07**	**1.44**	**0.61**
		Phase 2	On-site Equipment[4]	0.14	2.7	3.1	0.01	0.10	0.10
			On-road Trucks and Vehicles	0.02	0.01	0.13	0.00	0.03	0.01
			Phase Total	**0.16**	**2.8**	**3.2**	**0.01**	**0.14**	**0.11**
	2020	Phase 2	On-site Equipment[4]	0.14	2.7	3.1	0.01	0.10	0.10
			On-road Trucks and Vehicles	0.02	0.0	0.1	0.00	0.03	0.01
			Phase Total	**0.2**	**2.8**	**3.2**	**0.01**	**0.14**	**0.11**
Maximum Daily Emissions									
Period 1	Warehouse Rough Grading and Utility Installation, Cactus Channel Phase 1			2.8	94	39	0.21	9	4.4
Period 2	Warehouse Pad/Site-Specific Grading Activities, Cactus Channel Phase 1			2.3	42	53	0.14	9	4.7
Period 3	Warehouse Building Construction, Cactus Channel Phase 1			5.2	56	60	0.21	10	3.4
Period 4	Warehouse Building Construction, Cactus Channel Phase 2 (2019)			4.6	38	47	0.15	8.7	2.9
Period 5	Warehouse Building Construction, Cactus Channel Phase 2 (2020)			4.2	36	44	0.15	8.7	2.8
Period 6	Warehouse Building Construction			4.1	33	41	0.1	8.5	2.7
Period 7	Warehouse Paving			3.4	6	18	0.02	0.5	0.4
Period 8	Warehouse Architectural Coating			53	1.9	8	0.02	1.4	0.5
SCAQMD Significance Thresholds[6]				**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Threshold for Any Year of Construction?				NO	NO	NO	NO	NO	NO

Notes:

[1] Emissions shown here are based on Project-specific construction schedule, equipment list, and amount of hauling material. CalEEMod® defaults were used for on-site construction equipment horsepower and load factors, and on-road vehicle trips. Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] PM emissions estimated as a sum of exhaust, tire wear, brake wear, and fugitive emissions.

[4] Quantified regulatory and mitigation measures for on-site equipment activities include: (1) watering two times daily to reduce fugitive dust; and (2) half of the off-road construction equipment meets USEPA Tier 3 emission standards and the other half meets USEPA Tier 4 standards.

[5] Quantified mitigation measures for architectural coating emissions include the use of Super Compliant coatings with a VOC content less than 10 g/L VOC.

[6] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sf

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

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Table 7a. Maximum Daily Criteria Air Pollutant Emissions for Project Operation - Unmitigated
K4 and Cactus Channel Improvement Project
Riverside County, California

Emission Source	Maximum Daily Unmitigated Emission Estimates					
	VOC[1]	NO_x	CO	SO_x	PM_{10}[2]	$PM_{2.5}$[2]
	(lbs/day)					
Area[3]	16.3	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy[3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile[4]	26.3	252	237	1.3	100	30.3
Total Daily Emissions	**42.7**	**253**	**238**	**1.4**	**100**	**30.3**
SCAQMD Significance Thresholds[5]	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold?	NO	**YES**	NO	NO	NO	NO

Notes:

[1] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[2] PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.

[3] Emissions estimated using CalEEMod®. Refer to Appendix A for CalEEMod® outputs.

[4] Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018. Refer to Tables 8 through 15 for further details.

[5] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC - EMission FACtors model
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

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Table 7b. Maximum Daily Criteria Air Pollutant Emissions for Project Operation - Mitigated
K4 and Cactus Channel Improvement Project
Riverside County, California

Emission Source	Maximum Daily Mitigated Emission Estimates					
	VOC[1]	NO_x	CO	SO_x	PM_{10}[2]	$PM_{2.5}$[2]
	(lbs/day)					
Area[3,4]	14.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1
Energy[3]	< 0.1	0.4	0.3	< 0.1	< 0.1	< 0.1
Mobile[5]	26.3	252	237	1.3	100	30.3
Total Daily Emissions	**41.0**	**253**	**238**	**1.4**	**100**	**30.3**
SCAQMD Significance Threshold[6]	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold?	NO	**YES**	NO	NO	NO	NO

Notes:

[1] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[2] PM emissions for mobile sources are estimated as a sum of exhaust emissions, tire wear, brake wear, and entrained road dust.

[3] Emissions estimated using CalEEMod®. Refer to Appendix A for CalEEMod® outputs.

[4] Quantified mitigation measure for area sources includes the use of Super Compliant coatings with a VOC content less than 10 g/L VOC for architectural coatings.

[5] Emissions were estimated emission factors from EMFAC2017 along with Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018. Refer to Tables 8 through 15 for further details.

[6] SCAQMD Air Quality Significance Thresholds. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC - EMission FACtors model
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

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Table 8. Mobile Source Trip Rates for Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

Vehicle Type	Peak Daily Trips[1,2]
Trip Rates (trips per 1000sqft)	
Passenger Cars	7.46
2-Axle Trucks	0.12
3-Axle Trucks	0.149
4-Axle+ Trucks	0.451
Total	8.18
Trips (trips per day)	
Passenger Cars	5,356
2-Axle Trucks	86
3-Axle Trucks	107
4-Axle+ Trucks	324
Total	5,873

Notes:

[1] Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018.

[2] Trip rates in this table represent the maximum daily trips that would occur during the peak season (November 15th to January 15th).

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Table 9. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources
K4 and Cactus Channel Improvement Project
Riverside County, California

Vehicle Type	Average Trip Length[1,2]	Peak Daily Trips[3]	Peak Daily VMT[4]
Passenger Cars	16.6	5,356	88,910
2-Axle Trucks	60	86	5,160
3-Axle Trucks	60	107	6,420
4-Axle+ Trucks	60	324	19,440

Notes:

[1] Passenger cars represent vehicles used by employee to commute to work. Average trip length for these vehicles is assumed to be equal to the CalEEMod® default trip length for commercial-work trips in Riverside County.

[2] Truck trip length is assumed to be 60 miles based on an anticipated truck usage similar to recent Environmental Impact Reports for warehouse distribution centers in the region. The CalEEMod® default for trucks in CalEEMod® is 6.9 miles. Therefore, the use of a 60-mile trip length is conservative.

[3] Obtained from Table 8.

[4] Estimated as a product of average trip length and peak daily trips.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
VMT - vehicle miles traveled

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Table 10. Operational Mobile Source Fleet Mixes
K4 and Cactus Channel Improvement Project
Riverside County, California

CalEEMod® Default[1]	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	53.8%	3.8%	18.4%	12.2%	1.7%	0.5%	1.7%	6.8%	0.1%	0.1%	0.5%	0.1%	0.1%

Passenger Vehicles[2]	LDA	LDT1	LDT2
	70.7%	5.1%	24.2%

Trucks[3]	2-Axle		3-Axle	4-Axle
	LHDT1	LHDT2	MHDT	HHDT
	12.7%	3.9%	20.7%	62.7%

Notes:

[1] CalEEMod® default Unrefrigerated Warehouse - No Rail land use subtype in Riverside County - South Coast.

[2] Passenger vehicles represent vehicles used by employees to commute to work. Fleet mix for passenger vehicles are estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix.

[3] Fleet mix for the 2-axle, 3-axle, and 4-axle trucks was estimated by rationing the trip rates for these vehicle types prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018. 2-axle trucks further distributed into LHD1 and LHD2 based on the ratio of these vehicle classes in the CalEEMod® default fleet mix.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
LDA - Light Duty Automobile
LDT - Light-Duty Truck
LHD - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MDV - Medium-Duty Vehicle
MH - Motor Home
MHD - Medium-Heavy Duty truck
OBUS - Other Buses
UBUS - Urban Buses
MCY - Motorcycle
SBUS - School Bus

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Table 11. Operational Mobile Source Emission Factors - Running Exhaust, Running Loss, Tire Wear, and Brake Wear
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	EMFAC VMT Output[1] (miles/day)	EMFAC Emissions Output[2] (tons/day)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}[4]	$PM_{2.5}$[4]
Passenger Vehicles							
LDA	23,249,118	0.91	1.16	18.2	0.0687	1.19	0.49
LDT1	2,177,180	0.37	0.39	4.2	0.0076	0.11	0.05
LDT2	7,020,151	0.54	0.76	8.0	0.0265	0.36	0.15
Trucks							
LHDT1	1,069,352	0.32	2.16	0.95	0.0073	0.12	0.06
LHDT2	285,131	0.05	0.63	0.18	0.0019	0.04	0.02
MHDT	774,036	0.13	2.59	0.54	0.0081	0.21	0.13
HHDT	1,858,206	0.22	7.87	1.00	0.0269	0.33	0.20

EMFAC Vehicle Class	Project Specific Fleet Mix[5]	Running Exhaust, Running Loss, Tire Wear and Brake Wear Emission Factors[6] (grams/mile)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}[4]	$PM_{2.5}$[4]
Passenger Vehicles							
LDA	70.7%	0.035	0.045	0.71	0.0027	0.046	0.019
LDT1	5.1%	0.152	0.163	1.77	0.0032	0.047	0.020
LDT2	24.2%	0.070	0.098	1.03	0.0034	0.046	0.019
Weighted Emission Factor[7]		0.050	0.064	0.840	0.003	0.046	0.019
Trucks							
LHDT1	12.7%	0.27	1.83	0.81	0.006	0.10	0.05
LHDT2	3.9%	0.16	2.00	0.56	0.006	0.12	0.06
MHDT	20.7%	0.15	3.03	0.63	0.009	0.24	0.16
HHDT	62.7%	0.11	3.84	0.49	0.013	0.16	0.10
Weighted Emission Factor[7]		0.14	3.35	0.56	0.01	0.17	0.10

Notes:

[1] Data obtained from Table B-1 in Appendix B of this report.

[2] Sum of running exhaust, running loss, tire wear, and brake wear emissions obtained from Table B-3 in Appendix B of this

[3] For purposes of this analysis VOC is assumed to be equal to ROG.

[4] PM emissions are a sum of exhaust, tire wear, and brake wear.

[5] Data obtained from Table 10.

[6] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[7] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate VMT-based emission factors for passenger vehicles and trucks.

Abbreviations:

CO - carbon monoxide
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
LDT - Light-Duty Truck
LHDT - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

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Table 12. Operational Mobile Source Emission Factors - Starting Exhaust, Hot Soak, Diurnal Loss, and Resting Loss
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	EMFAC Vehicle Trips Output[1] (trips/day)	EMFAC Emissions Output[2] (tons/day)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Passenger Vehicles							
LDA	2,629,908	1.4	0.58	6.4	0.0016	0.0058	0.0053
LDT1	258,535	0.33	0.10	0.73	0.00019	0.00092	0.00084
LDT2	816,421	0.62	0.31	2.6	0.00066	0.0018	0.0017
Trucks							
LHDT1	434,726	0.080	0.15	0.47	0.000050	0.00012	0.00011
LHDT2	108,780	0.010	0.021	0.063	0.0000080	0.000013	0.000012
MHDT	144,226	0.0092	0.17	0.14	0.000011	0.000014	0.000013
HHDT	156,757	0.000031	0.33	0.0010	0.000000086	0.00000015	0.00000014

Vehicle Class	Project Specific Fleet Mix[4]	Starting Exhaust, Hot Soak, Diurnal Loss, and Resting Loss Emission Factors[5] (grams/trip)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Passenger Vehicles							
LDA	70.7%	0.47	0.20	2.2	0.00056	0.0020	0.0018
LDT1	5.1%	1.2	0.34	2.6	0.00068	0.0032	0.0030
LDT2	24.2%	0.69	0.34	2.9	0.00073	0.0020	0.0019
Weighted Emission Factor[6]		0.56	0.24	2.4	0.00061	0.0021	0.0019
Trucks							
LHDT1	12.7%	0.17	0.31	0.98	0.00010	0.00025	0.00023
LHDT2	3.9%	0.083	0.18	0.53	0.000066	0.00011	0.00010
MHDT	20.7%	0.058	1.1	0.89	0.000070	0.000086	0.000080
HHDT	62.7%	0.00018	1.9	0.0059	0.00000050	0.00000087	0.00000080
Weighted Emission Factor[6]		0.037	1.4	0.33	0.000031	0.000054	0.000050

Notes:

[1] Data obtained from Table B-2 in Appendix B of this report.

[2] Sum of starting exhaust, hot soak, diurnal, and resting loss emissions obtained from Table B-3 in Appendix B of this report.

[3] For purposes of this analysis VOC is assumed to be equal to ROG.

[4] Data obtained from Table 10.

[5] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trip output.

[6] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles and trucks.

Abbreviations:

CO - carbon monoxide
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
LDT - Light-Duty Truck
LHDT - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
NO_x - nitrogen oxide compounds (NO + NO2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

Conversion Factor:

907184.74 grams per ton

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Table 13. Operational Mobile Source Emission Factors - Haul Truck Idling
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	Project Specific Fleet Mix[1]	Idling Emission Factors for Trucks[2] (grams/idle-minute)					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
LHDT1	12.7%	0.16	0.69	1.3	0.00072	0.0077	0.0074
LHDT2	3.9%	0.11	0.92	0.88	0.0010	0.010	0.0099
MHDT	20.7%	0.032	1.2	0.51	0.0011	0.0047	0.0045
HHDT	62.7%	0.040	0.57	0.53	0.00097	0.00045	0.00043
Weighted Emission Factor[3]		**0.057**	**0.73**	**0.64**	**0.00097**	**0.0026**	**0.0025**

Notes:

[1] Data obtained from Table 10.

[2] Data obtained from Table B-4 in Appendix B of this report.

[3] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate idling emission factors for trucks.

Abbreviations:

CO - carbon monoxide
EMFAC - EMission FACtors model
LHDT - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

Conversion Factor:

60 minutes per hour

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Table 14. Entrained Road Dust Emission Estimates for Operational Mobile Sources
K4 and Cactus Channel Improvement Project
Riverside County, California

Vehicle Type	VMT[1] (miles/day)	Entrained Road Dust Emission Factor[1] (lb/VMT)		Entrained Road Dust Emissions[2] (lb/day)	
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
Passenger	88,910	0.00066	0.00016	58.77	14.43
Truck	31,020			20.51	5.03

Notes:

[1] Data obtained from Table 9.

[2] Emission factor calculated following guidance in the CalEEMod User's Guide, Appendix A, which is based on AP-42, Section 13.2.1 for vehicles traveling on paved roads. The equation is:

$EF = k \times (sL)^{0.91} \times (W)^{1.02}$, where:

0.0022 = k_{PM10} (lb/VMT), PM_{10} particle size multiplier

0.00054 = $k_{PM2.5}$ (lb/VMT), $PM_{2.5}$ particle size multiplier

0.1 = sL (g/m^2), silt loading (CalEEMod Default)

2.4 = W (tons), mean vehicle weight (CalEEMod Default)

[3] Assumes 100% of on-road travel occurs on paved roads.

Abbreviations:

CalEEMod - California Emissions Estimator Model

EF - emission factor

lb - pounds

PM_{10} - particulate matter less than 10 microns in aerodynamic diameter

$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter

VMT - vehicle miles traveled

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Table 15. Maximum Daily Criteria Air Pollutant Emission Estimates for Operational Mobile Sources
K4 and Cactus Channel Improvement Project
Riverside County, California

Mobile Source Activity	Peak Daily VMT[1] (miles/day)	Peak Daily Trips[1] (one-way trips/day)	Idle Duration (minutes/ round trip)	Maximum Daily Emissions (lb/day)					
				VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Passenger Car Trips (On- and Off-Site)[2]	88,910	5,356	--	16	15	193	0.57	68	18
Truck Trips (On- and Off-Site)[2]	31,020	517	--	10	231	39	0.77	32	12
Truck Idling (On-Site)[3]	--	517	15	0.49	6.23	5.44	0.0083	0.023	0.022
On-Site Emissions[4]				1.2	9.1	13	0.037	2.8	0.8
Total Emissions[5]				**26**	**252**	**237**	**1.3**	**100**	**30**

Notes

[1] Data obtained from Table 9.

[2] Includes emissions from running exhaust, running loss, tire wear, brake wear, starting exhaust, diurnal loss, hot soak, resting loss, and entrained road dust. Emissions were estimated using emission factors from Tables 11, 12, and 14 along with peak daily VMT and peak daily trips.

[3] Includes emissions from on-site truck idling that is estimated using the number of round trips (i.e. half of the one-way trips), idling time per round trip and truck idling emission factors from Tables 13.

[4] Estimated as a sum of the emissions from on-site travel of passenger cars and trucks, and truck idling. Emissions from on-site travel were estimated using a trip length of 0.6 miles per one-way trip; these emissions include running exhaust, running loss, tire and brake wear, starting exhaust, diurnal loss, hot soak, resting loss, and entrained road dust.

[5] Estimated as a sum of emissions from passenger car trips, truck trips, and truck idling.

Abbreviations:

CO - carbon monoxide
lb - pounds
NO - nitrogen monoxide
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
VMT - vehicle miles traveled

Conversion Factor:

453.592 grams/lb

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Table 16a. Comparison of Unmitigated Project Construction Emissions to SCAQMD Localized Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Year	Maximum Daily Unmitigated Emissions[1]			
	NO_x	CO	PM_{10}	$PM_{2.5}$
	lb/day			
Total On-Site				
2019	82.6	47.2	10.5	6.4
2020	19.5	14.7	1.0	0.9
SCAQMD Localized Significance Thresholds[2]	**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?	NO	NO	NO	NO
Warehouse On-Site				
2019	67.6	37.4	9.9	5.9
2020	14.1	14.7	0.8	0.7
SCAQMD Localized Significance Thresholds[2]	**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?	NO	NO	NO	NO
Cactus Channel On-Site				
2019	15.0	9.9	0.6	0.5
2020	5.4	2.1	0.2	0.2
SCAQMD Localized Significance Thresholds[3]	**118** **66[4]**	**602**	**4**	**3**
Exceeds Threshold?	NO	NO	NO	NO

Notes:

[1] Emissions estimated using CalEEMod®. Only on-site emissions are compared with the LSTs. PM emissions include reduction for watering two times daily to reduce fugitive dust.

[2] Total on-site and warehouse on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 5-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[3] Cactus Channel on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 1-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[4] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CO - carbon monoxide
lbs - pounds
LST - Localized Significance Threshold
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

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Table 16b. Comparison of Mitigated Project Construction Emissions to SCAQMD Localized Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Year	Maximum Daily Mitigated Emissions[1]			
	NO_x	CO	PM_{10}	$PM_{2.5}$
	lb/day			
Total On-Site				
2019	27.7	50.1	8.0	4.3
2020	10.4	17.3	0.5	0.5
SCAQMD Localized Significance Thresholds[2]	**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?	NO	NO	NO	NO
Warehouse On-Site				
2019	21.6	36.0	7.7	4.0
2020	7.7	17.3	0.4	0.4
SCAQMD Localized Significance Thresholds[2]	**270** **150[4]**	**1,577**	**13**	**8**
Exceeds Threshold?	NO	NO	NO	NO
Cactus Channel On-Site				
2019	6.1	14.0	0.3	0.3
2020	2.7	3.1	0.1	0.1
SCAQMD Localized Significance Thresholds[3]	**118** **66[4]**	**602**	**4**	**3**
Exceeds Threshold?	NO	NO	NO	NO

Notes:

[1] Emissions estimated using CalEEMod®. Only on-site emissions are compared with the LSTs. Quantified regulatory and mitigation measures include: (1) watering two times daily to reduce fugitive dust; and (2) half of the off-road construction equipment will meet USEPA Tier 3 emission standards and the other half will meet USEPA Tier 4 Final standards.

[2] Total on-site and warehouse on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 5-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[3] Cactus Channel on-site construction LSTs are based on Metropolitan Riverside County construction LSTs for a 1-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: November 2018.

[4] An approximated LST was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CO - carbon monoxide
lbs - pounds
LST - Localized Significance Threshold
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

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Table 17. Comparison of Project Operational Emissions to SCAQMD Localized Significance Thresholds
K4 and Cactus Channel Improvement Project
Riverside County, California

Operational Year	Maximum Daily On-Site Emissions[1,2]			
	NO_x	CO	PM_{10}	$PM_{2.5}$
	lb/day			
2020	9.5	13	2.8	0.83
SCAQMD Localized Significance Thresholds[3]	**270** **150[4]**	**1,577**	**4**	**2**
Exceeds Threshold?	NO	NO	NO	NO

Notes:

[1] Project emissions include on-site area, energy, and mobile source emissions. Area source and energy emissions were estimated using CalEEMod®. Mobile source emissions were calculated using emission factors from EMFAC2017 and CalEEMod® methodology for entrained road dust. Emissions shown here are for the first year of Project operation (2020), which is conservative because emissions are expected to decrease in later years. There are no quantified mitigation measures for NO_x, CO, and PM operational emissions.

[2] Onsite mobile emissions are estimated in Table 15.

[3] LST based on the operational Metropolitan Riverside County LSTs for a 5-acre site, at a 25-meter receptor distance, and are assumed to be conservative thresholds for larger project sites. Obtained from the 2008 SCAQMD Final Localized Significance Threshold Methodology, Appendix C, Mass Rate LST Look-up Tables. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds. Accessed: August 2018.

[4] An approximated LST of 150 lb/day was estimated to evaluate the federal 1-hour NO_2 standard, as the SCAQMD LST has not been updated to reflect this standard. This value was estimated by scaling the SCAQMD LST of 270 lb/day that represents the state 1-hr NO_2 standard with the ratio of the federal to state 1-hr NO_2 standard (0.10 ppm/0.18 ppm).

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC -EMission FACtors model
lb - pounds
LST - Localized Significance Threshold
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ppm - parts per million
SCAQMD - South Coast Air Quality Management District
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

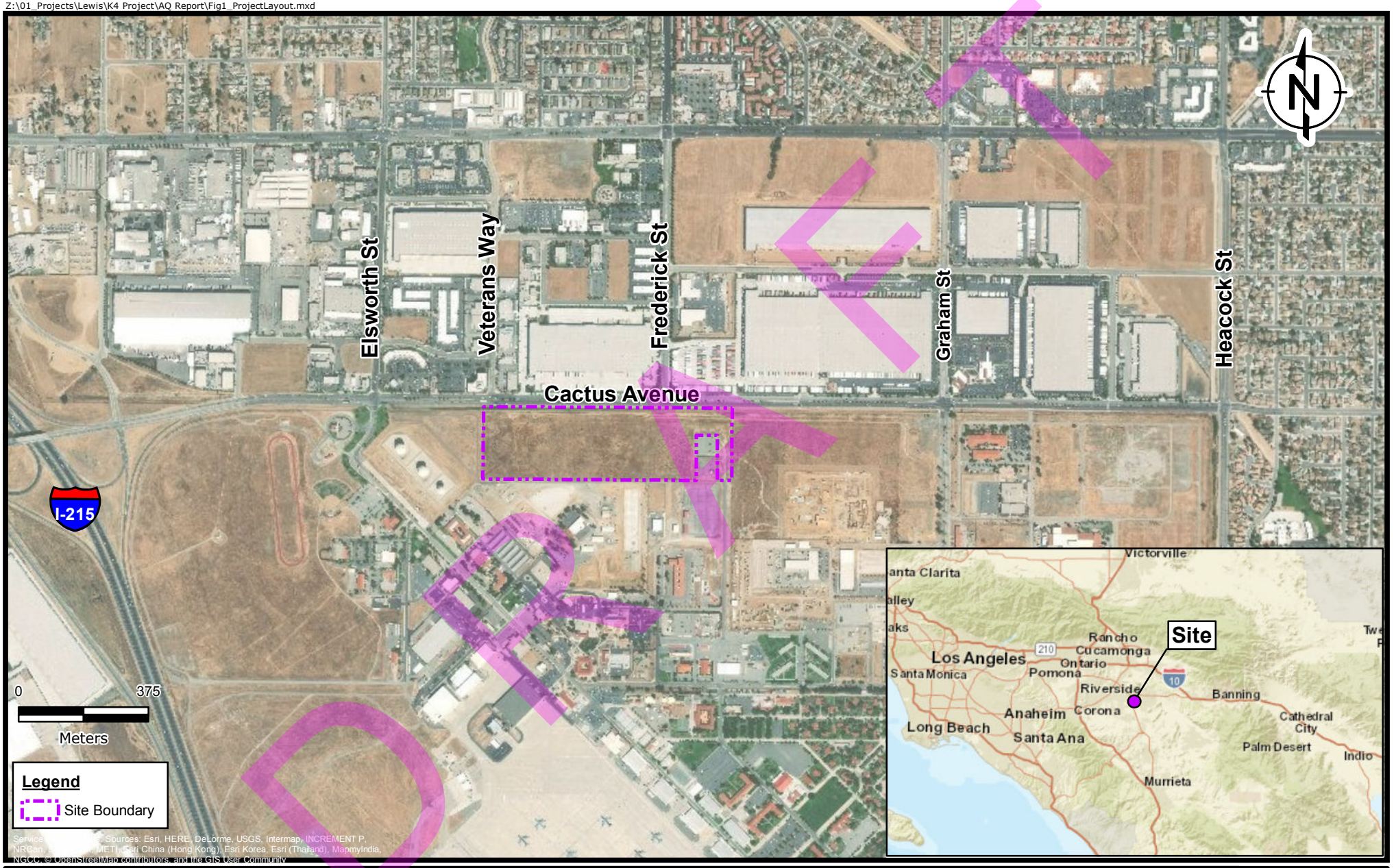
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FIGURES

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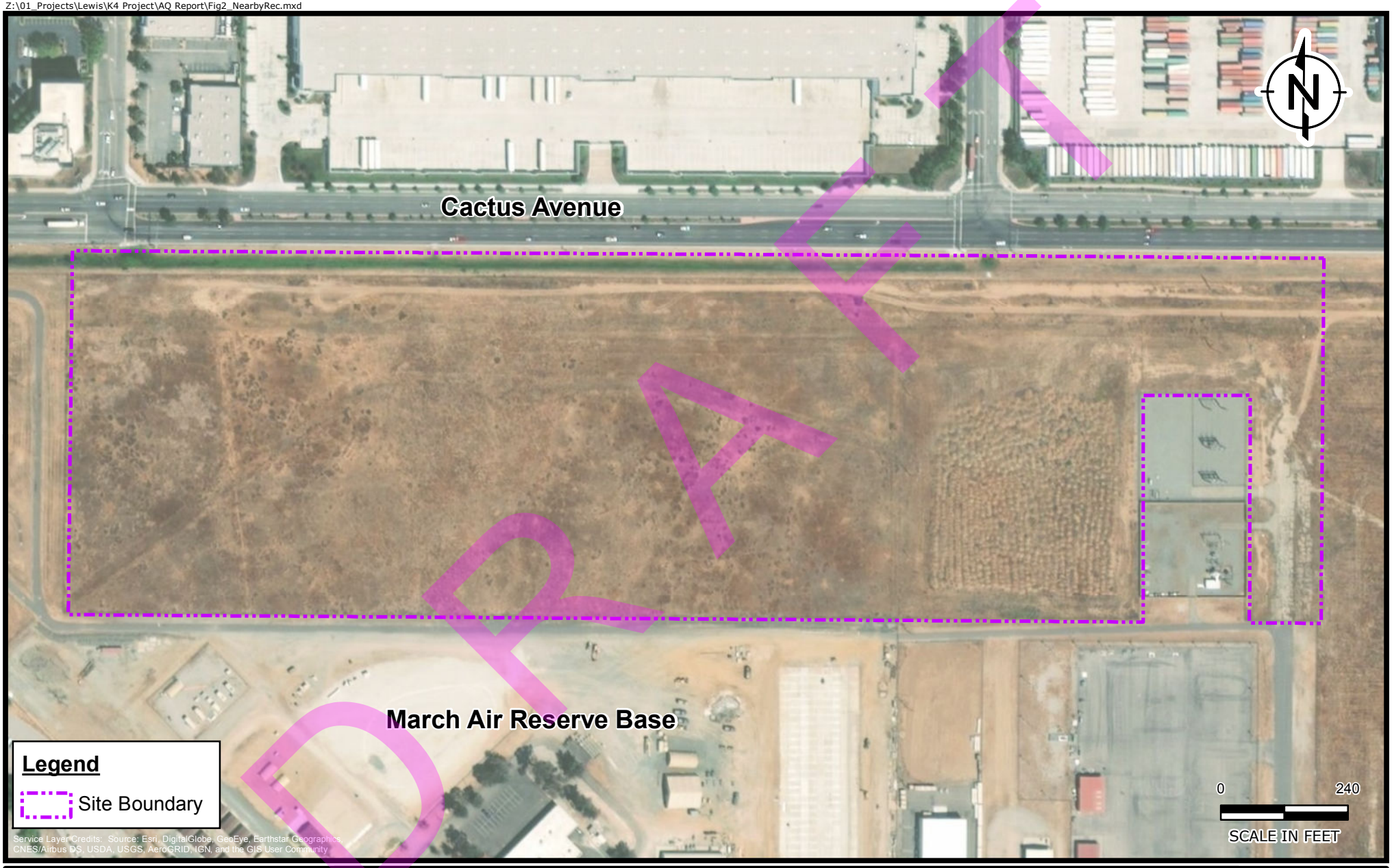
K4 Parcel Project Location

K4 and Cactus Channel Improvement Project
Unincorporated Riverside County, California

FIGURE
1

DRAFTED BY: R.Case | DATE: 8/3/2018 | PROJECT: 1690008459

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DRAFTED BY: R.Case | DATE: 8/21/2018

Project Vicinity

K4 and Cactus Channel Improvement Project
Unincorporated Riverside County, California

FIGURE
2

PROJECT: 1690008459

APPENDIX A
CALEEMOD® OUTPUT FILES

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List of CalEEMod Runs

Appendix A.1: K4 Project (On-Site) Construction – All Equipment – Unmitigated
Appendix A.2: K4 Project (On-Site) Construction – All Equipment – VOC Mitigation
Appendix A.3: K4 Project (On-Site) Construction – Tier 3 Equipment
Appendix A.4: K4 Project (On-Site) Construction – Tier 4 Equipment
Appendix A.5: Cactus Channel (Off-Site) Construction – All Equipment – Unmitigated
Appendix A.6: Cactus Channel (Off-Site) Construction – Tier 3 Equipment
Appendix A.7: Cactus Channel (Off-Site) Construction – Tier 4 Equipment
Appendix A.8: K4 Project Operation

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APPENDIX A.1
K4 PROJECT (ON-SITE) CONSTRUCTION – ALL EQUIPMENT – UNMITIGATED

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K4 - Construction - All Equipment - Unmitigated

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment -

Off-road Equipment - Project data

Trips and VMT - Project data

Grading - Project Data

Architectural Coating -

Construction Off-road Equipment Mitigation -

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Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	MaterialImported	0.00	220,000.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	HaulingTripLength	20.00	3.00

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0297	96.0899	42.7813	0.1453	15.4269	3.0088	18.4357	7.0898	2.7681	9.7854	0.0000	15,217.3961	15,217.3961	2.6542	0.0000	15,283.7500
2020	527.3965	39.2502	39.5153	0.1424	7.9702	0.9669	8.9371	2.1468	0.9083	3.0551	0.0000	14,399.9731	14,399.9731	1.1190	0.0000	14,427.9469
Maximum	**527.3965**	**96.0899**	**42.7813**	**0.1453**	**15.4269**	**3.0088**	**18.4357**	**7.0898**	**2.7681**	**9.7854**	**0.0000**	**15,217.3961**	**15,217.3961**	**2.6542**	**0.0000**	**15,283.7500**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0297	96.0899	42.7813	0.1453	7.9703	3.0088	10.0615	3.4064	2.7681	5.9552	0.0000	15,217.3961	15,217.3961	2.6542	0.0000	15,283.7500
2020	527.3965	39.2502	39.5153	0.1424	7.9702	0.9669	8.9371	2.1468	0.9083	3.0551	0.0000	14,399.9731	14,399.9731	1.1190	0.0000	14,427.9469
Maximum	**527.3965**	**96.0899**	**42.7813**	**0.1453**	**7.9703**	**3.0088**	**10.0615**	**3.4064**	**2.7681**	**5.9552**	**0.0000**	**15,217.3961**	**15,217.3961**	**2.6542**	**0.0000**	**15,283.7500**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**31.87**	**0.00**	**30.59**	**39.88**	**0.00**	**29.83**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	2	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	2	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	3	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Welders	2	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	2	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	4	10.00	0.00	27,500.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	583.00	227.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	2	117.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.5507	0.0000	12.5507	6.6972	0.0000	6.6972			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704		2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**12.5507**	**1.4896**	**14.0403**	**6.6972**	**1.3704**	**8.0675**		**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3543	67.2326	6.3877	0.1209	1.3212	0.0935	1.4147	0.3630	0.0894	0.4524		12,797.7031	12,797.7031	1.9214		12,845.7381
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**1.4094**	**67.2664**	**6.8320**	**0.1220**	**1.4330**	**0.0942**	**1.5271**	**0.3926**	**0.0901**	**0.4827**		**12,911.4554**	**12,911.4554**	**1.9246**		**12,959.5700**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.6478	0.0000	5.6478	3.0137	0.0000	3.0137			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704	0.0000	2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**5.6478**	**1.4896**	**7.1374**	**3.0137**	**1.3704**	**4.3841**	**0.0000**	**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3543	67.2326	6.3877	0.1209	1.3212	0.0935	1.4147	0.3630	0.0894	0.4524		12,797.7031	12,797.7031	1.9214		12,845.7381
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**1.4094**	**67.2664**	**6.8320**	**0.1220**	**1.4330**	**0.0942**	**1.5271**	**0.3926**	**0.0901**	**0.4827**		**12,911.4554**	**12,911.4554**	**1.9246**		**12,959.5700**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					15.2257	0.0000	15.2257	6.9640	0.0000	6.9640			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669		6,805.3842	6,805.3842	2.1532		6,859.2130
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**15.2257**	**3.0075**	**18.2332**	**6.9640**	**2.7669**	**9.7309**		**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2130**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8516	0.0000	6.8516	3.1338	0.0000	3.1338			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669	0.0000	6,805.3842	6,805.3842	2.1532		6,859.2129
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**6.8516**	**3.0075**	**9.8591**	**3.1338**	**2.7669**	**5.9007**	**0.0000**	**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2129**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591		1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**		**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7561	25.8402	4.8424	0.0597	1.4537	0.1963	1.6500	0.4186	0.1878	0.6063		6,294.7693	6,294.7693	0.5037		6,307.3610
Worker	3.2100	1.9699	25.9001	0.0666	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		6,631.7551	6,631.7551	0.1857		6,636.3967
Total	**3.9661**	**27.8101**	**30.7425**	**0.1263**	**7.9703**	**0.2365**	**8.2068**	**2.1468**	**0.2248**	**2.3716**		**12,926.5245**	**12,926.5245**	**0.6893**		**12,943.7577**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591	0.0000	1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**	**0.0000**	**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7561	25.8402	4.8424	0.0597	1.4537	0.1963	1.6500	0.4186	0.1878	0.6063		6,294.7693	6,294.7693	0.5037		6,307.3610
Worker	3.2100	1.9699	25.9001	0.0666	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		6,631.7551	6,631.7551	0.1857		6,636.3967
Total	**3.9661**	**27.8101**	**30.7425**	**0.1263**	**7.9703**	**0.2365**	**8.2068**	**2.1468**	**0.2248**	**2.3716**		**12,926.5245**	**12,926.5245**	**0.6893**		**12,943.7577**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449		1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**		**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6327	23.3564	4.2729	0.0593	1.4536	0.1329	1.5865	0.4185	0.1271	0.5456		6,251.3740	6,251.3740	0.4689		6,263.0960
Worker	2.9668	1.7546	23.5074	0.0645	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		6,422.2962	6,422.2962	0.1646		6,426.4116
Total	**3.5995**	**25.1110**	**27.7803**	**0.1238**	**7.9702**	**0.1723**	**8.1425**	**2.1468**	**0.1634**	**2.3102**		**12,673.6701**	**12,673.6701**	**0.6335**		**12,689.5077**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449	0.0000	1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**	**0.0000**	**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6327	23.3564	4.2729	0.0593	1.4536	0.1329	1.5865	0.4185	0.1271	0.5456		6,251.3740	6,251.3740	0.4689		6,263.0960
Worker	2.9668	1.7546	23.5074	0.0645	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		6,422.2962	6,422.2962	0.1646		6,426.4116
Total	**3.5995**	**25.1110**	**27.7803**	**0.1238**	**7.9702**	**0.1723**	**8.1425**	**2.1468**	**0.1634**	**2.3102**		**12,673.6701**	**12,673.6701**	**0.6335**		**12,689.5077**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	526.3167					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219		562.8961	562.8961	0.0436		563.9856
Total	**526.8011**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**		**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5954	0.3521	4.7176	0.0129	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,288.8656	1,288.8656	0.0330		1,289.6915
Total	**0.5954**	**0.3521**	**4.7176**	**0.0129**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,288.8656**	**1,288.8656**	**0.0330**		**1,289.6915**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	526.3167					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219	0.0000	562.8961	562.8961	0.0436		563.9856
Total	**526.8011**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**	**0.0000**	**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5954	0.3521	4.7176	0.0129	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,288.8656	1,288.8656	0.0330		1,289.6915
Total	**0.5954**	**0.3521**	**4.7176**	**0.0129**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,288.8656**	**1,288.8656**	**0.0330**		**1,289.6915**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Unmitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Construction - All Equipment - Unmitigated

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment -

Off-road Equipment - Project data

Trips and VMT - Project data

Grading - Project Data

Architectural Coating -

Construction Off-road Equipment Mitigation -

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Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	MaterialImported	0.00	220,000.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	HaulingTripLength	20.00	3.00

2.0 Emissions Summary

DRAFT

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0274	94.2097	38.6602	0.1359	15.4269	3.0088	18.4357	7.0898	2.7681	9.7854	0.0000	14,193.9183	14,193.9183	2.8947	0.0000	14,266.2856
2020	527.3842	39.1885	35.7540	0.1335	7.9702	0.9684	8.9386	2.1468	0.9098	3.0566	0.0000	13,504.1883	13,504.1883	1.1503	0.0000	13,532.9462
Maximum	**527.3842**	**94.2097**	**38.6602**	**0.1359**	**15.4269**	**3.0088**	**18.4357**	**7.0898**	**2.7681**	**9.7854**	**0.0000**	**14,193.9183**	**14,193.9183**	**2.8947**	**0.0000**	**14,266.2856**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0274	94.2097	38.6602	0.1359	7.9703	3.0088	10.0615	3.4064	2.7681	5.9552	0.0000	14,193.9183	14,193.9183	2.8947	0.0000	14,266.2856
2020	527.3842	39.1885	35.7540	0.1335	7.9702	0.9684	8.9386	2.1468	0.9098	3.0566	0.0000	13,504.1883	13,504.1883	1.1503	0.0000	13,532.9462
Maximum	**527.3842**	**94.2097**	**38.6602**	**0.1359**	**7.9703**	**3.0088**	**10.0615**	**3.4064**	**2.7681**	**5.9552**	**0.0000**	**14,193.9183**	**14,193.9183**	**2.8947**	**0.0000**	**14,266.2856**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**31.87**	**0.00**	**30.59**	**39.88**	**0.00**	**29.83**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	2	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	2	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	3	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Welders	2	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	2	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	4	10.00	0.00	27,500.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	583.00	227.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	2	117.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.5507	0.0000	12.5507	6.6972	0.0000	6.6972			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704		2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**12.5507**	**1.4896**	**14.0403**	**6.6972**	**1.3704**	**8.0675**		**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4996	65.3511	9.1352	0.1113	1.3212	0.1017	1.4229	0.3630	0.0973	0.4603		11,785.9259	11,785.9259	2.1624		11,839.9846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**1.5534**	**65.3861**	**9.4953**	**0.1123**	**1.4330**	**0.1024**	**1.5354**	**0.3926**	**0.0980**	**0.4906**		**11,887.9776**	**11,887.9776**	**2.1651**		**11,942.1055**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.6478	0.0000	5.6478	3.0137	0.0000	3.0137			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704	0.0000	2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**5.6478**	**1.4896**	**7.1374**	**3.0137**	**1.3704**	**4.3841**	**0.0000**	**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4996	65.3511	9.1352	0.1113	1.3212	0.1017	1.4229	0.3630	0.0973	0.4603		11,785.9259	11,785.9259	2.1624		11,839.9846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**1.5534**	**65.3861**	**9.4953**	**0.1123**	**1.4330**	**0.1024**	**1.5354**	**0.3926**	**0.0980**	**0.4906**		**11,887.9776**	**11,887.9776**	**2.1651**		**11,942.1055**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					15.2257	0.0000	15.2257	6.9640	0.0000	6.9640			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669		6,805.3842	6,805.3842	2.1532		6,859.2130
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**15.2257**	**3.0075**	**18.2332**	**6.9640**	**2.7669**	**9.7309**		**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2130**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0630	0.6481	1.8400e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		183.6931	183.6931	4.9800e-003		183.8177
Total	**0.0968**	**0.0630**	**0.6481**	**1.8400e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**183.6931**	**183.6931**	**4.9800e-003**		**183.8177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8516	0.0000	6.8516	3.1338	0.0000	3.1338			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669	0.0000	6,805.3842	6,805.3842	2.1532		6,859.2129
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**6.8516**	**3.0075**	**9.8591**	**3.1338**	**2.7669**	**5.9007**	**0.0000**	**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2129**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0630	0.6481	1.8400e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		183.6931	183.6931	4.9800e-003		183.8177
Total	**0.0968**	**0.0630**	**0.6481**	**1.8400e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**183.6931**	**183.6931**	**4.9800e-003**		**183.8177**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591		1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**		**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7937	25.7813	5.6301	0.0575	1.4537	0.1987	1.6524	0.4186	0.1901	0.6087		6,059.5071	6,059.5071	0.5595		6,073.4953
Worker	3.1364	2.0393	20.9912	0.0597	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		5,949.6150	5,949.6150	0.1614		5,953.6510
Total	**3.9301**	**27.8206**	**26.6214**	**0.1172**	**7.9703**	**0.2390**	**8.2092**	**2.1468**	**0.2272**	**2.3739**		**12,009.1221**	**12,009.1221**	**0.7210**		**12,027.1463**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591	0.0000	1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**	**0.0000**	**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7937	25.7813	5.6301	0.0575	1.4537	0.1987	1.6524	0.4186	0.1901	0.6087		6,059.5071	6,059.5071	0.5595		6,073.4953
Worker	3.1364	2.0393	20.9912	0.0597	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		5,949.6150	5,949.6150	0.1614		5,953.6510
Total	**3.9301**	**27.8206**	**26.6214**	**0.1172**	**7.9703**	**0.2390**	**8.2092**	**2.1468**	**0.2272**	**2.3739**		**12,009.1221**	**12,009.1221**	**0.7210**		**12,027.1463**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449		1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**		**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6674	23.2341	5.0031	0.0571	1.4536	0.1344	1.5880	0.4185	0.1286	0.5471		6,016.4707	6,016.4707	0.5218		6,029.5148
Worker	2.9054	1.8151	19.0159	0.0578	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		5,761.4147	5,761.4147	0.1431		5,764.9922
Total	**3.5728**	**25.0492**	**24.0190**	**0.1149**	**7.9702**	**0.1739**	**8.1441**	**2.1468**	**0.1649**	**2.3117**		**11,777.8854**	**11,777.8854**	**0.6649**		**11,794.5070**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449	0.0000	1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**	**0.0000**	**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6674	23.2341	5.0031	0.0571	1.4536	0.1344	1.5880	0.4185	0.1286	0.5471		6,016.4707	6,016.4707	0.5218		6,029.5148
Worker	2.9054	1.8151	19.0159	0.0578	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		5,761.4147	5,761.4147	0.1431		5,764.9922
Total	**3.5728**	**25.0492**	**24.0190**	**0.1149**	**7.9702**	**0.1739**	**8.1441**	**2.1468**	**0.1649**	**2.3117**		**11,777.8854**	**11,777.8854**	**0.6649**		**11,794.5070**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0467	0.4893	1.4900e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		148.2354	148.2354	3.6800e-003		148.3274
Total	**0.0748**	**0.0467**	**0.4893**	**1.4900e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**148.2354**	**148.2354**	**3.6800e-003**		**148.3274**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0467	0.4893	1.4900e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		148.2354	148.2354	3.6800e-003		148.3274
Total	**0.0748**	**0.0467**	**0.4893**	**1.4900e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**148.2354**	**148.2354**	**3.6800e-003**		**148.3274**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	526.3167					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219		562.8961	562.8961	0.0436		563.9856
Total	**526.8011**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**		**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5831	0.3643	3.8162	0.0116	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,156.2359	1,156.2359	0.0287		1,156.9538
Total	**0.5831**	**0.3643**	**3.8162**	**0.0116**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,156.2359**	**1,156.2359**	**0.0287**		**1,156.9538**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	526.3167					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219	0.0000	562.8961	562.8961	0.0436		563.9856
Total	**526.8011**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**	**0.0000**	**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5831	0.3643	3.8162	0.0116	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,156.2359	1,156.2359	0.0287		1,156.9538
Total	**0.5831**	**0.3643**	**3.8162**	**0.0116**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,156.2359**	**1,156.2359**	**0.0287**		**1,156.9538**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Unmitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.2
K4 PROJECT (ON-SITE) CONSTRUCTION – ALL EQUIPMENT – VOC MITIGATION

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K4 - Construction - All Equipment - Low VOC

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment -

Off-road Equipment - Project data

Trips and VMT - Project data

Grading - Project Data

Architectural Coating - Super-low VOC

Construction Off-road Equipment Mitigation -

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K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Summer

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstructionPhase	NumDays	55.00	13.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	30.00	55.00
tblGrading	MaterialImported	0.00	220,000.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	HaulingTripLength	20.00	3.00

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2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0297	96.0899	42.7813	0.1453	15.4269	3.0088	18.4357	7.0898	2.7681	9.7854	0.0000	15,217.3961	15,217.3961	2.6542	0.0000	15,283.7500
2020	53.7114	39.2502	39.5153	0.1424	7.9702	0.9669	8.9371	2.1468	0.9083	3.0551	0.0000	14,399.9731	14,399.9731	1.1190	0.0000	14,427.9469
Maximum	**53.7114**	**96.0899**	**42.7813**	**0.1453**	**15.4269**	**3.0088**	**18.4357**	**7.0898**	**2.7681**	**9.7854**	**0.0000**	**15,217.3961**	**15,217.3961**	**2.6542**	**0.0000**	**15,283.7500**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0297	96.0899	42.7813	0.1453	7.9703	3.0088	10.0615	3.4064	2.7681	5.9552	0.0000	15,217.3961	15,217.3961	2.6542	0.0000	15,283.7500
2020	53.7114	39.2502	39.5153	0.1424	7.9702	0.9669	8.9371	2.1468	0.9083	3.0551	0.0000	14,399.9731	14,399.9731	1.1190	0.0000	14,427.9469
Maximum	**53.7114**	**96.0899**	**42.7813**	**0.1453**	**7.9703**	**3.0088**	**10.0615**	**3.4064**	**2.7681**	**5.9552**	**0.0000**	**15,217.3961**	**15,217.3961**	**2.6542**	**0.0000**	**15,283.7500**

DRAFT

K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Summer

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	31.87	0.00	30.59	39.88	0.00	29.83	0.00	0.00	0.00	0.00	0.00	0.00

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

DRAFT

K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	2	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	2	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	3	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Welders	2	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	2	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	4	10.00	0.00	27,500.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	583.00	227.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	2	117.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.5507	0.0000	12.5507	6.6972	0.0000	6.6972			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704		2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**12.5507**	**1.4896**	**14.0403**	**6.6972**	**1.3704**	**8.0675**		**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3543	67.2326	6.3877	0.1209	1.3212	0.0935	1.4147	0.3630	0.0894	0.4524		12,797.7031	12,797.7031	1.9214		12,845.7381
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**1.4094**	**67.2664**	**6.8320**	**0.1220**	**1.4330**	**0.0942**	**1.5271**	**0.3926**	**0.0901**	**0.4827**		**12,911.4554**	**12,911.4554**	**1.9246**		**12,959.5700**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.6478	0.0000	5.6478	3.0137	0.0000	3.0137			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704	0.0000	2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**5.6478**	**1.4896**	**7.1374**	**3.0137**	**1.3704**	**4.3841**	**0.0000**	**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3543	67.2326	6.3877	0.1209	1.3212	0.0935	1.4147	0.3630	0.0894	0.4524		12,797.7031	12,797.7031	1.9214		12,845.7381
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**1.4094**	**67.2664**	**6.8320**	**0.1220**	**1.4330**	**0.0942**	**1.5271**	**0.3926**	**0.0901**	**0.4827**		**12,911.4554**	**12,911.4554**	**1.9246**		**12,959.5700**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					15.2257	0.0000	15.2257	6.9640	0.0000	6.9640			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669		6,805.3842	6,805.3842	2.1532		6,859.2130
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**15.2257**	**3.0075**	**18.2332**	**6.9640**	**2.7669**	**9.7309**		**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2130**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8516	0.0000	6.8516	3.1338	0.0000	3.1338			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669	0.0000	6,805.3842	6,805.3842	2.1532		6,859.2129
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**6.8516**	**3.0075**	**9.8591**	**3.1338**	**2.7669**	**5.9007**	**0.0000**	**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2129**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0991	0.0608	0.7997	2.0600e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		204.7540	204.7540	5.7300e-003		204.8973
Total	**0.0991**	**0.0608**	**0.7997**	**2.0600e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**204.7540**	**204.7540**	**5.7300e-003**		**204.8973**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591		1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**		**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7561	25.8402	4.8424	0.0597	1.4537	0.1963	1.6500	0.4186	0.1878	0.6063		6,294.7693	6,294.7693	0.5037		6,307.3610
Worker	3.2100	1.9699	25.9001	0.0666	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		6,631.7551	6,631.7551	0.1857		6,636.3967
Total	**3.9661**	**27.8101**	**30.7425**	**0.1263**	**7.9703**	**0.2365**	**8.2068**	**2.1468**	**0.2248**	**2.3716**		**12,926.5245**	**12,926.5245**	**0.6893**		**12,943.7577**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591	0.0000	1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**	**0.0000**	**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7561	25.8402	4.8424	0.0597	1.4537	0.1963	1.6500	0.4186	0.1878	0.6063		6,294.7693	6,294.7693	0.5037		6,307.3610
Worker	3.2100	1.9699	25.9001	0.0666	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		6,631.7551	6,631.7551	0.1857		6,636.3967
Total	**3.9661**	**27.8101**	**30.7425**	**0.1263**	**7.9703**	**0.2365**	**8.2068**	**2.1468**	**0.2248**	**2.3716**		**12,926.5245**	**12,926.5245**	**0.6893**		**12,943.7577**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449		1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**		**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6327	23.3564	4.2729	0.0593	1.4536	0.1329	1.5865	0.4185	0.1271	0.5456		6,251.3740	6,251.3740	0.4689		6,263.0960
Worker	2.9668	1.7546	23.5074	0.0645	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		6,422.2962	6,422.2962	0.1646		6,426.4116
Total	**3.5995**	**25.1110**	**27.7803**	**0.1238**	**7.9702**	**0.1723**	**8.1425**	**2.1468**	**0.1634**	**2.3102**		**12,673.6701**	**12,673.6701**	**0.6335**		**12,689.5077**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449	0.0000	1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**	**0.0000**	**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6327	23.3564	4.2729	0.0593	1.4536	0.1329	1.5865	0.4185	0.1271	0.5456		6,251.3740	6,251.3740	0.4689		6,263.0960
Worker	2.9668	1.7546	23.5074	0.0645	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		6,422.2962	6,422.2962	0.1646		6,426.4116
Total	**3.5995**	**25.1110**	**27.7803**	**0.1238**	**7.9702**	**0.1723**	**8.1425**	**2.1468**	**0.1634**	**2.3102**		**12,673.6701**	**12,673.6701**	**0.6335**		**12,689.5077**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0763	0.0451	0.6048	1.6600e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		165.2392	165.2392	4.2400e-003		165.3451
Total	**0.0763**	**0.0451**	**0.6048**	**1.6600e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**165.2392**	**165.2392**	**4.2400e-003**		**165.3451**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219		562.8961	562.8961	0.0436		563.9856
Total	**53.1160**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**		**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5954	0.3521	4.7176	0.0129	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,288.8656	1,288.8656	0.0330		1,289.6915
Total	**0.5954**	**0.3521**	**4.7176**	**0.0129**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,288.8656**	**1,288.8656**	**0.0330**		**1,289.6915**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219	0.0000	562.8961	562.8961	0.0436		563.9856
Total	**53.1160**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**	**0.0000**	**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5954	0.3521	4.7176	0.0129	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,288.8656	1,288.8656	0.0330		1,289.6915
Total	**0.5954**	**0.3521**	**4.7176**	**0.0129**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,288.8656**	**1,288.8656**	**0.0330**		**1,289.6915**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Unmitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Construction - All Equipment - Low VOC

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment -

Off-road Equipment - Project data

Trips and VMT - Project data

Grading - Project Data

Architectural Coating - Super-low VOC

Construction Off-road Equipment Mitigation -

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K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Winter

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstructionPhase	NumDays	55.00	13.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	30.00	55.00
tblGrading	MaterialImported	0.00	220,000.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	HaulingTripLength	20.00	3.00

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2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0274	94.2097	38.6602	0.1359	15.4269	3.0088	18.4357	7.0898	2.7681	9.7854	0.0000	14,193.9183	14,193.9183	2.8947	0.0000	14,266.2856
2020	53.6991	39.1885	35.7540	0.1335	7.9702	0.9684	8.9386	2.1468	0.9098	3.0566	0.0000	13,504.1883	13,504.1883	1.1503	0.0000	13,532.9462
Maximum	**53.6991**	**94.2097**	**38.6602**	**0.1359**	**15.4269**	**3.0088**	**18.4357**	**7.0898**	**2.7681**	**9.7854**	**0.0000**	**14,193.9183**	**14,193.9183**	**2.8947**	**0.0000**	**14,266.2856**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	6.0274	94.2097	38.6602	0.1359	7.9703	3.0088	10.0615	3.4064	2.7681	5.9552	0.0000	14,193.9183	14,193.9183	2.8947	0.0000	14,266.2856
2020	53.6991	39.1885	35.7540	0.1335	7.9702	0.9684	8.9386	2.1468	0.9098	3.0566	0.0000	13,504.1883	13,504.1883	1.1503	0.0000	13,532.9462
Maximum	**53.6991**	**94.2097**	**38.6602**	**0.1359**	**7.9703**	**3.0088**	**10.0615**	**3.4064**	**2.7681**	**5.9552**	**0.0000**	**14,193.9183**	**14,193.9183**	**2.8947**	**0.0000**	**14,266.2856**

DRAFT

K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Winter

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	31.87	0.00	30.59	39.88	0.00	29.83	0.00	0.00	0.00	0.00	0.00	0.00

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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K4 - Construction - All Equipment - Low VOC - Riverside-South Coast County, Winter

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	2	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	2	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	3	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Welders	2	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	2	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	4	10.00	0.00	27,500.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	583.00	227.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	2	117.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					12.5507	0.0000	12.5507	6.6972	0.0000	6.6972			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704		2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**12.5507**	**1.4896**	**14.0403**	**6.6972**	**1.3704**	**8.0675**		**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4996	65.3511	9.1352	0.1113	1.3212	0.1017	1.4229	0.3630	0.0973	0.4603		11,785.9259	11,785.9259	2.1624		11,839.9846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**1.5534**	**65.3861**	**9.4953**	**0.1123**	**1.4330**	**0.1024**	**1.5354**	**0.3926**	**0.0980**	**0.4906**		**11,887.9776**	**11,887.9776**	**2.1651**		**11,942.1055**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.6478	0.0000	5.6478	3.0137	0.0000	3.0137			0.0000			0.0000
Off-Road	2.7348	28.8236	13.1736	0.0233		1.4896	1.4896		1.3704	1.3704	0.0000	2,305.9407	2,305.9407	0.7296		2,324.1801
Total	**2.7348**	**28.8236**	**13.1736**	**0.0233**	**5.6478**	**1.4896**	**7.1374**	**3.0137**	**1.3704**	**4.3841**	**0.0000**	**2,305.9407**	**2,305.9407**	**0.7296**		**2,324.1801**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.4996	65.3511	9.1352	0.1113	1.3212	0.1017	1.4229	0.3630	0.0973	0.4603		11,785.9259	11,785.9259	2.1624		11,839.9846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**1.5534**	**65.3861**	**9.4953**	**0.1123**	**1.4330**	**0.1024**	**1.5354**	**0.3926**	**0.0980**	**0.4906**		**11,887.9776**	**11,887.9776**	**2.1651**		**11,942.1055**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					15.2257	0.0000	15.2257	6.9640	0.0000	6.9640			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669		6,805.3842	6,805.3842	2.1532		6,859.2130
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**15.2257**	**3.0075**	**18.2332**	**6.9640**	**2.7669**	**9.7309**		**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2130**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0630	0.6481	1.8400e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		183.6931	183.6931	4.9800e-003		183.8177
Total	**0.0968**	**0.0630**	**0.6481**	**1.8400e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**183.6931**	**183.6931**	**4.9800e-003**		**183.8177**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8516	0.0000	6.8516	3.1338	0.0000	3.1338			0.0000			0.0000
Off-Road	5.9306	67.5651	37.3578	0.0687		3.0075	3.0075		2.7669	2.7669	0.0000	6,805.3842	6,805.3842	2.1532		6,859.2129
Total	**5.9306**	**67.5651**	**37.3578**	**0.0687**	**6.8516**	**3.0075**	**9.8591**	**3.1338**	**2.7669**	**5.9007**	**0.0000**	**6,805.3842**	**6,805.3842**	**2.1532**		**6,859.2129**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0630	0.6481	1.8400e-003	0.2012	1.2400e-003	0.2024	0.0534	1.1400e-003	0.0545		183.6931	183.6931	4.9800e-003		183.8177
Total	**0.0968**	**0.0630**	**0.6481**	**1.8400e-003**	**0.2012**	**1.2400e-003**	**0.2024**	**0.0534**	**1.1400e-003**	**0.0545**		**183.6931**	**183.6931**	**4.9800e-003**		**183.8177**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591		1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**		**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7937	25.7813	5.6301	0.0575	1.4537	0.1987	1.6524	0.4186	0.1901	0.6087		6,059.5071	6,059.5071	0.5595		6,073.4953
Worker	3.1364	2.0393	20.9912	0.0597	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		5,949.6150	5,949.6150	0.1614		5,953.6510
Total	**3.9301**	**27.8206**	**26.6214**	**0.1172**	**7.9703**	**0.2390**	**8.2092**	**2.1468**	**0.2272**	**2.3739**		**12,009.1221**	**12,009.1221**	**0.7210**		**12,027.1463**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9387	15.4517	12.0388	0.0187		0.9165	0.9165		0.8591	0.8591	0.0000	1,755.6038	1,755.6038	0.4935		1,767.9421
Total	**1.9387**	**15.4517**	**12.0388**	**0.0187**		**0.9165**	**0.9165**		**0.8591**	**0.8591**	**0.0000**	**1,755.6038**	**1,755.6038**	**0.4935**		**1,767.9421**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.7937	25.7813	5.6301	0.0575	1.4537	0.1987	1.6524	0.4186	0.1901	0.6087		6,059.5071	6,059.5071	0.5595		6,073.4953
Worker	3.1364	2.0393	20.9912	0.0597	6.5166	0.0402	6.5568	1.7282	0.0371	1.7653		5,949.6150	5,949.6150	0.1614		5,953.6510
Total	**3.9301**	**27.8206**	**26.6214**	**0.1172**	**7.9703**	**0.2390**	**8.2092**	**2.1468**	**0.2272**	**2.3739**		**12,009.1221**	**12,009.1221**	**0.7210**		**12,027.1463**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449		1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**		**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6674	23.2341	5.0031	0.0571	1.4536	0.1344	1.5880	0.4185	0.1286	0.5471		6,016.4707	6,016.4707	0.5218		6,029.5148
Worker	2.9054	1.8151	19.0159	0.0578	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		5,761.4147	5,761.4147	0.1431		5,764.9922
Total	**3.5728**	**25.0492**	**24.0190**	**0.1149**	**7.9702**	**0.1739**	**8.1441**	**2.1468**	**0.1649**	**2.3117**		**11,777.8854**	**11,777.8854**	**0.6649**		**11,794.5070**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7355	14.1393	11.7350	0.0187		0.7946	0.7946		0.7449	0.7449	0.0000	1,726.3029	1,726.3029	0.4855		1,738.4392
Total	**1.7355**	**14.1393**	**11.7350**	**0.0187**		**0.7946**	**0.7946**		**0.7449**	**0.7449**	**0.0000**	**1,726.3029**	**1,726.3029**	**0.4855**		**1,738.4392**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6674	23.2341	5.0031	0.0571	1.4536	0.1344	1.5880	0.4185	0.1286	0.5471		6,016.4707	6,016.4707	0.5218		6,029.5148
Worker	2.9054	1.8151	19.0159	0.0578	6.5166	0.0395	6.5560	1.7282	0.0363	1.7646		5,761.4147	5,761.4147	0.1431		5,764.9922
Total	**3.5728**	**25.0492**	**24.0190**	**0.1149**	**7.9702**	**0.1739**	**8.1441**	**2.1468**	**0.1649**	**2.3117**		**11,777.8854**	**11,777.8854**	**0.6649**		**11,794.5070**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926		2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**		**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0467	0.4893	1.4900e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		148.2354	148.2354	3.6800e-003		148.3274
Total	**0.0748**	**0.0467**	**0.4893**	**1.4900e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**148.2354**	**148.2354**	**3.6800e-003**		**148.3274**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.3566	14.0656	14.6521	0.0228		0.7528	0.7528		0.6926	0.6926	0.0000	2,207.7334	2,207.7334	0.7140		2,225.5841
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.2348**	**14.0656**	**14.6521**	**0.0228**		**0.7528**	**0.7528**		**0.6926**	**0.6926**	**0.0000**	**2,207.7334**	**2,207.7334**	**0.7140**		**2,225.5841**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0748	0.0467	0.4893	1.4900e-003	0.1677	1.0200e-003	0.1687	0.0445	9.3000e-004	0.0454		148.2354	148.2354	3.6800e-003		148.3274
Total	**0.0748**	**0.0467**	**0.4893**	**1.4900e-003**	**0.1677**	**1.0200e-003**	**0.1687**	**0.0445**	**9.3000e-004**	**0.0454**		**148.2354**	**148.2354**	**3.6800e-003**		**148.3274**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219		562.8961	562.8961	0.0436		563.9856
Total	**53.1160**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**		**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5831	0.3643	3.8162	0.0116	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,156.2359	1,156.2359	0.0287		1,156.9538
Total	**0.5831**	**0.3643**	**3.8162**	**0.0116**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,156.2359**	**1,156.2359**	**0.0287**		**1,156.9538**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.4844	3.3677	3.6628	5.9400e-003		0.2219	0.2219		0.2219	0.2219	0.0000	562.8961	562.8961	0.0436		563.9856
Total	**53.1160**	**3.3677**	**3.6628**	**5.9400e-003**		**0.2219**	**0.2219**		**0.2219**	**0.2219**	**0.0000**	**562.8961**	**562.8961**	**0.0436**		**563.9856**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5831	0.3643	3.8162	0.0116	1.3078	7.9200e-003	1.3157	0.3468	7.2900e-003	0.3541		1,156.2359	1,156.2359	0.0287		1,156.9538
Total	**0.5831**	**0.3643**	**3.8162**	**0.0116**	**1.3078**	**7.9200e-003**	**1.3157**	**0.3468**	**7.2900e-003**	**0.3541**		**1,156.2359**	**1,156.2359**	**0.0287**		**1,156.9538**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Unmitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.3
K4 PROJECT (ON-SITE) CONSTRUCTION – TIER 3 EQUIPMENT

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K4 - Construction - Tier 3

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project Data

Off-road Equipment - Project data

Trips and VMT - Equipment only

Grading - Equipment only

Architectural Coating - Super-low VOC

Energy Use -

Water And Wastewater -

Construction Off-road Equipment Mitigation - Tier 3 equipment

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
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tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	AcresOfGrading	40.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	VendorTripNumber	227.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	583.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	117.00	0.00

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	3.4979	40.2395	22.7096	0.0419	6.0221	1.7568	7.7789	3.3102	1.6162	4.9265	0.0000	4,152.5993	4,152.5993	1.3138	0.0000	4,185.4453
2020	52.8739	9.4284	7.3260	0.0119	0.0000	0.4945	0.4945	0.0000	0.4619	0.4619	0.0000	1,107.6219	1,107.6219	0.3570	0.0000	1,115.6667
Maximum	**52.8739**	**40.2395**	**22.7096**	**0.0419**	**6.0221**	**1.7568**	**7.7789**	**3.3102**	**1.6162**	**4.9265**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**	**0.0000**	**4,185.4453**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.0307	20.1932	23.0287	0.0419	2.7099	0.8217	3.5316	1.4896	0.8217	2.3113	0.0000	4,152.5993	4,152.5993	1.3138	0.0000	4,185.4453
2020	52.6911	6.4666	8.6478	0.0119	0.0000	0.3598	0.3598	0.0000	0.3598	0.3598	0.0000	1,107.6219	1,107.6219	0.3570	0.0000	1,115.6667
Maximum	**52.6911**	**20.1932**	**23.0287**	**0.0419**	**2.7099**	**0.8217**	**3.5316**	**1.4896**	**0.8217**	**2.3113**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**	**0.0000**	**4,185.4453**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.70**	**46.32**	**-5.46**	**0.00**	**55.00**	**47.52**	**52.96**	**55.00**	**43.15**	**50.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	1	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	2	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	2	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.3674	14.4118	6.5868	0.0116		0.7448	0.7448		0.6852	0.6852		1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**1.3674**	**14.4118**	**6.5868**	**0.0116**	**6.0221**	**0.7448**	**6.7669**	**3.3102**	**0.6852**	**3.9954**		**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.2851	5.7771	6.8727	0.0116		0.2749	0.2749		0.2749	0.2749	0.0000	1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**0.2851**	**5.7771**	**6.8727**	**0.0116**	**2.7099**	**0.2749**	**2.9848**	**1.4896**	**0.2749**	**1.7645**	**0.0000**	**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	3.4979	40.2395	22.7096	0.0419		1.7568	1.7568		1.6162	1.6162		4,152.5993	4,152.5993	1.3138		4,185.4453
Total	**3.4979**	**40.2395**	**22.7096**	**0.0419**	**6.0221**	**1.7568**	**7.7789**	**3.3102**	**1.6162**	**4.9265**		**4,152.5993**	**4,152.5993**	**1.3138**		**4,185.4453**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.0307	20.1932	23.0287	0.0419		0.8217	0.8217		0.8217	0.8217	0.0000	4,152.5993	4,152.5993	1.3138		4,185.4453
Total	**1.0307**	**20.1932**	**23.0287**	**0.0419**	**2.7099**	**0.8217**	**3.5316**	**1.4896**	**0.8217**	**2.3113**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**		**4,185.4453**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1899	10.3539	7.0226	0.0119		0.5697	0.5697		0.5321	0.5321		1,127.7065	1,127.7065	0.3258		1,135.8524
Total	**1.1899**	**10.3539**	**7.0226**	**0.0119**		**0.5697**	**0.5697**		**0.5321**	**0.5321**		**1,127.7065**	**1,127.7065**	**0.3258**		**1,135.8524**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	6.4666	7.3957	0.0119		0.3598	0.3598		0.3598	0.3598	0.0000	1,127.7065	1,127.7065	0.3258		1,135.8524
Total	**0.3341**	**6.4666**	**7.3957**	**0.0119**		**0.3598**	**0.3598**		**0.3598**	**0.3598**	**0.0000**	**1,127.7065**	**1,127.7065**	**0.3258**		**1,135.8524**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0661	9.4284	6.7930	0.0119		0.4945	0.4945		0.4619	0.4619		1,107.6219	1,107.6219	0.3218		1,115.6667
Total	**1.0661**	**9.4284**	**6.7930**	**0.0119**		**0.4945**	**0.4945**		**0.4619**	**0.4619**		**1,107.6219**	**1,107.6219**	**0.3218**		**1,115.6667**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	6.4666	7.3957	0.0119		0.3598	0.3598		0.3598	0.3598	0.0000	1,107.6219	1,107.6219	0.3218		1,115.6667
Total	**0.3341**	**6.4666**	**7.3957**	**0.0119**		**0.3598**	**0.3598**		**0.3598**	**0.3598**	**0.0000**	**1,107.6219**	**1,107.6219**	**0.3218**		**1,115.6667**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5565**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	5.6476	8.6478	0.0114		0.3047	0.3047		0.3047	0.3047	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.1587**	**5.6476**	**8.6478**	**0.0114**		**0.3047**	**0.3047**		**0.3047**	**0.3047**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**52.8739**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**52.6911**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Unmitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Construction - Tier 3

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project Data

Off-road Equipment - Project data

Trips and VMT - Equipment only

Grading - Equipment only

Architectural Coating - Super-low VOC

Energy Use -

Water And Wastewater -

Construction Off-road Equipment Mitigation - Tier 3 equipment

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00

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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	AcresOfGrading	40.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	VendorTripNumber	227.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	10.00	0.00
tblTripsAndVMT	WorkerTripNumber	583.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	117.00	0.00

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	3.4979	40.2395	22.7096	0.0419	6.0221	1.7568	7.7789	3.3102	1.6162	4.9265	0.0000	4,152.5993	4,152.5993	1.3138	0.0000	4,185.4453
2020	52.8739	9.4284	7.3260	0.0119	0.0000	0.4945	0.4945	0.0000	0.4619	0.4619	0.0000	1,107.6219	1,107.6219	0.3570	0.0000	1,115.6667
Maximum	**52.8739**	**40.2395**	**22.7096**	**0.0419**	**6.0221**	**1.7568**	**7.7789**	**3.3102**	**1.6162**	**4.9265**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**	**0.0000**	**4,185.4453**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.0307	20.1932	23.0287	0.0419	2.7099	0.8217	3.5316	1.4896	0.8217	2.3113	0.0000	4,152.5993	4,152.5993	1.3138	0.0000	4,185.4453
2020	52.6911	6.4666	8.6478	0.0119	0.0000	0.3598	0.3598	0.0000	0.3598	0.3598	0.0000	1,107.6219	1,107.6219	0.3570	0.0000	1,115.6667
Maximum	**52.6911**	**20.1932**	**23.0287**	**0.0419**	**2.7099**	**0.8217**	**3.5316**	**1.4896**	**0.8217**	**2.3113**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**	**0.0000**	**4,185.4453**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.70**	**46.32**	**-5.46**	**0.00**	**55.00**	**47.52**	**52.96**	**55.00**	**43.15**	**50.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	1	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	2	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	2	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	4	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.3674	14.4118	6.5868	0.0116		0.7448	0.7448		0.6852	0.6852		1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**1.3674**	**14.4118**	**6.5868**	**0.0116**	**6.0221**	**0.7448**	**6.7669**	**3.3102**	**0.6852**	**3.9954**		**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.2851	5.7771	6.8727	0.0116		0.2749	0.2749		0.2749	0.2749	0.0000	1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**0.2851**	**5.7771**	**6.8727**	**0.0116**	**2.7099**	**0.2749**	**2.9848**	**1.4896**	**0.2749**	**1.7645**	**0.0000**	**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	3.4979	40.2395	22.7096	0.0419		1.7568	1.7568		1.6162	1.6162		4,152.5993	4,152.5993	1.3138		4,185.4453
Total	**3.4979**	**40.2395**	**22.7096**	**0.0419**	**6.0221**	**1.7568**	**7.7789**	**3.3102**	**1.6162**	**4.9265**		**4,152.5993**	**4,152.5993**	**1.3138**		**4,185.4453**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	1.0307	20.1932	23.0287	0.0419		0.8217	0.8217		0.8217	0.8217	0.0000	4,152.5993	4,152.5993	1.3138		4,185.4453
Total	**1.0307**	**20.1932**	**23.0287**	**0.0419**	**2.7099**	**0.8217**	**3.5316**	**1.4896**	**0.8217**	**2.3113**	**0.0000**	**4,152.5993**	**4,152.5993**	**1.3138**		**4,185.4453**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.1899	10.3539	7.0226	0.0119		0.5697	0.5697		0.5321	0.5321		1,127.7065	1,127.7065	0.3258		1,135.8524
Total	**1.1899**	**10.3539**	**7.0226**	**0.0119**		**0.5697**	**0.5697**		**0.5321**	**0.5321**		**1,127.7065**	**1,127.7065**	**0.3258**		**1,135.8524**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	6.4666	7.3957	0.0119		0.3598	0.3598		0.3598	0.3598	0.0000	1,127.7065	1,127.7065	0.3258		1,135.8524
Total	**0.3341**	**6.4666**	**7.3957**	**0.0119**		**0.3598**	**0.3598**		**0.3598**	**0.3598**	**0.0000**	**1,127.7065**	**1,127.7065**	**0.3258**		**1,135.8524**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.0661	9.4284	6.7930	0.0119		0.4945	0.4945		0.4619	0.4619		1,107.6219	1,107.6219	0.3218		1,115.6667
Total	**1.0661**	**9.4284**	**6.7930**	**0.0119**		**0.4945**	**0.4945**		**0.4619**	**0.4619**		**1,107.6219**	**1,107.6219**	**0.3218**		**1,115.6667**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3341	6.4666	7.3957	0.0119		0.3598	0.3598		0.3598	0.3598	0.0000	1,107.6219	1,107.6219	0.3218		1,115.6667
Total	**0.3341**	**6.4666**	**7.3957**	**0.0119**		**0.3598**	**0.3598**		**0.3598**	**0.3598**	**0.0000**	**1,107.6219**	**1,107.6219**	**0.3218**		**1,115.6667**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5565**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2805	5.6476	8.6478	0.0114		0.3047	0.3047		0.3047	0.3047	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.1587**	**5.6476**	**8.6478**	**0.0114**		**0.3047**	**0.3047**		**0.3047**	**0.3047**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**52.8739**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0594	1.3570	1.8324	2.9700e-003		0.0951	0.0951		0.0951	0.0951	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**52.6911**	**1.3570**	**1.8324**	**2.9700e-003**		**0.0951**	**0.0951**		**0.0951**	**0.0951**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Unmitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.4
K4 PROJECT (ON-SITE) CONSTRUCTION – TIER 4 EQUIPMENT

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K4 - Construction - Tier 4

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project Data

Off-road Equipment - Project data

Trips and VMT - Equipment only

Grading - Equipment only

Architectural Coating - Super-low VOC

Energy Use -

Water And Wastewater -

Construction Off-road Equipment Mitigation - Tier 4 equipment

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	AcresOfGrading	20.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	VendorTripNumber	227.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	583.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	117.00	0.00

2.0 Emissions Summary

DRAFT

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.4327	27.3256	14.6482	0.0268	6.0221	1.2508	7.2729	3.3102	1.1507	4.4609	0.0000	2,652.7848	2,652.7848	0.8393	0.0000	2,673.7677
2020	52.8739	7.0328	7.3260	0.0114	0.0000	0.3764	0.3764	0.0000	0.3463	0.3463	0.0000	1,103.8667	1,103.8667	0.3570	0.0000	1,112.7920
Maximum	**52.8739**	**27.3256**	**14.6482**	**0.0268**	**6.0221**	**1.2508**	**7.2729**	**3.3102**	**1.1507**	**4.4609**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**	**0.0000**	**2,673.7677**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.3290	1.4254	13.0109	0.0268	2.7099	0.0439	2.7538	1.4896	0.0439	1.5335	0.0000	2,652.7848	2,652.7848	0.8393	0.0000	2,673.7677
2020	52.6614	1.2296	8.6478	0.0114	0.0000	0.0187	0.0187	0.0000	0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570	0.0000	1,112.7920
Maximum	**52.6614**	**1.4254**	**13.0109**	**0.0268**	**2.7099**	**0.0439**	**2.7538**	**1.4896**	**0.0439**	**1.5335**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**	**0.0000**	**2,673.7677**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.19**	**92.27**	**1.44**	**0.00**	**55.00**	**96.16**	**63.75**	**55.00**	**95.82**	**67.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Total	**19.2541**	**21.6095**	**39.2093**	**0.1545**	**11.0262**	**0.1667**	**11.1929**	**2.9505**	**0.1589**	**3.1094**		**15,957.7377**	**15,957.7377**	**0.7167**	**8.6100e-003**	**15,978.2229**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	1	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	1	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	2	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.3674	14.4118	6.5868	0.0116		0.7448	0.7448		0.6852	0.6852		1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**1.3674**	**14.4118**	**6.5868**	**0.0116**	**6.0221**	**0.7448**	**6.7669**	**3.3102**	**0.6852**	**3.9954**		**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.1425	0.6176	6.1756	0.0116		0.0190	0.0190		0.0190	0.0190	0.0000	1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**0.1425**	**0.6176**	**6.1756**	**0.0116**	**2.7099**	**0.0190**	**2.7289**	**1.4896**	**0.0190**	**1.5086**	**0.0000**	**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	2.4327	27.3256	14.6482	0.0268		1.2508	1.2508		1.1507	1.1507		2,652.7848	2,652.7848	0.8393		2,673.7677
Total	**2.4327**	**27.3256**	**14.6482**	**0.0268**	**6.0221**	**1.2508**	**7.2729**	**3.3102**	**1.1507**	**4.4609**		**2,652.7848**	**2,652.7848**	**0.8393**		**2,673.7677**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.3290	1.4254	13.0109	0.0268		0.0439	0.0439		0.0439	0.0439	0.0000	2,652.7848	2,652.7848	0.8393		2,673.7677
Total	**0.3290**	**1.4254**	**13.0109**	**0.0268**	**2.7099**	**0.0439**	**2.7538**	**1.4896**	**0.0439**	**1.5335**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**		**2,673.7677**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7488	5.0978	5.0162	6.8000e-003		0.3469	0.3469		0.3271	0.3271		627.8973	627.8973	0.1677		632.0897
Total	**0.7488**	**5.0978**	**5.0162**	**6.8000e-003**		**0.3469**	**0.3469**		**0.3271**	**0.3271**		**627.8973**	**627.8973**	**0.1677**		**632.0897**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0959	1.2296	4.7077	6.8000e-003		9.8600e-003	9.8600e-003		9.8600e-003	9.8600e-003	0.0000	627.8973	627.8973	0.1677		632.0897
Total	**0.0959**	**1.2296**	**4.7077**	**6.8000e-003**		**9.8600e-003**	**9.8600e-003**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**627.8973**	**627.8973**	**0.1677**		**632.0897**

DRAFT

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6694	4.7108	4.9420	6.8000e-003		0.3000	0.3000		0.2830	0.2830		618.6810	618.6810	0.1637		622.7725
Total	**0.6694**	**4.7108**	**4.9420**	**6.8000e-003**		**0.3000**	**0.3000**		**0.2830**	**0.2830**		**618.6810**	**618.6810**	**0.1637**		**622.7725**

DRAFT

3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0959	1.2296	4.7077	6.8000e-003		9.8600e-003	9.8600e-003		9.8600e-003	9.8600e-003	0.0000	618.6810	618.6810	0.1637		622.7725
Total	**0.0959**	**1.2296**	**4.7077**	**6.8000e-003**		**9.8600e-003**	**9.8600e-003**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**618.6810**	**618.6810**	**0.1637**		**622.7725**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5565**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.0185**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**52.8739**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**52.6614**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117
Unmitigated	2.8695	21.2167	38.7378	0.1521	11.0262	0.1364	11.1626	2.9505	0.1286	3.0792		15,487.6387	15,487.6387	0.7069		15,505.3117

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Construction - Tier 4

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project Data

Off-road Equipment - Project data

Trips and VMT - Equipment only

Grading - Equipment only

Architectural Coating - Super-low VOC

Energy Use -

Water And Wastewater -

Construction Off-road Equipment Mitigation - Tier 4 equipment

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	10.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	10.00
tblArchitecturalCoating	EF_Parking	100.00	10.00
tblArchitecturalCoating	EF_Residential_Exterior	50.00	10.00
tblArchitecturalCoating	EF_Residential_Interior	50.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00

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tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	AcresOfGrading	20.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	VendorTripNumber	227.00	0.00
tblTripsAndVMT	WorkerTripNumber	5.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	583.00	0.00
tblTripsAndVMT	WorkerTripNumber	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	117.00	0.00

2.0 Emissions Summary

DRAFT

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.4327	27.3256	14.6482	0.0268	6.0221	1.2508	7.2729	3.3102	1.1507	4.4609	0.0000	2,652.7848	2,652.7848	0.8393	0.0000	2,673.7677
2020	52.8739	7.0328	7.3260	0.0114	0.0000	0.3764	0.3764	0.0000	0.3463	0.3463	0.0000	1,103.8667	1,103.8667	0.3570	0.0000	1,112.7920
Maximum	**52.8739**	**27.3256**	**14.6482**	**0.0268**	**6.0221**	**1.2508**	**7.2729**	**3.3102**	**1.1507**	**4.4609**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**	**0.0000**	**2,673.7677**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.3290	1.4254	13.0109	0.0268	2.7099	0.0439	2.7538	1.4896	0.0439	1.5335	0.0000	2,652.7848	2,652.7848	0.8393	0.0000	2,673.7677
2020	52.6614	1.2296	8.6478	0.0114	0.0000	0.0187	0.0187	0.0000	0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570	0.0000	1,112.7920
Maximum	**52.6614**	**1.4254**	**13.0109**	**0.0268**	**2.7099**	**0.0439**	**2.7538**	**1.4896**	**0.0439**	**1.5335**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**	**0.0000**	**2,673.7677**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.19**	**92.27**	**1.44**	**0.00**	**55.00**	**96.16**	**63.75**	**55.00**	**95.82**	**67.71**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Total	**18.8454**	**21.8006**	**33.5383**	**0.1427**	**11.0262**	**0.1676**	**11.1938**	**2.9505**	**0.1598**	**3.1103**		**14,780.6366**	**14,780.6366**	**0.7272**	**8.6100e-003**	**14,801.3831**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	1	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	1	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	1	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	1	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	1	8.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	2	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	3	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	1.3674	14.4118	6.5868	0.0116		0.7448	0.7448		0.6852	0.6852		1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**1.3674**	**14.4118**	**6.5868**	**0.0116**	**6.0221**	**0.7448**	**6.7669**	**3.3102**	**0.6852**	**3.9954**		**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.1425	0.6176	6.1756	0.0116		0.0190	0.0190		0.0190	0.0190	0.0000	1,152.9703	1,152.9703	0.3648		1,162.0900
Total	**0.1425**	**0.6176**	**6.1756**	**0.0116**	**2.7099**	**0.0190**	**2.7289**	**1.4896**	**0.0190**	**1.5086**	**0.0000**	**1,152.9703**	**1,152.9703**	**0.3648**		**1,162.0900**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.0221	0.0000	6.0221	3.3102	0.0000	3.3102			0.0000			0.0000
Off-Road	2.4327	27.3256	14.6482	0.0268		1.2508	1.2508		1.1507	1.1507		2,652.7848	2,652.7848	0.8393		2,673.7677
Total	**2.4327**	**27.3256**	**14.6482**	**0.0268**	**6.0221**	**1.2508**	**7.2729**	**3.3102**	**1.1507**	**4.4609**		**2,652.7848**	**2,652.7848**	**0.8393**		**2,673.7677**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.7099	0.0000	2.7099	1.4896	0.0000	1.4896			0.0000			0.0000
Off-Road	0.3290	1.4254	13.0109	0.0268		0.0439	0.0439		0.0439	0.0439	0.0000	2,652.7848	2,652.7848	0.8393		2,673.7677
Total	**0.3290**	**1.4254**	**13.0109**	**0.0268**	**2.7099**	**0.0439**	**2.7538**	**1.4896**	**0.0439**	**1.5335**	**0.0000**	**2,652.7848**	**2,652.7848**	**0.8393**		**2,673.7677**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7488	5.0978	5.0162	6.8000e-003		0.3469	0.3469		0.3271	0.3271		627.8973	627.8973	0.1677		632.0897
Total	**0.7488**	**5.0978**	**5.0162**	**6.8000e-003**		**0.3469**	**0.3469**		**0.3271**	**0.3271**		**627.8973**	**627.8973**	**0.1677**		**632.0897**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0959	1.2296	4.7077	6.8000e-003		9.8600e-003	9.8600e-003		9.8600e-003	9.8600e-003	0.0000	627.8973	627.8973	0.1677		632.0897
Total	**0.0959**	**1.2296**	**4.7077**	**6.8000e-003**		**9.8600e-003**	**9.8600e-003**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**627.8973**	**627.8973**	**0.1677**		**632.0897**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6694	4.7108	4.9420	6.8000e-003		0.3000	0.3000		0.2830	0.2830		618.6810	618.6810	0.1637		622.7725
Total	**0.6694**	**4.7108**	**4.9420**	**6.8000e-003**		**0.3000**	**0.3000**		**0.2830**	**0.2830**		**618.6810**	**618.6810**	**0.1637**		**622.7725**

DRAFT

3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0959	1.2296	4.7077	6.8000e-003		9.8600e-003	9.8600e-003		9.8600e-003	9.8600e-003	0.0000	618.6810	618.6810	0.1637		622.7725
Total	**0.0959**	**1.2296**	**4.7077**	**6.8000e-003**		**9.8600e-003**	**9.8600e-003**		**9.8600e-003**	**9.8600e-003**	**0.0000**	**618.6810**	**618.6810**	**0.1637**		**622.7725**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6783	7.0328	7.3260	0.0114		0.3764	0.3764		0.3463	0.3463		1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.5565**	**7.0328**	**7.3260**	**0.0114**		**0.3764**	**0.3764**		**0.3463**	**0.3463**		**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1402	0.6077	8.6478	0.0114		0.0187	0.0187		0.0187	0.0187	0.0000	1,103.8667	1,103.8667	0.3570		1,112.7920
Paving	2.8783					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**3.0185**	**0.6077**	**8.6478**	**0.0114**		**0.0187**	**0.0187**		**0.0187**	**0.0187**	**0.0000**	**1,103.8667**	**1,103.8667**	**0.3570**		**1,112.7920**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**52.8739**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	52.6317					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.0297	0.1288	1.8324	2.9700e-003		3.9600e-003	3.9600e-003		3.9600e-003	3.9600e-003	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**52.6614**	**0.1288**	**1.8324**	**2.9700e-003**		**3.9600e-003**	**3.9600e-003**		**3.9600e-003**	**3.9600e-003**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720
Unmitigated	2.4607	21.4078	33.0669	0.1403	11.0262	0.1374	11.1636	2.9505	0.1296	3.0801		14,310.5376	14,310.5376	0.7174		14,328.4720

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.5
CACTUS CHANNEL (OFF-SITE) CONSTRUCTION – ALL EQUIPMENT – UNMITIGATED

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K4 - Cactus Channel - Unmitigated

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Trips and VMT -

Grading -

Energy Use -

Construction Off-road Equipment Mitigation -

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Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblGrading	MaterialExported	0.00	60,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.6932	29.5650	12.0737	0.0677	1.1634	0.6355	1.7989	0.3109	0.5865	0.8974	0.0000	7,009.9312	7,009.9312	1.0062	0.0000	7,035.0871
2020	0.4687	5.4006	2.2363	6.1000e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	591.8375	591.8375	0.1816	0.0000	596.3767
Maximum	**1.6932**	**29.5650**	**12.0737**	**0.0677**	**1.1634**	**0.6355**	**1.7989**	**0.3109**	**0.5865**	**0.8974**	**0.0000**	**7,009.9312**	**7,009.9312**	**1.0062**	**0.0000**	**7,035.0871**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.6932	29.5650	12.0737	0.0677	1.1317	0.6355	1.7672	0.3061	0.5865	0.8926	0.0000	7,009.9312	7,009.9312	1.0062	0.0000	7,035.0871
2020	0.4687	5.4006	2.2363	6.1000e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	591.8375	591.8375	0.1816	0.0000	596.3767
Maximum	**1.6932**	**29.5650**	**12.0737**	**0.0677**	**1.1317**	**0.6355**	**1.7672**	**0.3061**	**0.5865**	**0.8926**	**0.0000**	**7,009.9312**	**7,009.9312**	**1.0062**	**0.0000**	**7,035.0871**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**2.65**	**0.00**	**1.54**	**1.50**	**0.00**	**0.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	2	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	2	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	1	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	4	10.00	0.00	7,500.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0576	0.0000	0.0576	8.7200e-003	0.0000	8.7200e-003			0.0000			0.0000
Off-Road	1.3190	15.0165	9.8840	0.0228		0.5823	0.5823		0.5357	0.5357		2,259.8623	2,259.8623	0.7150		2,277.7372
Total	**1.3190**	**15.0165**	**9.8840**	**0.0228**	**0.0576**	**0.5823**	**0.6399**	**8.7200e-003**	**0.5357**	**0.5445**		**2,259.8623**	**2,259.8623**	**0.7150**		**2,277.7372**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3192	14.5148	1.7455	0.0437	0.9941	0.0525	1.0465	0.2725	0.0502	0.3227		4,636.3167	4,636.3167	0.2881		4,643.5180
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**0.3742**	**14.5486**	**2.1897**	**0.0449**	**1.1058**	**0.0531**	**1.1590**	**0.3022**	**0.0508**	**0.3530**		**4,750.0690**	**4,750.0690**	**0.2912**		**4,757.3499**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0259	0.0000	0.0259	3.9200e-003	0.0000	3.9200e-003			0.0000			0.0000
Off-Road	1.3190	15.0165	9.8840	0.0228		0.5823	0.5823		0.5357	0.5357	0.0000	2,259.8623	2,259.8623	0.7150		2,277.7372
Total	**1.3190**	**15.0165**	**9.8840**	**0.0228**	**0.0259**	**0.5823**	**0.6082**	**3.9200e-003**	**0.5357**	**0.5397**	**0.0000**	**2,259.8623**	**2,259.8623**	**0.7150**		**2,277.7372**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3192	14.5148	1.7455	0.0437	0.9941	0.0525	1.0465	0.2725	0.0502	0.3227		4,636.3167	4,636.3167	0.2881		4,643.5180
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0551	0.0338	0.4443	1.1400e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		113.7522	113.7522	3.1800e-003		113.8319
Total	**0.3742**	**14.5486**	**2.1897**	**0.0449**	**1.1058**	**0.0531**	**1.1590**	**0.3022**	**0.0508**	**0.3530**		**4,750.0690**	**4,750.0690**	**0.2912**		**4,757.3499**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343		571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**		**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0165**	**0.0101**	**0.1333**	**3.4000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**34.1257**	**34.1257**	**9.6000e-004**		**34.1496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343	0.0000	571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**	**0.0000**	**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0165**	**0.0101**	**0.1333**	**3.4000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**34.1257**	**34.1257**	**9.6000e-004**		**34.1496**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**		**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0153	9.0300e-003	0.1210	3.3000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		33.0478	33.0478	8.5000e-004		33.0690
Total	**0.0153**	**9.0300e-003**	**0.1210**	**3.3000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**33.0478**	**33.0478**	**8.5000e-004**		**33.0690**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045	0.0000	558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**	**0.0000**	**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0153	9.0300e-003	0.1210	3.3000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		33.0478	33.0478	8.5000e-004		33.0690
Total	**0.0153**	**9.0300e-003**	**0.1210**	**3.3000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**33.0478**	**33.0478**	**8.5000e-004**		**33.0690**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Cactus Channel - Unmitigated

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Trips and VMT -

Grading -

Energy Use -

Construction Off-road Equipment Mitigation -

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Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblGrading	MaterialExported	0.00	60,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.7084	29.7124	12.2960	0.0665	1.1634	0.6364	1.7998	0.3109	0.5874	0.8983	0.0000	6,883.2560	6,883.2560	1.0332	0.0000	6,909.0851
2020	0.4684	5.4009	2.2132	6.0700e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	588.4367	588.4367	0.1815	0.0000	592.9732
Maximum	**1.7084**	**29.7124**	**12.2960**	**0.0665**	**1.1634**	**0.6364**	**1.7998**	**0.3109**	**0.5874**	**0.8983**	**0.0000**	**6,883.2560**	**6,883.2560**	**1.0332**	**0.0000**	**6,909.0851**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	1.7084	29.7124	12.2960	0.0665	1.1317	0.6364	1.7681	0.3061	0.5874	0.8935	0.0000	6,883.2560	6,883.2560	1.0332	0.0000	6,909.0851
2020	0.4684	5.4009	2.2132	6.0700e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	588.4367	588.4367	0.1815	0.0000	592.9732
Maximum	**1.7084**	**29.7124**	**12.2960**	**0.0665**	**1.1317**	**0.6364**	**1.7681**	**0.3061**	**0.5874**	**0.8935**	**0.0000**	**6,883.2560**	**6,883.2560**	**1.0332**	**0.0000**	**6,909.0851**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**2.65**	**0.00**	**1.54**	**1.50**	**0.00**	**0.43**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	2	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	2	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	1	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	4	10.00	0.00	7,500.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0576	0.0000	0.0576	8.7200e-003	0.0000	8.7200e-003			0.0000			0.0000
Off-Road	1.3190	15.0165	9.8840	0.0228		0.5823	0.5823		0.5357	0.5357		2,259.8623	2,259.8623	0.7150		2,277.7372
Total	**1.3190**	**15.0165**	**9.8840**	**0.0228**	**0.0576**	**0.5823**	**0.6399**	**8.7200e-003**	**0.5357**	**0.5445**		**2,259.8623**	**2,259.8623**	**0.7150**		**2,277.7372**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3356	14.6610	2.0520	0.0426	0.9941	0.0534	1.0474	0.2725	0.0511	0.3236		4,521.3421	4,521.3421	0.3154		4,529.2270
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**0.3894**	**14.6960**	**2.4121**	**0.0437**	**1.1058**	**0.0541**	**1.1599**	**0.3022**	**0.0517**	**0.3539**		**4,623.3938**	**4,623.3938**	**0.3182**		**4,631.3479**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0259	0.0000	0.0259	3.9200e-003	0.0000	3.9200e-003			0.0000			0.0000
Off-Road	1.3190	15.0165	9.8840	0.0228		0.5823	0.5823		0.5357	0.5357	0.0000	2,259.8623	2,259.8623	0.7150		2,277.7372
Total	**1.3190**	**15.0165**	**9.8840**	**0.0228**	**0.0259**	**0.5823**	**0.6082**	**3.9200e-003**	**0.5357**	**0.5397**	**0.0000**	**2,259.8623**	**2,259.8623**	**0.7150**		**2,277.7372**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.3356	14.6610	2.0520	0.0426	0.9941	0.0534	1.0474	0.2725	0.0511	0.3236		4,521.3421	4,521.3421	0.3154		4,529.2270
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0538	0.0350	0.3601	1.0200e-003	0.1118	6.9000e-004	0.1125	0.0296	6.4000e-004	0.0303		102.0517	102.0517	2.7700e-003		102.1209
Total	**0.3894**	**14.6960**	**2.4121**	**0.0437**	**1.1058**	**0.0541**	**1.1599**	**0.3022**	**0.0517**	**0.3539**		**4,623.3938**	**4,623.3938**	**0.3182**		**4,631.3479**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343		571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**		**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0161	0.0105	0.1080	3.1000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		30.6155	30.6155	8.3000e-004		30.6363
Total	**0.0161**	**0.0105**	**0.1080**	**3.1000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**30.6155**	**30.6155**	**8.3000e-004**		**30.6363**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343	0.0000	571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**	**0.0000**	**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0161	0.0105	0.1080	3.1000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		30.6155	30.6155	8.3000e-004		30.6363
Total	**0.0161**	**0.0105**	**0.1080**	**3.1000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**30.6155**	**30.6155**	**8.3000e-004**		**30.6363**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**		**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0150	9.3400e-003	0.0979	3.0000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		29.6471	29.6471	7.4000e-004		29.6655
Total	**0.0150**	**9.3400e-003**	**0.0979**	**3.0000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**29.6471**	**29.6471**	**7.4000e-004**		**29.6655**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045	0.0000	558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**	**0.0000**	**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0150	9.3400e-003	0.0979	3.0000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		29.6471	29.6471	7.4000e-004		29.6655
Total	**0.0150**	**9.3400e-003**	**0.0979**	**3.0000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**29.6471**	**29.6471**	**7.4000e-004**		**29.6655**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.6
CACTUS CHANNEL (OFF-SITE) CONSTRUCTION – TIER 3 EQUIPMENT

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K4 - Cactus Channel - Tier 3

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Construction Off-road Equipment Mitigation - Tier 3 equipment

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Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.6870	7.5251	5.1641	0.0120	0.0559	0.2915	0.3474	0.0148	0.2682	0.2830	0.0000	1,186.8073	1,186.8073	0.3591	0.0000	1,195.7845
2020	0.4687	5.4006	2.2363	6.1000e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	591.8375	591.8375	0.1816	0.0000	596.3767
Maximum	**0.6870**	**7.5251**	**5.1641**	**0.0120**	**0.0559**	**0.2915**	**0.3474**	**0.0148**	**0.2682**	**0.2830**	**0.0000**	**1,186.8073**	**1,186.8073**	**0.3591**	**0.0000**	**1,195.7845**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.3093	5.4639	7.4913	0.0120	0.0559	0.2324	0.2883	0.0148	0.2323	0.2472	0.0000	1,186.8073	1,186.8073	0.3591	0.0000	1,195.7845
2020	0.1571	2.7501	3.1929	6.1000e-003	0.0335	0.1042	0.1377	8.8900e-003	0.1042	0.1131	0.0000	591.8375	591.8375	0.1816	0.0000	596.3767
Maximum	**0.3093**	**5.4639**	**7.4913**	**0.0120**	**0.0559**	**0.2324**	**0.2883**	**0.0148**	**0.2323**	**0.2472**	**0.0000**	**1,186.8073**	**1,186.8073**	**0.3591**	**0.0000**	**1,195.7845**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**59.65**	**36.45**	**-44.37**	**0.00**	**0.00**	**34.52**	**29.41**	**0.00**	**28.84**	**27.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	1	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	1	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	1	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.6595	7.5082	4.9420	0.0114		0.2912	0.2912		0.2679	0.2679		1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.6595**	**7.5082**	**4.9420**	**0.0114**	**0.0000**	**0.2912**	**0.2912**	**0.0000**	**0.2679**	**0.2679**		**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0275	0.0169	0.2221	5.7000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		56.8761	56.8761	1.5900e-003		56.9159
Total	**0.0275**	**0.0169**	**0.2221**	**5.7000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**56.8761**	**56.8761**	**1.5900e-003**		**56.9159**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2817	5.4470	7.2692	0.0114		0.2320	0.2320		0.2320	0.2320	0.0000	1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.2817**	**5.4470**	**7.2692**	**0.0114**	**0.0000**	**0.2320**	**0.2320**	**0.0000**	**0.2320**	**0.2320**	**0.0000**	**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0275	0.0169	0.2221	5.7000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		56.8761	56.8761	1.5900e-003		56.9159
Total	**0.0275**	**0.0169**	**0.2221**	**5.7000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**56.8761**	**56.8761**	**1.5900e-003**		**56.9159**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343		571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**		**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0165**	**0.0101**	**0.1333**	**3.4000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**34.1257**	**34.1257**	**9.6000e-004**		**34.1496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1418	2.7411	3.0719	5.7700e-003		0.1040	0.1040		0.1040	0.1040	0.0000	571.2106	571.2106	0.1807		575.7287
Total	**0.1418**	**2.7411**	**3.0719**	**5.7700e-003**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0165	0.0101	0.1333	3.4000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		34.1257	34.1257	9.6000e-004		34.1496
Total	**0.0165**	**0.0101**	**0.1333**	**3.4000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**34.1257**	**34.1257**	**9.6000e-004**		**34.1496**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**		**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0153	9.0300e-003	0.1210	3.3000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		33.0478	33.0478	8.5000e-004		33.0690
Total	**0.0153**	**9.0300e-003**	**0.1210**	**3.3000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**33.0478**	**33.0478**	**8.5000e-004**		**33.0690**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1418	2.7411	3.0719	5.7700e-003		0.1040	0.1040		0.1040	0.1040	0.0000	558.7896	558.7896	0.1807		563.3077
Total	**0.1418**	**2.7411**	**3.0719**	**5.7700e-003**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0153	9.0300e-003	0.1210	3.3000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		33.0478	33.0478	8.5000e-004		33.0690
Total	**0.0153**	**9.0300e-003**	**0.1210**	**3.3000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**33.0478**	**33.0478**	**8.5000e-004**		**33.0690**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Cactus Channel - Tier 3

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Construction Off-road Equipment Mitigation - Tier 3 equipment

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Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.6864	7.5257	5.1220	0.0119	0.0559	0.2915	0.3474	0.0148	0.2682	0.2830	0.0000	1,180.9570	1,180.9570	0.3589	0.0000	1,189.9291
2020	0.4684	5.4009	2.2132	6.0700e-003	0.0335	0.2225	0.2560	8.8900e-003	0.2047	0.2136	0.0000	588.4367	588.4367	0.1815	0.0000	592.9732
Maximum	**0.6864**	**7.5257**	**5.1220**	**0.0119**	**0.0559**	**0.2915**	**0.3474**	**0.0148**	**0.2682**	**0.2830**	**0.0000**	**1,180.9570**	**1,180.9570**	**0.3589**	**0.0000**	**1,189.9291**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.3086	5.4645	7.4492	0.0119	0.0559	0.2324	0.2883	0.0148	0.2323	0.2472	0.0000	1,180.9570	1,180.9570	0.3589	0.0000	1,189.9291
2020	0.1567	2.7504	3.1698	6.0700e-003	0.0335	0.1042	0.1377	8.8900e-003	0.1042	0.1131	0.0000	588.4367	588.4367	0.1815	0.0000	592.9732
Maximum	**0.3086**	**5.4645**	**7.4492**	**0.0119**	**0.0559**	**0.2324**	**0.2883**	**0.0148**	**0.2323**	**0.2472**	**0.0000**	**1,180.9570**	**1,180.9570**	**0.3589**	**0.0000**	**1,189.9291**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**59.70**	**36.45**	**-44.77**	**0.00**	**0.00**	**34.52**	**29.41**	**0.00**	**28.84**	**27.46**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	1	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	1	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	1	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.6595	7.5082	4.9420	0.0114		0.2912	0.2912		0.2679	0.2679		1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.6595**	**7.5082**	**4.9420**	**0.0114**	**0.0000**	**0.2912**	**0.2912**	**0.0000**	**0.2679**	**0.2679**		**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0269	0.0175	0.1800	5.1000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		51.0259	51.0259	1.3800e-003		51.0605
Total	**0.0269**	**0.0175**	**0.1800**	**5.1000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**51.0259**	**51.0259**	**1.3800e-003**		**51.0605**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.2817	5.4470	7.2692	0.0114		0.2320	0.2320		0.2320	0.2320	0.0000	1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.2817**	**5.4470**	**7.2692**	**0.0114**	**0.0000**	**0.2320**	**0.2320**	**0.0000**	**0.2320**	**0.2320**	**0.0000**	**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0269	0.0175	0.1800	5.1000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		51.0259	51.0259	1.3800e-003		51.0605
Total	**0.0269**	**0.0175**	**0.1800**	**5.1000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**51.0259**	**51.0259**	**1.3800e-003**		**51.0605**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.5040	6.0070	2.2930	5.7700e-003		0.2546	0.2546		0.2343	0.2343		571.2106	571.2106	0.1807		575.7287
Total	**0.5040**	**6.0070**	**2.2930**	**5.7700e-003**	**0.0000**	**0.2546**	**0.2546**	**0.0000**	**0.2343**	**0.2343**		**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0161	0.0105	0.1080	3.1000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		30.6155	30.6155	8.3000e-004		30.6363
Total	**0.0161**	**0.0105**	**0.1080**	**3.1000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**30.6155**	**30.6155**	**8.3000e-004**		**30.6363**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1418	2.7411	3.0719	5.7700e-003		0.1040	0.1040		0.1040	0.1040	0.0000	571.2106	571.2106	0.1807		575.7287
Total	**0.1418**	**2.7411**	**3.0719**	**5.7700e-003**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**571.2106**	**571.2106**	**0.1807**		**575.7287**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0161	0.0105	0.1080	3.1000e-004	0.0335	2.1000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		30.6155	30.6155	8.3000e-004		30.6363
Total	**0.0161**	**0.0105**	**0.1080**	**3.1000e-004**	**0.0335**	**2.1000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**30.6155**	**30.6155**	**8.3000e-004**		**30.6363**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.4534	5.3915	2.1154	5.7700e-003		0.2223	0.2223		0.2045	0.2045		558.7896	558.7896	0.1807		563.3077
Total	**0.4534**	**5.3915**	**2.1154**	**5.7700e-003**	**0.0000**	**0.2223**	**0.2223**	**0.0000**	**0.2045**	**0.2045**		**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0150	9.3400e-003	0.0979	3.0000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		29.6471	29.6471	7.4000e-004		29.6655
Total	**0.0150**	**9.3400e-003**	**0.0979**	**3.0000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**29.6471**	**29.6471**	**7.4000e-004**		**29.6655**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1418	2.7411	3.0719	5.7700e-003		0.1040	0.1040		0.1040	0.1040	0.0000	558.7896	558.7896	0.1807		563.3077
Total	**0.1418**	**2.7411**	**3.0719**	**5.7700e-003**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**0.1040**	**0.1040**	**0.0000**	**558.7896**	**558.7896**	**0.1807**		**563.3077**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0150	9.3400e-003	0.0979	3.0000e-004	0.0335	2.0000e-004	0.0337	8.8900e-003	1.9000e-004	9.0800e-003		29.6471	29.6471	7.4000e-004		29.6655
Total	**0.0150**	**9.3400e-003**	**0.0979**	**3.0000e-004**	**0.0335**	**2.0000e-004**	**0.0337**	**8.8900e-003**	**1.9000e-004**	**9.0800e-003**		**29.6471**	**29.6471**	**7.4000e-004**		**29.6655**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.7
CACTUS CHANNEL (OFF-SITE) CONSTRUCTION – TIER 4 EQUIPMENT

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K4 - Cactus Channel - Tier 4

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Trips and VMT -

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 equipment

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Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.6870	7.5251	5.1641	0.0120	0.0559	0.2915	0.3474	0.0148	0.2682	0.2830	0.0000	1,186.8073	1,186.8073	0.3591	0.0000	1,195.7845
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.6870**	**7.5251**	**5.1641**	**0.0120**	**0.0559**	**0.2915**	**0.3474**	**0.0148**	**0.2682**	**0.2830**	**0.0000**	**1,186.8073**	**1,186.8073**	**0.3591**	**0.0000**	**1,195.7845**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.1684	0.6273	6.9758	0.0120	0.0559	0.0191	0.0750	0.0148	0.0191	0.0339	0.0000	1,186.8073	1,186.8073	0.3591	0.0000	1,195.7845
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.1684**	**0.6273**	**6.9758**	**0.0120**	**0.0559**	**0.0191**	**0.0750**	**0.0148**	**0.0191**	**0.0339**	**0.0000**	**1,186.8073**	**1,186.8073**	**0.3591**	**0.0000**	**1,195.7845**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**75.49**	**91.66**	**-35.08**	**0.00**	**0.00**	**93.44**	**78.41**	**0.00**	**92.88**	**88.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	1	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	1	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	0	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.6595	7.5082	4.9420	0.0114		0.2912	0.2912		0.2679	0.2679		1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.6595**	**7.5082**	**4.9420**	**0.0114**	**0.0000**	**0.2912**	**0.2912**	**0.0000**	**0.2679**	**0.2679**		**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0275	0.0169	0.2221	5.7000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		56.8761	56.8761	1.5900e-003		56.9159
Total	**0.0275**	**0.0169**	**0.2221**	**5.7000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**56.8761**	**56.8761**	**1.5900e-003**		**56.9159**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1409	0.6104	6.7536	0.0114		0.0188	0.0188		0.0188	0.0188	0.0000	1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.1409**	**0.6104**	**6.7536**	**0.0114**	**0.0000**	**0.0188**	**0.0188**	**0.0000**	**0.0188**	**0.0188**	**0.0000**	**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0275	0.0169	0.2221	5.7000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		56.8761	56.8761	1.5900e-003		56.9159
Total	**0.0275**	**0.0169**	**0.2221**	**5.7000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**56.8761**	**56.8761**	**1.5900e-003**		**56.9159**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Cactus Channel - Tier 4

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project Data

Off-road Equipment - Project Data

Off-road Equipment - Project Data

Trips and VMT -

Energy Use -

Construction Off-road Equipment Mitigation - Tier 4 equipment

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Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.6864	7.5257	5.1220	0.0119	0.0559	0.2915	0.3474	0.0148	0.2682	0.2830	0.0000	1,180.9570	1,180.9570	0.3589	0.0000	1,189.9291
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.6864**	**7.5257**	**5.1220**	**0.0119**	**0.0559**	**0.2915**	**0.3474**	**0.0148**	**0.2682**	**0.2830**	**0.0000**	**1,180.9570**	**1,180.9570**	**0.3589**	**0.0000**	**1,189.9291**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	0.1678	0.6279	6.9337	0.0119	0.0559	0.0191	0.0750	0.0148	0.0191	0.0339	0.0000	1,180.9570	1,180.9570	0.3589	0.0000	1,189.9291
2020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.1678**	**0.6279**	**6.9337**	**0.0119**	**0.0559**	**0.0191**	**0.0750**	**0.0148**	**0.0191**	**0.0339**	**0.0000**	**1,180.9570**	**1,180.9570**	**0.3589**	**0.0000**	**1,189.9291**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**75.56**	**91.66**	**-35.37**	**0.00**	**0.00**	**93.44**	**78.41**	**0.00**	**92.88**	**88.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**	**0.0000**	**8.0000e-004**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	1	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	1	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	0	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	2	5.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.6595	7.5082	4.9420	0.0114		0.2912	0.2912		0.2679	0.2679		1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.6595**	**7.5082**	**4.9420**	**0.0114**	**0.0000**	**0.2912**	**0.2912**	**0.0000**	**0.2679**	**0.2679**		**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0269	0.0175	0.1800	5.1000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		51.0259	51.0259	1.3800e-003		51.0605
Total	**0.0269**	**0.0175**	**0.1800**	**5.1000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**51.0259**	**51.0259**	**1.3800e-003**		**51.0605**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.1409	0.6104	6.7536	0.0114		0.0188	0.0188		0.0188	0.0188	0.0000	1,129.9311	1,129.9311	0.3575		1,138.8686
Total	**0.1409**	**0.6104**	**6.7536**	**0.0114**	**0.0000**	**0.0188**	**0.0188**	**0.0000**	**0.0188**	**0.0188**	**0.0000**	**1,129.9311**	**1,129.9311**	**0.3575**		**1,138.8686**

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3.2 Phase 1 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0269	0.0175	0.1800	5.1000e-004	0.0559	3.4000e-004	0.0562	0.0148	3.2000e-004	0.0151		51.0259	51.0259	1.3800e-003		51.0605
Total	**0.0269**	**0.0175**	**0.1800**	**5.1000e-004**	**0.0559**	**3.4000e-004**	**0.0562**	**0.0148**	**3.2000e-004**	**0.0151**		**51.0259**	**51.0259**	**1.3800e-003**		**51.0605**

3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

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3.3 Phase 2 - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

5.0 Energy Detail

Historical Energy Use: N

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5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Unmitigated	0.0647	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0115					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	3.0000e-005	0.0000	3.5000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		7.6000e-004	7.6000e-004	0.0000		8.0000e-004
Total	**0.0647**	**0.0000**	**3.5000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**7.6000e-004**	**7.6000e-004**	**0.0000**		**8.0000e-004**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.8
K4 PROJECT OPERATION

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K4 - Operation

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project data

Energy Use -

Water And Wastewater - Project data

Solid Waste - 75% waste diversion

Land Use Change -

Sequestration -

Area Mitigation - Super-low VOC content

Energy Mitigation - All lighting fixtures will be Energy Star certified

Construction Phase - Construction emissions evaluated separately

Off-road Equipment - Construction emissions evaluated separately.

Trips and VMT - Construction emissions evaluated separately.

Vehicle Trips - Mobile emissions evaluated separately.

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Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	100	10
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	50	10
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	50	10
tblConstructionPhase	NumDays	50.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblSequestration	NumberOfNewTrees	0.00	200.00
tblSolidWaste	SolidWasteGenerationRate	674.92	245.46
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	166,037,500.00	3,285,000.00
tblWater	OutdoorWaterUseRate	0.00	1,755,193.00

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**16.3847**	**0.3928**	**0.4715**	**2.3600e-003**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0303**	**0.0303**		**470.0990**	**470.0990**	**9.8100e-003**	**8.6100e-003**	**472.9112**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	14.6545	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**14.6976**	**0.3928**	**0.4715**	**2.3600e-003**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0303**	**0.0303**		**470.0990**	**470.0990**	**9.8100e-003**	**8.6100e-003**	**472.9112**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	10.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	6/27/2018	6/26/2018	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

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Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	14.6545	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**14.6545**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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K4 - Operation

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project data

Energy Use -

Water And Wastewater - Project data

Solid Waste - 75% waste diversion

Land Use Change -

Sequestration -

Area Mitigation - Super-low VOC content

Energy Mitigation - All lighting fixtures will be Energy Star certified

Construction Phase - Construction emissions evaluated separately

Off-road Equipment - Construction emissions evaluated separately.

Trips and VMT - Construction emissions evaluated separately.

Vehicle Trips - Mobile emissions evaluated separately.

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Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	100	10
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	50	10
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	50	10
tblConstructionPhase	NumDays	50.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblSequestration	NumberOfNewTrees	0.00	200.00
tblSolidWaste	SolidWasteGenerationRate	674.92	245.46
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	166,037,500.00	3,285,000.00
tblWater	OutdoorWaterUseRate	0.00	1,755,193.00

2.0 Emissions Summary

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2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**16.3847**	**0.3928**	**0.4715**	**2.3600e-003**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0303**	**0.0303**		**470.0990**	**470.0990**	**9.8100e-003**	**8.6100e-003**	**472.9112**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	14.6545	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Energy	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**14.6976**	**0.3928**	**0.4715**	**2.3600e-003**	**0.0000**	**0.0303**	**0.0303**	**0.0000**	**0.0303**	**0.0303**		**470.0990**	**470.0990**	**9.8100e-003**	**8.6100e-003**	**472.9112**

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	10.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	6/27/2018	6/26/2018	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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3.2 Demolition - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

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Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
NaturalGas Unmitigated	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3993.26	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.99326	0.0431	0.3915	0.3289	2.3500e-003		0.0298	0.0298		0.0298	0.0298		469.7953	469.7953	9.0000e-003	8.6100e-003	472.5871
Total		**0.0431**	**0.3915**	**0.3289**	**2.3500e-003**		**0.0298**	**0.0298**		**0.0298**	**0.0298**		**469.7953**	**469.7953**	**9.0000e-003**	**8.6100e-003**	**472.5871**

6.0 Area Detail

6.1 Mitigation Measures Area

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Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	14.6545	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Unmitigated	16.3416	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.8746					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**16.3416**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1875					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	14.4536					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0134	1.3200e-003	0.1426	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3037	0.3037	8.1000e-004		0.3241
Total	**14.6545**	**1.3200e-003**	**0.1426**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3037**	**0.3037**	**8.1000e-004**		**0.3241**

7.0 Water Detail

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7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX B
EMFAC2017 MODEL OUTPUTS

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Table B-1. EMFAC2017 Output for Vehicle Miles Traveled in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Sub Area	EMFAC Vehicle Class	Fuel	Vehicles Miles Traveled (miles/day)
2020	Riverside (SC)	LDA	Gas	22,811,940
2020	Riverside (SC)	LDA	Dsl	211,708
2020	Riverside (SC)	LDA	Elec	225,470
2020	Riverside (SC)	LDT1	Gas	2,171,444
2020	Riverside (SC)	LDT2	Gas	6,953,901
2020	Riverside (SC)	LHDT1	Gas	522,854
2020	Riverside (SC)	LHDT2	Gas	74,925
2020	Riverside (SC)	MHDT	Gas	51,276
2020	Riverside (SC)	HHDT	Gas	496
2020	Riverside (SC)	LDT1	Dsl	704
2020	Riverside (SC)	LDT2	Dsl	38,381
2020	Riverside (SC)	LHDT1	Dsl	546,498
2020	Riverside (SC)	LHDT2	Dsl	210,206
2020	Riverside (SC)	MHDT	Dsl	722,760
2020	Riverside (SC)	HHDT	Dsl	1,849,784
2020	Riverside (SC)	LDT1	Elec	5,032
2020	Riverside (SC)	LDT2	Elec	27,870
2020	Riverside (SC)	HHDT	NG	7,927

Abbreviations:
Dsl - diesel
Elec - electric
HHDT - heavy-heavy duty truck
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
NG - natural gas
SC - South Coast

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Table B-2. EMFAC2017 Output for Vehicle Trips in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Sub Area	EMFAC Vehicle Class	Fuel	Trips (trips/day)
2020	Riverside (SC)	LDA	Gas	2,577,014
2020	Riverside (SC)	LDA	Dsl	23,004
2020	Riverside (SC)	LDA	Elec	29,889
2020	Riverside (SC)	LDT1	Gas	257,766
2020	Riverside (SC)	LDT2	Gas	808,079
2020	Riverside (SC)	LHDT1	Gas	236,934
2020	Riverside (SC)	LHDT2	Gas	33,477
2020	Riverside (SC)	MHDT	Gas	25,405
2020	Riverside (SC)	HHDT	Gas	157
2020	Riverside (SC)	LDT1	Dsl	108
2020	Riverside (SC)	LDT2	Dsl	3,973
2020	Riverside (SC)	LHDT1	Dsl	197,791
2020	Riverside (SC)	LHDT2	Dsl	75,303
2020	Riverside (SC)	MHDT	Dsl	118,822
2020	Riverside (SC)	HHDT	Dsl	155,838
2020	Riverside (SC)	LDT1	Elec	662
2020	Riverside (SC)	LDT2	Elec	4,369
2020	Riverside (SC)	HHDT	NG	762

Abbreviations:
Dsl - diesel
Elec - electric
HHDT - heavy-heavy duty truck
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
NG - natural gas
SC - South Coast

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LDA	Gas	DIURN	HC	0.168330161
2020	Annual	Riverside (SC)	LDA	Gas	DIURN	ROG	0.182834131
2020	Annual	Riverside (SC)	LDA	Gas	DIURN	TOG	0.182834131
2020	Annual	Riverside (SC)	LDA	Gas	HOTSOAK	HC	0.283311608
2020	Annual	Riverside (SC)	LDA	Gas	HOTSOAK	ROG	0.302896731
2020	Annual	Riverside (SC)	LDA	Gas	HOTSOAK	TOG	0.302896731
2020	Annual	Riverside (SC)	LDA	Gas	PMBW	PM	0.942969733
2020	Annual	Riverside (SC)	LDA	Gas	PMBW	PM10	0.924110338
2020	Annual	Riverside (SC)	LDA	Gas	PMBW	PM2_5	0.396047288
2020	Annual	Riverside (SC)	LDA	Gas	PMTW	PM	0.201166876
2020	Annual	Riverside (SC)	LDA	Gas	PMTW	PM10	0.201166876
2020	Annual	Riverside (SC)	LDA	Gas	PMTW	PM2_5	0.050291719
2020	Annual	Riverside (SC)	LDA	Gas	RESTLOSS	HC	0.13041946
2020	Annual	Riverside (SC)	LDA	Gas	RESTLOSS	ROG	0.1416569
2020	Annual	Riverside (SC)	LDA	Gas	RESTLOSS	TOG	0.1416569
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	CO	18.13959353
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	HC	0.372889008
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	NOx	1.136618519
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	PM	0.040976712
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	PM10	0.036635189
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	PM2_5	0.033685705
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	ROG	0.276917505
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	SOx	0.068221531
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	TOG	0.403725163
2020	Annual	Riverside (SC)	LDA	Gas	RUNLOSS	HC	0.585909068
2020	Annual	Riverside (SC)	LDA	Gas	RUNLOSS	ROG	0.626412532
2020	Annual	Riverside (SC)	LDA	Gas	RUNLOSS	TOG	0.626412532
2020	Annual	Riverside (SC)	LDA	Gas	STREX	CO	6.397062076
2020	Annual	Riverside (SC)	LDA	Gas	STREX	HC	0.765553624
2020	Annual	Riverside (SC)	LDA	Gas	STREX	NOx	0.582271827
2020	Annual	Riverside (SC)	LDA	Gas	STREX	PM	0.00645136
2020	Annual	Riverside (SC)	LDA	Gas	STREX	PM10	0.005768242
2020	Annual	Riverside (SC)	LDA	Gas	STREX	PM2_5	0.005304048
2020	Annual	Riverside (SC)	LDA	Gas	STREX	ROG	0.729795218
2020	Annual	Riverside (SC)	LDA	Gas	STREX	SOx	0.001616535
2020	Annual	Riverside (SC)	LDA	Gas	STREX	TOG	0.799027618
2020	Annual	Riverside (SC)	LDA	Dsl	PMBW	PM	0.008751284
2020	Annual	Riverside (SC)	LDA	Dsl	PMBW	PM10	0.008576258
2020	Annual	Riverside (SC)	LDA	Dsl	PMBW	PM2_5	0.003675539
2020	Annual	Riverside (SC)	LDA	Dsl	PMTW	PM	0.001866941
2020	Annual	Riverside (SC)	LDA	Dsl	PMTW	PM10	0.001866941
2020	Annual	Riverside (SC)	LDA	Dsl	PMTW	PM2_5	0.000466735
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	CO	0.047317877
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	HC	0.002882171
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	NOx	0.023125195
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	PM	0.002038901
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	PM10	0.002026667
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	PM2_5	0.001938995
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	ROG	0.00364995
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	SOx	0.000451098
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	TOG	0.004155226
2020	Annual	Riverside (SC)	LDA	Elec	DIURN	HC	0.00016996
2020	Annual	Riverside (SC)	LDA	Elec	DIURN	ROG	0.000184605

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LDA	Elec	DIURN	TOG	0.000184605
2020	Annual	Riverside (SC)	LDA	Elec	HOTSOAK	HC	0.000150635
2020	Annual	Riverside (SC)	LDA	Elec	HOTSOAK	ROG	0.000161048
2020	Annual	Riverside (SC)	LDA	Elec	HOTSOAK	TOG	0.000161048
2020	Annual	Riverside (SC)	LDA	Elec	PMBW	PM	0.009320196
2020	Annual	Riverside (SC)	LDA	Elec	PMBW	PM10	0.009133792
2020	Annual	Riverside (SC)	LDA	Elec	PMBW	PM2_5	0.003914482
2020	Annual	Riverside (SC)	LDA	Elec	PMTW	PM	0.001988308
2020	Annual	Riverside (SC)	LDA	Elec	PMTW	PM10	0.001988308
2020	Annual	Riverside (SC)	LDA	Elec	PMTW	PM2_5	0.000497077
2020	Annual	Riverside (SC)	LDA	Elec	RESTLOSS	HC	5.67E-05
2020	Annual	Riverside (SC)	LDA	Elec	RESTLOSS	ROG	6.16E-05
2020	Annual	Riverside (SC)	LDA	Elec	RESTLOSS	TOG	6.16E-05
2020	Annual	Riverside (SC)	LDT1	Gas	DIURN	HC	0.056006462
2020	Annual	Riverside (SC)	LDT1	Gas	DIURN	ROG	0.060832193
2020	Annual	Riverside (SC)	LDT1	Gas	DIURN	TOG	0.060832193
2020	Annual	Riverside (SC)	LDT1	Gas	HOTSOAK	HC	0.077567582
2020	Annual	Riverside (SC)	LDT1	Gas	HOTSOAK	ROG	0.082929772
2020	Annual	Riverside (SC)	LDT1	Gas	HOTSOAK	TOG	0.082929772
2020	Annual	Riverside (SC)	LDT1	Gas	PMBW	PM	0.08976027
2020	Annual	Riverside (SC)	LDT1	Gas	PMBW	PM10	0.087965065
2020	Annual	Riverside (SC)	LDT1	Gas	PMBW	PM2_5	0.037699314
2020	Annual	Riverside (SC)	LDT1	Gas	PMTW	PM	0.019148858
2020	Annual	Riverside (SC)	LDT1	Gas	PMTW	PM10	0.019148858
2020	Annual	Riverside (SC)	LDT1	Gas	PMTW	PM2_5	0.004787214
2020	Annual	Riverside (SC)	LDT1	Gas	RESTLOSS	HC	0.037888532
2020	Annual	Riverside (SC)	LDT1	Gas	RESTLOSS	ROG	0.041153153
2020	Annual	Riverside (SC)	LDT1	Gas	RESTLOSS	TOG	0.041153153
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	CO	4.242824927
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	HC	0.127960606
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	NOx	0.390486112
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	PM	0.00652147
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	PM10	0.005831079
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	PM2_5	0.005361903
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	ROG	0.095028041
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	SOx	0.007622918
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	TOG	0.138542297
2020	Annual	Riverside (SC)	LDT1	Gas	RUNLOSS	HC	0.253141881
2020	Annual	Riverside (SC)	LDT1	Gas	RUNLOSS	ROG	0.270641393
2020	Annual	Riverside (SC)	LDT1	Gas	RUNLOSS	TOG	0.270641393
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	CO	0.727368872
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	HC	0.152355346
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	NOx	0.096989292
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	PM	0.001026788
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	PM10	0.000918116
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	PM2_5	0.000844258
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	ROG	0.145238762
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	SOx	0.000193911
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	TOG	0.159017042
2020	Annual	Riverside (SC)	LDT2	Gas	DIURN	HC	0.079166029
2020	Annual	Riverside (SC)	LDT2	Gas	DIURN	ROG	0.085987277
2020	Annual	Riverside (SC)	LDT2	Gas	DIURN	TOG	0.085987277
2020	Annual	Riverside (SC)	LDT2	Gas	HOTSOAK	HC	0.119596936

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LDT2	Gas	HOTSOAK	ROG	0.127864584
2020	Annual	Riverside (SC)	LDT2	Gas	HOTSOAK	TOG	0.127864584
2020	Annual	Riverside (SC)	LDT2	Gas	PMBW	PM	0.287451141
2020	Annual	Riverside (SC)	LDT2	Gas	PMBW	PM10	0.281702118
2020	Annual	Riverside (SC)	LDT2	Gas	PMBW	PM2_5	0.120729479
2020	Annual	Riverside (SC)	LDT2	Gas	PMTW	PM	0.06132291
2020	Annual	Riverside (SC)	LDT2	Gas	PMTW	PM10	0.06132291
2020	Annual	Riverside (SC)	LDT2	Gas	PMTW	PM2_5	0.015330727
2020	Annual	Riverside (SC)	LDT2	Gas	RESTLOSS	HC	0.065107888
2020	Annual	Riverside (SC)	LDT2	Gas	RESTLOSS	ROG	0.070717833
2020	Annual	Riverside (SC)	LDT2	Gas	RESTLOSS	TOG	0.070717833
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	CO	7.951255208
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	HC	0.192103378
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	NOx	0.754238843
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	PM	0.013139422
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	PM10	0.011747798
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	PM2_5	0.010802242
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	ROG	0.142656596
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	SOx	0.026386164
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	TOG	0.207989621
2020	Annual	Riverside (SC)	LDT2	Gas	RUNLOSS	HC	0.371269162
2020	Annual	Riverside (SC)	LDT2	Gas	RUNLOSS	ROG	0.396934727
2020	Annual	Riverside (SC)	LDT2	Gas	RUNLOSS	TOG	0.396934727
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	CO	2.587844148
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	HC	0.348802391
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	NOx	0.305589709
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	PM	0.002050137
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	PM10	0.001833042
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	PM2_5	0.001685523
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	ROG	0.332508296
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	SOx	0.00066132
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	TOG	0.364053134
2020	Annual	Riverside (SC)	LHDT1	Gas	DIURN	HC	0.001224682
2020	Annual	Riverside (SC)	LHDT1	Gas	DIURN	ROG	0.001330205
2020	Annual	Riverside (SC)	LHDT1	Gas	DIURN	TOG	0.001330205
2020	Annual	Riverside (SC)	LHDT1	Gas	HOTSOAK	HC	0.035682312
2020	Annual	Riverside (SC)	LHDT1	Gas	HOTSOAK	ROG	0.038149004
2020	Annual	Riverside (SC)	LHDT1	Gas	HOTSOAK	TOG	0.038149004
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	CO	0.0656819
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	HC	0.011001936
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	NOx	0.000712824
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	ROG	0.008166588
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	SOx	2.14E-05
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	TOG	0.01191191
2020	Annual	Riverside (SC)	LHDT1	Gas	PMBW	PM	0.044955148
2020	Annual	Riverside (SC)	LHDT1	Gas	PMBW	PM10	0.044056045
2020	Annual	Riverside (SC)	LHDT1	Gas	PMBW	PM2_5	0.018881162
2020	Annual	Riverside (SC)	LHDT1	Gas	PMTW	PM	0.004610784
2020	Annual	Riverside (SC)	LHDT1	Gas	PMTW	PM10	0.004610784
2020	Annual	Riverside (SC)	LHDT1	Gas	PMTW	PM2_5	0.001152696
2020	Annual	Riverside (SC)	LHDT1	Gas	RESTLOSS	HC	0.000621864
2020	Annual	Riverside (SC)	LHDT1	Gas	RESTLOSS	ROG	0.000675446
2020	Annual	Riverside (SC)	LHDT1	Gas	RESTLOSS	TOG	0.000675446

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	CO	0.544954168
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	HC	0.026681418
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	NOx	0.149487534
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	PM	0.000709401
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	PM10	0.000634915
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	PM2_5	0.000584135
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	ROG	0.020047556
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	SOx	0.004537677
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	TOG	0.028877535
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNLOSS	HC	0.225061135
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNLOSS	ROG	0.240619446
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNLOSS	TOG	0.240619446
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	CO	0.47096106
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	HC	0.041654422
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	NOx	0.150852406
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	PM	0.000132514
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	PM10	0.000118821
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	PM2_5	0.000109428
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	ROG	0.039718745
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	SOx	4.98E-05
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	TOG	0.043479708
2020	Annual	Riverside (SC)	LHDT2	Gas	DIURN	HC	0.000141407
2020	Annual	Riverside (SC)	LHDT2	Gas	DIURN	ROG	0.000153591
2020	Annual	Riverside (SC)	LHDT2	Gas	DIURN	TOG	0.000153591
2020	Annual	Riverside (SC)	LHDT2	Gas	HOTSOAK	HC	0.004261537
2020	Annual	Riverside (SC)	LHDT2	Gas	HOTSOAK	ROG	0.004556134
2020	Annual	Riverside (SC)	LHDT2	Gas	HOTSOAK	TOG	0.004556134
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	CO	0.009308483
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	HC	0.001554647
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	NOx	0.000100628
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	ROG	0.001153615
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	SOx	3.48E-06
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	TOG	0.00168325
2020	Annual	Riverside (SC)	LHDT2	Gas	PMBW	PM	0.007515788
2020	Annual	Riverside (SC)	LHDT2	Gas	PMBW	PM10	0.007365472
2020	Annual	Riverside (SC)	LHDT2	Gas	PMBW	PM2_5	0.003156631
2020	Annual	Riverside (SC)	LHDT2	Gas	PMTW	PM	0.000660729
2020	Annual	Riverside (SC)	LHDT2	Gas	PMTW	PM10	0.000660729
2020	Annual	Riverside (SC)	LHDT2	Gas	PMTW	PM2_5	0.000165182
2020	Annual	Riverside (SC)	LHDT2	Gas	RESTLOSS	HC	7.34E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RESTLOSS	ROG	7.97E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RESTLOSS	TOG	7.97E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	CO	0.04822085
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	HC	0.002391649
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	NOx	0.018382794
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	PM	8.59E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	PM10	7.68E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	PM2_5	7.06E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	ROG	0.001780347
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	SOx	0.000743349
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	TOG	0.00258924
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNLOSS	HC	0.026080971
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNLOSS	ROG	0.027883929

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNLOSS	TOG	0.027883929
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	CO	0.063157203
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	HC	0.005355758
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	NOx	0.02112834
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	PM	1.48E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	PM10	1.33E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	PM2_5	1.22E-05
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	ROG	0.005105757
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	SOx	7.95E-06
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	TOG	0.005590004
2020	Annual	Riverside (SC)	MHDT	Gas	DIURN	HC	7.62E-05
2020	Annual	Riverside (SC)	MHDT	Gas	DIURN	ROG	8.27E-05
2020	Annual	Riverside (SC)	MHDT	Gas	DIURN	TOG	8.27E-05
2020	Annual	Riverside (SC)	MHDT	Gas	HOTSOAK	HC	0.002510493
2020	Annual	Riverside (SC)	MHDT	Gas	HOTSOAK	ROG	0.002684041
2020	Annual	Riverside (SC)	MHDT	Gas	HOTSOAK	TOG	0.002684041
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	CO	0.020040634
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	HC	0.001884909
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	NOx	0.000124598
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	ROG	0.001398601
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	SOx	7.65E-06
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	TOG	0.002040835
2020	Annual	Riverside (SC)	MHDT	Gas	PMBW	PM	0.007517386
2020	Annual	Riverside (SC)	MHDT	Gas	PMBW	PM10	0.007367038
2020	Annual	Riverside (SC)	MHDT	Gas	PMBW	PM2_5	0.003157302
2020	Annual	Riverside (SC)	MHDT	Gas	PMTW	PM	0.00067826
2020	Annual	Riverside (SC)	MHDT	Gas	PMTW	PM10	0.00067826
2020	Annual	Riverside (SC)	MHDT	Gas	PMTW	PM2_5	0.000169565
2020	Annual	Riverside (SC)	MHDT	Gas	RESTLOSS	HC	3.92E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RESTLOSS	ROG	4.26E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RESTLOSS	TOG	4.26E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	CO	0.115777374
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	HC	0.005646898
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	NOx	0.033385457
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	PM	5.90E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	PM10	5.28E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	PM2_5	4.85E-05
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	ROG	0.004189992
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	SOx	0.00092282
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	TOG	0.006114027
2020	Annual	Riverside (SC)	MHDT	Gas	RUNLOSS	HC	0.012917925
2020	Annual	Riverside (SC)	MHDT	Gas	RUNLOSS	ROG	0.013810931
2020	Annual	Riverside (SC)	MHDT	Gas	RUNLOSS	TOG	0.013810931
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	CO	0.141447521
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	HC	0.0067418
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	NOx	0.010821379
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	PM	1.54E-05
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	PM10	1.37E-05
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	PM2_5	1.26E-05
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	ROG	0.006426817
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	SOx	1.11E-05
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	TOG	0.007036555
2020	Annual	Riverside (SC)	HHDT	Gas	DIURN	HC	7.67E-07

Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	HHDT	Gas	DIURN	ROG	8.33E-07
2020	Annual	Riverside (SC)	HHDT	Gas	DIURN	TOG	8.33E-07
2020	Annual	Riverside (SC)	HHDT	Gas	HOTSOAK	HC	2.73E-05
2020	Annual	Riverside (SC)	HHDT	Gas	HOTSOAK	ROG	2.92E-05
2020	Annual	Riverside (SC)	HHDT	Gas	HOTSOAK	TOG	2.92E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMBW	PM	3.44E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMBW	PM10	3.37E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMBW	PM2_5	1.45E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMTW	PM	1.09E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMTW	PM10	1.09E-05
2020	Annual	Riverside (SC)	HHDT	Gas	PMTW	PM2_5	2.73E-06
2020	Annual	Riverside (SC)	HHDT	Gas	RESTLOSS	HC	4.67E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RESTLOSS	ROG	5.07E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RESTLOSS	TOG	5.07E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	CO	0.017543845
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	HC	0.000471664
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	NOx	0.002951248
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	PM	6.28E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	PM10	5.62E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	PM2_5	5.16E-07
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	ROG	0.000349974
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	SOx	1.16E-05
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	TOG	0.000510682
2020	Annual	Riverside (SC)	HHDT	Gas	RUNLOSS	HC	0.000144396
2020	Annual	Riverside (SC)	HHDT	Gas	RUNLOSS	ROG	0.000154378
2020	Annual	Riverside (SC)	HHDT	Gas	RUNLOSS	TOG	0.000154378
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	CO	0.001024048
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	HC	1.98E-07
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	NOx	0.000104956
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	PM	1.67E-07
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	PM10	1.50E-07
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	PM2_5	1.38E-07
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	ROG	1.89E-07
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	SOx	8.55E-08
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	TOG	2.07E-07
2020	Annual	Riverside (SC)	LDT1	Dsl	PMBW	PM	2.91E-05
2020	Annual	Riverside (SC)	LDT1	Dsl	PMBW	PM10	2.85E-05
2020	Annual	Riverside (SC)	LDT1	Dsl	PMBW	PM2_5	1.22E-05
2020	Annual	Riverside (SC)	LDT1	Dsl	PMTW	PM	6.20E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	PMTW	PM10	6.20E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	PMTW	PM2_5	1.55E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	CO	0.001055795
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	HC	0.000136587
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	NOx	0.001011781
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	PM	0.000136583
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	PM10	0.000135764
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	PM2_5	0.000129891
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	ROG	0.000172972
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	SOx	2.96E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	TOG	0.000196917
2020	Annual	Riverside (SC)	LDT2	Dsl	PMBW	PM	0.001586527
2020	Annual	Riverside (SC)	LDT2	Dsl	PMBW	PM10	0.001554797
2020	Annual	Riverside (SC)	LDT2	Dsl	PMBW	PM2_5	0.000666341

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LDT2	Dsl	PMTW	PM	0.000338459
2020	Annual	Riverside (SC)	LDT2	Dsl	PMTW	PM10	0.000338459
2020	Annual	Riverside (SC)	LDT2	Dsl	PMTW	PM2_5	8.46E-05
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	CO	0.005028943
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	HC	0.000558863
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	NOx	0.002614034
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	PM	0.000326112
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	PM10	0.000324155
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	PM2_5	0.000310132
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	ROG	0.000707738
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	SOx	0.000109978
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	TOG	0.000805712
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	CO	0.015768641
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	HC	0.001502278
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	NOx	0.041757267
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	PM	0.000476703
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	PM10	0.000473842
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	PM2_5	0.000453344
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	ROG	0.001902469
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	SOx	2.28E-05
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	TOG	0.002165834
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMBW	PM	0.046988035
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMBW	PM10	0.046048274
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMBW	PM2_5	0.019734975
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMTW	PM	0.007228928
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMTW	PM10	0.007228928
2020	Annual	Riverside (SC)	LHDT1	Dsl	PMTW	PM2_5	0.001807232
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	CO	0.403972754
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	HC	0.046892338
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	NOx	2.009523795
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	PM	0.013649773
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	PM10	0.013567874
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	PM2_5	0.012980934
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	ROG	0.059383954
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	SOx	0.0028022
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	TOG	0.067604684
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	CO	0.006003394
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	HC	0.000571943
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	NOx	0.01590967
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	PM	0.000180463
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	PM10	0.00017938
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	PM2_5	0.000171621
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	ROG	0.000724303
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	SOx	1.39E-05
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	TOG	0.00082457
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMBW	PM	0.021085788
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMBW	PM10	0.020664072
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMBW	PM2_5	0.008856031
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMTW	PM	0.002780543
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMTW	PM10	0.002780543
2020	Annual	Riverside (SC)	LHDT2	Dsl	PMTW	PM2_5	0.000695136
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	CO	0.128277011
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	HC	0.015075153

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	NOx	0.611329799
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	PM	0.004679101
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	PM10	0.004651027
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	PM2_5	0.004449825
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	ROG	0.019091012
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	SOx	0.001173908
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	TOG	0.021733848
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	CO	0.030807796
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	HC	0.001412774
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	NOx	0.120680273
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	PM	0.000475926
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	PM10	0.00047307
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	PM2_5	0.000452605
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	ROG	0.001789137
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	SOx	0.000105227
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	TOG	0.002036796
2020	Annual	Riverside (SC)	MHDT	Dsl	PMBW	PM	0.10596196
2020	Annual	Riverside (SC)	MHDT	Dsl	PMBW	PM10	0.103842721
2020	Annual	Riverside (SC)	MHDT	Dsl	PMBW	PM2_5	0.044504023
2020	Annual	Riverside (SC)	MHDT	Dsl	PMTW	PM	0.009560478
2020	Annual	Riverside (SC)	MHDT	Dsl	PMTW	PM10	0.009560478
2020	Annual	Riverside (SC)	MHDT	Dsl	PMTW	PM2_5	0.002390119
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	CO	0.422305324
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	HC	0.088698993
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	NOx	2.551954439
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	PM	0.087925918
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	PM10	0.087398362
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	PM2_5	0.083617548
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	ROG	0.112328405
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	SOx	0.007153004
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	TOG	0.127877338
2020	Annual	Riverside (SC)	MHDT	Dsl	STREX	NOx	0.156473383
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	CO	0.941200077
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	HC	0.061064049
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	NOx	1.028436233
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	PM	0.002019171
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	PM10	0.002007056
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	PM2_5	0.001920231
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	ROG	0.077331512
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	SOx	0.001774343
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	TOG	0.088036039
2020	Annual	Riverside (SC)	HHDT	Dsl	PMBW	PM	0.125784258
2020	Annual	Riverside (SC)	HHDT	Dsl	PMBW	PM10	0.123268573
2020	Annual	Riverside (SC)	HHDT	Dsl	PMBW	PM2_5	0.052829388
2020	Annual	Riverside (SC)	HHDT	Dsl	PMTW	PM	0.071876719
2020	Annual	Riverside (SC)	HHDT	Dsl	PMTW	PM10	0.071876719
2020	Annual	Riverside (SC)	HHDT	Dsl	PMTW	PM2_5	0.01796918
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	CO	0.866830929
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	HC	0.169130712
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	NOx	7.846145388
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	PM	0.13737592
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	PM10	0.136551664
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	PM2_5	0.1306445

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	ROG	0.214187134
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	SOx	0.026887784
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	TOG	0.243835747
2020	Annual	Riverside (SC)	HHDT	Dsl	STREX	NOx	0.325904011
2020	Annual	Riverside (SC)	LDT1	Elec	DIURN	HC	3.76E-06
2020	Annual	Riverside (SC)	LDT1	Elec	DIURN	ROG	4.09E-06
2020	Annual	Riverside (SC)	LDT1	Elec	DIURN	TOG	4.09E-06
2020	Annual	Riverside (SC)	LDT1	Elec	HOTSOAK	HC	3.34E-06
2020	Annual	Riverside (SC)	LDT1	Elec	HOTSOAK	ROG	3.57E-06
2020	Annual	Riverside (SC)	LDT1	Elec	HOTSOAK	TOG	3.57E-06
2020	Annual	Riverside (SC)	LDT1	Elec	PMBW	PM	0.000208012
2020	Annual	Riverside (SC)	LDT1	Elec	PMBW	PM10	0.000203852
2020	Annual	Riverside (SC)	LDT1	Elec	PMBW	PM2_5	8.74E-05
2020	Annual	Riverside (SC)	LDT1	Elec	PMTW	PM	4.44E-05
2020	Annual	Riverside (SC)	LDT1	Elec	PMTW	PM10	4.44E-05
2020	Annual	Riverside (SC)	LDT1	Elec	PMTW	PM2_5	1.11E-05
2020	Annual	Riverside (SC)	LDT1	Elec	RESTLOSS	HC	1.26E-06
2020	Annual	Riverside (SC)	LDT1	Elec	RESTLOSS	ROG	1.36E-06
2020	Annual	Riverside (SC)	LDT1	Elec	RESTLOSS	TOG	1.36E-06
2020	Annual	Riverside (SC)	LDT2	Elec	DIURN	HC	2.46E-05
2020	Annual	Riverside (SC)	LDT2	Elec	DIURN	ROG	2.67E-05
2020	Annual	Riverside (SC)	LDT2	Elec	DIURN	TOG	2.67E-05
2020	Annual	Riverside (SC)	LDT2	Elec	HOTSOAK	HC	2.20E-05
2020	Annual	Riverside (SC)	LDT2	Elec	HOTSOAK	ROG	2.35E-05
2020	Annual	Riverside (SC)	LDT2	Elec	HOTSOAK	TOG	2.35E-05
2020	Annual	Riverside (SC)	LDT2	Elec	PMBW	PM	0.001152046
2020	Annual	Riverside (SC)	LDT2	Elec	PMBW	PM10	0.001129006
2020	Annual	Riverside (SC)	LDT2	Elec	PMBW	PM2_5	0.00048386
2020	Annual	Riverside (SC)	LDT2	Elec	PMTW	PM	0.00024577
2020	Annual	Riverside (SC)	LDT2	Elec	PMTW	PM10	0.00024577
2020	Annual	Riverside (SC)	LDT2	Elec	PMTW	PM2_5	6.14E-05
2020	Annual	Riverside (SC)	LDT2	Elec	RESTLOSS	HC	8.21E-06
2020	Annual	Riverside (SC)	LDT2	Elec	RESTLOSS	ROG	8.92E-06
2020	Annual	Riverside (SC)	LDT2	Elec	RESTLOSS	TOG	8.92E-06
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	CO	0.004608944
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	HC	0.000293617
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	NOx	0.005058397
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	PM	1.11E-05
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	PM10	1.10E-05
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	PM2_5	1.06E-05
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	ROG	1.41E-05
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	TOG	0.00029976
2020	Annual	Riverside (SC)	HHDT	NG	PMBW	PM	0.000550508
2020	Annual	Riverside (SC)	HHDT	NG	PMBW	PM10	0.000539498
2020	Annual	Riverside (SC)	HHDT	NG	PMBW	PM2_5	0.000231214
2020	Annual	Riverside (SC)	HHDT	NG	PMTW	PM	0.000314576
2020	Annual	Riverside (SC)	HHDT	NG	PMTW	PM10	0.000314576
2020	Annual	Riverside (SC)	HHDT	NG	PMTW	PM2_5	7.86E-05
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	CO	0.118834759
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	HC	0.044974526
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	NOx	0.024165607
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	PM	5.45E-05
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	PM10	5.41E-05

Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	PM2_5	5.18E-05
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	ROG	0.00262731
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	TOG	0.046226883
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	CH4	0.071419443
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	CO2	6893.981078
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	Fuel	727.6817814
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	N2O	0.125232946
2020	Annual	Riverside (SC)	LDA	Gas	STREX	CH4	0.163336214
2020	Annual	Riverside (SC)	LDA	Gas	STREX	CO2	163.3554784
2020	Annual	Riverside (SC)	LDA	Gas	STREX	Fuel	17.24269391
2020	Annual	Riverside (SC)	LDA	Gas	STREX	N2O	0.078747716
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	CH4	0.000169533
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	CO2	47.71704173
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	Fuel	4.252687363
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	N2O	0.007500454
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	CH4	0.021409978
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	CO2	770.3177324
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	Fuel	81.30950367
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	N2O	0.027664937
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	CH4	0.027991372
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	CO2	19.59522554
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	Fuel	2.068338811
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	N2O	0.009566094
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	CH4	0.034939139
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	CO2	2666.397429
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	Fuel	281.4467881
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	N2O	0.060362747
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	CH4	0.070945387
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	CO2	66.82824583
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	Fuel	7.053935372
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	N2O	0.032700735
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	CH4	0.002243942
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	CO2	2.160767964
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	Fuel	0.228075979
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	N2O	5.60E-05
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	CH4	0.004145501
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	CO2	458.5452686
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	Fuel	48.40092163
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	N2O	0.008965574
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	CH4	0.0079224
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	CO2	5.034736174
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	Fuel	0.531432527
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	N2O	0.011533401
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	CH4	0.000322048
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	CO2	0.351483702
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	Fuel	0.03710023
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	N2O	7.97E-06
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	CH4	0.000401095
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	CO2	75.11756712
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	Fuel	7.928899781
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	N2O	0.001199952
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	CH4	0.001037697
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	CO2	0.803678368

Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	Fuel	0.084830826
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	N2O	0.001621683
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	CH4	0.000352856
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	CO2	0.773417189
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	Fuel	0.081636661
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	N2O	9.86E-06
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	CH4	0.000847965
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	CO2	93.2535829
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	Fuel	9.843214329
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	N2O	0.001568515
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	CH4	0.001162114
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	CO2	1.126665873
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	Fuel	0.118923191
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	N2O	0.000789438
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	CH4	6.76E-05
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	CO2	1.167712124
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	Fuel	0.123255754
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	N2O	9.54E-05
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	CH4	3.68E-08
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	CO2	0.00864427
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	Fuel	0.00091243
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	N2O	2.31E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	CH4	8.03E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	CO2	0.313580136
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	Fuel	0.027947212
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	N2O	4.93E-05
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	CH4	3.29E-05
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	CO2	11.63345037
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	Fuel	1.036808352
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	N2O	0.001828616
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	CH4	8.84E-05
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	CO2	2.409749679
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	Fuel	0.214764194
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	N2O	0.000378779
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	CH4	0.002758271
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	CO2	296.4162539
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	Fuel	26.41751482
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	N2O	0.046592507
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	CH4	3.36E-05
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	CO2	1.474903864
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	Fuel	0.131447902
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	N2O	0.000231834
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	CH4	0.000886741
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	CO2	124.1757981
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	Fuel	11.06692343
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	N2O	0.019518706
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	CH4	8.31E-05
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	CO2	11.13812552
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	Fuel	0.9926635
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	N2O	0.001750758
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	CH4	0.005217363
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	CO2	757.1315661
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	Fuel	67.47785961

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	N2O	0.119010539
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	CH4	0.003591848
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	CO2	187.8107155
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	Fuel	16.73826012
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	N2O	0.029521229
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	CH4	0.009948438
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	CO2	2846.019764
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	Fuel	253.6459061
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	N2O	0.447354674
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	CH4	0.000282453
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	CO2	0.848835098
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	Fuel	0.098112391
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	N2O	0.000173041
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	CH4	0.043048534
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	CO2	29.08849803
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	Fuel	3.362186715
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	N2O	0.005929881

Abbreviations:

CH4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
DIURN - diurnal
Dsl - diesel
Elec - electric
HC - hydrocarbon
HHDT - heavy-heavy duty truck
IDLEX - idle exhaust
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
N2O - nitrous oxide
NG - natural gas
NOx - oxides of nitrogen
PM - particulate matter
PM10 - PM smaller than 10 microns in diameter
PM2_5 - PM smaller than 2.5 microns in diameter
PMBW - particulate matter brake wear
PMTW - particulate matter tire wear
RESTLOSS - resting loss
ROG - reactive organic gas
RUNEX - running exhaust
RUNLOSS - running loss
SC - South Coast
SOx - oxides of sulfur
STREX - starting exhaust
TOG - total organic gas

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Table B-4. EMFAC2017 Output for Heavy Duty Truck Idle Emission Rates in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Process	Pollutant	Emission Rate (g/idle-hour)
2020	Annual	Riverside (SC)	HHDT	IDLEX	HC	1.911671842
2020	Annual	Riverside (SC)	HHDT	IDLEX	CO	31.51585009
2020	Annual	Riverside (SC)	HHDT	IDLEX	NOx	34.05212705
2020	Annual	Riverside (SC)	HHDT	IDLEX	SOx	0.058428292
2020	Annual	Riverside (SC)	HHDT	IDLEX	PM	0.026969218
2020	Annual	Riverside (SC)	HHDT	IDLEX	TOG	2.751902044
2020	Annual	Riverside (SC)	HHDT	IDLEX	ROG	2.408910367
2020	Annual	Riverside (SC)	HHDT	IDLEX	CO2	6151.086501
2020	Annual	Riverside (SC)	HHDT	IDLEX	CH4	0.121365297
2020	Annual	Riverside (SC)	HHDT	IDLEX	PM10	0.026807403
2020	Annual	Riverside (SC)	HHDT	IDLEX	PM2_5	0.025647726
2020	Annual	Riverside (SC)	LHDT1	IDLEX	HC	12.1801516
2020	Annual	Riverside (SC)	LHDT1	IDLEX	CO	79.33964745
2020	Annual	Riverside (SC)	LHDT1	IDLEX	NOx	41.36942458
2020	Annual	Riverside (SC)	LHDT1	IDLEX	SOx	0.043006653
2020	Annual	Riverside (SC)	LHDT1	IDLEX	PM	0.464348271
2020	Annual	Riverside (SC)	LHDT1	IDLEX	TOG	13.71290147
2020	Annual	Riverside (SC)	LHDT1	IDLEX	ROG	9.808103847
2020	Annual	Riverside (SC)	LHDT1	IDLEX	CO2	4276.53584
2020	Annual	Riverside (SC)	LHDT1	IDLEX	CH4	1.120257841
2020	Annual	Riverside (SC)	LHDT1	IDLEX	PM10	0.461562182
2020	Annual	Riverside (SC)	LHDT1	IDLEX	PM2_5	0.441595206
2020	Annual	Riverside (SC)	LHDT2	IDLEX	HC	7.368553708
2020	Annual	Riverside (SC)	LHDT2	IDLEX	CO	53.0550589
2020	Annual	Riverside (SC)	LHDT2	IDLEX	NOx	55.47506034
2020	Annual	Riverside (SC)	LHDT2	IDLEX	SOx	0.060347295
2020	Annual	Riverside (SC)	LHDT2	IDLEX	PM	0.625298077
2020	Annual	Riverside (SC)	LHDT2	IDLEX	TOG	8.689498834
2020	Annual	Riverside (SC)	LHDT2	IDLEX	ROG	6.50691113
2020	Annual	Riverside (SC)	LHDT2	IDLEX	CO2	6200.306082
2020	Annual	Riverside (SC)	LHDT2	IDLEX	CH4	0.636365458
2020	Annual	Riverside (SC)	LHDT2	IDLEX	PM10	0.621546288
2020	Annual	Riverside (SC)	LHDT2	IDLEX	PM2_5	0.594658471
2020	Annual	Riverside (SC)	MHDT	IDLEX	HC	1.968196903
2020	Annual	Riverside (SC)	MHDT	IDLEX	CO	30.3484927
2020	Annual	Riverside (SC)	MHDT	IDLEX	NOx	72.10145424
2020	Annual	Riverside (SC)	MHDT	IDLEX	SOx	0.067370909
2020	Annual	Riverside (SC)	MHDT	IDLEX	PM	0.284052487
2020	Annual	Riverside (SC)	MHDT	IDLEX	TOG	2.433702686
2020	Annual	Riverside (SC)	MHDT	IDLEX	ROG	1.902576657
2020	Annual	Riverside (SC)	MHDT	IDLEX	CO2	7018.196821

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Table B-4. EMFAC2017 Output for Heavy Duty Truck Idle Emission Rates in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Process	Pollutant	Emission Rate (g/idle-hour)
2020	Annual	Riverside (SC)	MHDT	IDLEX	CH4	0.153369672
2020	Annual	Riverside (SC)	MHDT	IDLEX	PM10	0.282348172
2020	Annual	Riverside (SC)	MHDT	IDLEX	PM2_5	0.270133915

Abbreviations:

CH4 - methane
CO - carbon monoxide
CO2 - carbon dioxide
Dsl - diesel
Elec - electric
HC - hydrocarbon
HHDT - heavy-heavy duty truck
IDLEX - idle exhaust
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
NG - natural gas
NOx - oxides of nitrogen
PM - particulate matter
PM10 - PM smaller than 10 microns in diameter
PM2_5 - PM smaller than 2.5 microns in diameter
ROG - reactive organic gas
SC - South Coast
SOx - oxides of sulfur
TOG - total organic gas

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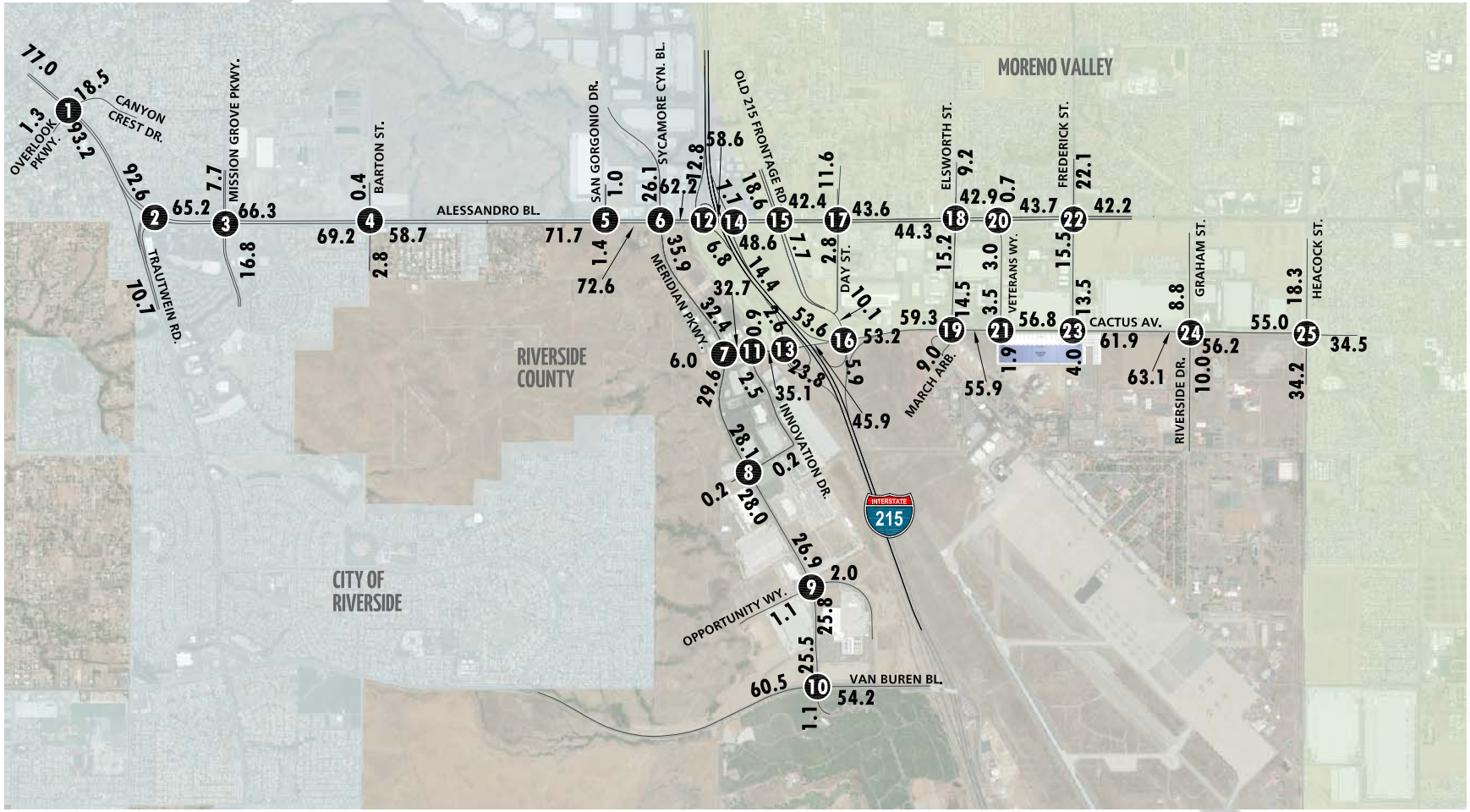
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APPENDIX C
TRAFFIC VOLUMES AT AFFECTED INTERSECTIONS

SOURCE: URBAN CROSSROADS. 2018. K4 PARCEL TRAFFIC IMPACT ANALYSIS. JULY 20

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EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2023) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

11742 - adt.dwg

URBAN CROSSROADS

ADMINISTRATIVE DRAFT 3

Prepared for
K4 and Cactus Channel Improvement Project
Riverside County, California

Prepared by
Ramboll US Corporation
Irvine, California

Project Number
1690008459

Date
December 2018

HEALTH RISK ASSESSMENT TECHNICAL REPORT

K4 AND CACTUS CHANNEL IMPROVEMENT PROJECT RIVERSIDE COUNTY, CALIFORNIA

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ACRONYMS AND ABBREVIATIONS

AERMIC	AMS/EPA Regulatory Model Improvement Committee
AERMOD	AMS/EPA Regulatory Model Improvement Committee Model
AMS/EPA	American Meteorological Society/ Environmental Protection Agency
ARB	Air Resources Board
ASF	Age sensitivity factor
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CPF	cancer potency factor
cREL	chronic reference exposure level
DBR	Daily Breathing Rate
DPM	Diesel particulate matter
EF	emission factor
EMFAC	EMission FACtors model
FAH	Fraction of Time at Home
g/m3	gram/cubic meter
HARP2	Hotspots Analysis and Reporting Program Version 2
HHDT	Heavy-heavy duty trucks
HI	hazard index
HIC	Chronic Hazard index
HQ	hazard quotient
HRA	Health risk assessment
JPA	Joint Powers Authority
LHDT	Light-heavy duty trucks
MATES	Multiple Air Toxics Exposure Study
MHDT	Medium-heavy duty truck
MICR	Maximum individual cancer risk
MP	Multipathway
MPR	Multipathway factor for residential exposure
MPW	Multipathway factor for worker exposure
MWAF	Molecular weight adjustment factor
NED	National Elevation Dataset
NHTSA	National Highway Traffic Safety Administration
OEHHA	Office of Environmental Health Hazard Assessment

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ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

PM	Particulate Matter
PM_{10}	Particulate Matter less than 10 Microns in diameter
REL	Reference exposure level
SC	South Coast
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
TACs	Toxic Air Contaminants
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
WAF	Worker adjustment factor

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EXECUTIVE SUMMARY

Meridian Park K4, LLC proposes a high-cube fulfillment center warehouse for industrial use in Riverside County, California, known as the K4 and Cactus Channel Improvement Project (the Project). The Project is an approximately 718,000 square feet building on an approximately 35.4-acre site that includes surface parking areas for automobiles and truck trailers, and a 7.0-acre drainage channel (Cactus Avenue Channel) bordering the parcel to the north (south side of Cactus Avenue). The warehouse development will be used up to 7 days per week and 24 hours per day. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site.

The health risk assessment (HRA) for the Project was performed as required per South Coast Air Quality Management District (SCAQMD) Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis (2003 SCAQMD Mobile Source Guidance).[1] This document provides guidance for analyzing cancer risks from diesel particulate matter from mobile sources at facilities such as truck stops, truck routes and warehouse distribution centers. The 2003 SCAQMD Mobile Source Guidance provides technical guidance for analyzing cancer risks from potential diesel particulate emissions impacts from truck idling and movement. The primary source of toxic emissions of concern are the heavy-duty vehicles transporting goods to and from the warehouse during Project operation. Consistent with the 2003 SCAQMD Mobile Source Guidance, this analysis evaluates the emissions associated with Project operations of the heavy-duty vehicles while they are onsite and in the near vicinity of the Project Site.

This analysis uses the standard emission estimation, air dispersion modeling, and health risk assessment techniques. These include the California Air Resources Board's EMFAC2017,[2] which is the most recent on-road vehicle emissions estimation model, to estimate the emissions from the heavy-duty vehicles, American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Model (AERMOD), and current HRA guidance provided by the California Office of Environmental Health Hazard Assessment (OEHHA)[3] and the South Coast Air Quality Management District (SCAQMD).[4]

The Project health impacts are presented in Table ES-1. The results of this HRA show that the maximum estimated excess lifetime cancer risk for an offsite receptor is 1.3 in a million and noncancer chronic hazard index (HI) is 0.004 due to Project operations. These cancer risk and noncancer hazard impacts are below the SCAQMD significance thresholds.[5]

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1 SCAQMD. 2003. Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis. August. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. Accessed: May 2018.

2 California Air Resources Board. 2018. EMFAC2017. Available at: https://www.arb.ca.gov/emfac/

3 OEHHA. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. February. Available online at http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed: January 2018.

4 SCAQMD. 2017. Risk Assessment Procedures for Rules 1401 and 212. September. Available at: http://www.aqmd.gov/home/permits/risk-assessment. Accessed: August 2018.

5 SCAQMD. 2015. Air Quality Significance Thresholds. March. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2.

1. INTRODUCTION

This health risk assessment (HRA) evaluates the potential health impacts on residential, sensitive, and worker populations potentially exposed to diesel particulate matter (DPM) emissions from project operations (i.e., heavy-duty trucks transporting goods to and from the warehouse).

The SCAQMD has established significance thresholds[6] to assess the impact of toxic air contaminants (TACs) from project-related emissions sources on nearby sensitive receptors including residents and other human populations, against which air quality impacts of projects and plans proposed in the South Coast Air Basin (SCAB) are to be compared. TACs have been identified as carcinogens by the California Air Resources Board (ARB) in conjunction with the California Office of Environmental and Health Hazard Assessments (OEHHA). TACs may have both chronic (i.e., of long duration) and acute (i.e., severe but of short duration) health impacts. SCAQMD significance thresholds for TACs include cancer risk (maximum incremental cancer risk of 10 in a million) and chronic and acute hazards (project incremental index of 1). The SCAQMD California Environmental Quality Act (CEQA) Air Quality Handbook includes a list of air contaminants that should be analyzed for acute health hazards.[7] This health risk evaluation focused on diesel particulate matter (DPM) emissions consistent with SCAQMD Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions (2003 SCAQMD Mobile Source Guidance).[8] DPM does not have an acute non-cancer toxicity value; therefore, the potential of exposure to acute health impacts was not assessed as part of this analysis. This SCAQMD guidance does not require nor recommend the evaluation of construction emissions in an HRA.

To calculate health impacts for comparison to SCAQMD thresholds, this report assesses risk to residential, sensitive, and worker receptors using the SCAQMD Mobile Source Guidance with the following modifications: (1) current version of the AERMOD (version 18081) was used for dispersion modeling and (2) the health risk methodology followed the current 2015 OEHHA Guidance and SCAQMD Risk Assessment Procedures.[9, 10]

This HRA report includes a discussion of the air dispersion modelling, emission estimation, and health risk calculations.

1.1 Project Description

K4 and Cactus Channel Improvement Project proposes a high-cube fulfillment center industrial use warehouse development in Riverside County, California, known as the K4 and Cactus Channel Improvement Project (the Project). The Project is a building consisting of approximately 718,000 square feet on an approximately 35.4-acre site that includes surface

[6] SCAQMD. 2015. Air Quality Significance Thresholds. March. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

[7] SCAQMD. 1993. CEQA Air Quality Handbook. Table 10-5.

[8] SCAQMD. 2003. Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis. August. Available at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. Accessed: August 2018.

[9] OEHHA. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. February. Available at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html. Accessed: August 2018.

[10] SCAQMD. 2017. Risk Assessment Procedures for Rules 1401, 1401.1 and 212. Version 8.1. September. Available at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf?sfvrsn=12. Accessed: August 2018.

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parking areas for automobiles and truck trailers. The warehouse development will be used up to 7 days per week and 24 hours per day. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the Riverside County Flood Control District and Water Conservation District ("District") and it would either be constructed contemporaneously with the project or built separately depending on permitting and timing. The channel would function as part of the District's Master Plan and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site. The closest residential land uses are located approximately 0.5 miles to the north and southeast of the Project Site. The proposed Project area is shown in **Figure 1** and the land use summary is presented in **Table 1.**

Regulatory Measures

- Compliance with California Air Resources Board Airborne Toxic Control Measure (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling (Section 2485).[11] The ATCM limits idling of the vehicle's primary diesel engine to a maximum of 5 minutes at any one location. For the purposes of this regulation, idling is defined as "the vehicle is running at any location while the vehicle is stationary."
- EMFAC2017 incorporates adopted ARB regulations and federal emissions standards to date. [12] These include:
  - The Heavy-duty Engines and Vehicles Fuel Efficiency Standards adopted by the United States Environmental Protection Agency (USEPA) and the National Highway Traffic Safety Administration (NHTSA) for Phase 1 (model year 2014-2018) and Phase 2 (model year 2018-2027).
  - The Advanced Clean Cars program that will apply to light-duty vehicles in model years 2017-2025
  - CARB's Truck and Bus Regulation, which requires heavy-duty trucks to be retrofit with diesel particulate filters or replaced with newer engines

[11] CARB. 2005. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling (Section 2485). October 20. Available at: https://www.arb.ca.gov/msprog/truck-idling/13ccr2485_09022016.pdf. Accessed: August 2018.

[12] CARB. 2018. EMFAC2017 Volume III – Technical Documentation. V1.0.2. July. Available at: https://www.arb.ca.gov/msei/downloads/emfac2017-volume-iii-technical-documentation.pdf. Accessed: August 2018.

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1.2 Existing Conditions

As noted above, the Project site is currently vacant land. The plot of land is located with a United States Air Force base to the south and an industrial area to the north.

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2. EMISSIONS ESTIMATION

This technical report evaluates health risk impacts associated with DPM emitted by the heavy-duty trucks transporting goods to and from the proposed Project during operation, in accordance with the 2003 SCAQMD Mobile Source Guidance. Based on California regulatory guidelines,[13, 14] DPM was used as a surrogate to estimate cancer and chronic impacts of diesel-fueled vehicle exhaust.

Ramboll estimated DPM emissions from the project related heavy-duty trucks when idling on-site at the loading docks and entry/exit points, travelling on-site, and travelling to and from the Project site for the 30-year residential exposure period from Project build out year 2020 through the first quarter of 2050. To estimate the annual DPM emissions, emission factors were combined with truck traffic activity data (trip rates) and idling time or travel distance. There is no operational activity associated with the Cactus Channel, hence operational emissions are zero.

2.1 Traffic Data

Urban Crossroads[15] provided peak daily truck trips associated with the Project that would occur during the holiday season (i.e., assumed to be November 15th to January 15th). Daily trips during the non-peak period were estimated to be two-thirds of the peak daily trips based on the Project specific ratio of peak period to non-peak period employment. As shown in **Table 2**, annual average truck trips were estimated using the daily trip estimates for each time period (peak and non-peak) and the number of days in that time period.

Off-site truck routes provided in the Urban Crossroads Traffic Impact Analysis (TIA) were used to represent the modeled road segments shown in **Figure 2**. On-site truck routes and truck idling locations provided in **Figure 3** were placed based on the Project site plan. The truck idling locations were placed at the loading dock area, and the Project site access points near the entry and exit gates.

As shown in **Table 3**, Ramboll calculated vehicle miles traveled (VMT) on each roadway segment as a product of the number of truck trips on that roadway segment and the length of the roadway segment. The number of truck stops per year at each on-site idling location are presented in **Table 4**. For idling at the dock, the number of truck stops was assumed to be equal to the number of round-trips (i.e., half the number of one-way trips), as trucks are assumed to idle only once while docking at the site**.** At the Project site access points (East Gate and West Gate), the number of truck stops per year was assumed to be equal to the number of annual one-way truck trips at these locations, as the trucks are assumed to idle once while entering and once while exiting the site.

2.2 Emission Factor Calculation

Emission factors were estimated using CARB's mobile source emission inventory, EMFAC2017, which is the most recently available on-road vehicle emissions estimation

[13] Cal/EPA. 1998. Findings of the Scientific Review Panel on the Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998 meeting. Office of Environmental Health Hazard Assessment and Air Resources Board.

[14] Cal/EPA. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. Office of Environmental Health Hazard Assessment. February.

[15] Urban Crossroads. 2018. K4 Parcel Project Traffic Impact Analysis. July 20.

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model.[16] Particulate matter with a diameter less than 10 microns (PM_{10}) exhaust emissions from diesel vehicles was used as a proxy for DPM. Two EMFAC2017 database queries were used to estimate DPM emission factors in grams per mile and grams per idle-minute. Running exhaust emission factors (Query 1) were calculated using EMFAC's "Emissions" model using the web-based tool. This allows for average emissions to be calculated independent of temperature and relative humidity. Idling exhaust emissions factors (Query 2) were calculated using EMFAC's "Emissions Rates" model using the desktop tool. Vehicle categories provided by Urban Crossroads 2-axle, 3-axle, and 4-axle trucks were represented as light-heavy duty trucks (LHDT), medium-heavy duty trucks (MHDT), and Heavy-heavy duty trucks (HHDT) EMFAC vehicle categories, respectively. Input parameters used for these model runs are provided below:

- Inputs for EMFAC2017 Database Query 1 (web-based tool)
  - Data Type: Emissions
  - Region: Sub-Area, Riverside (SC)
  - Calendar Year: 2020, 2025, 2030, 2035, 2040, 2045, and 2050
  - Season: Annual
  - Vehicle Category: LHDT1, LHDT2, MHDT, and HHDT
  - Model Year: Aggregated
  - Speed: Aggregated
  - Fuel: All
- Inputs for EMFAC2017 Database Query 2 (desktop tool)
  - Data Type: Emission Rates
  - Region: Sub-Area, Riverside (SC)
  - Calendar Year: 2020, 2025, 2030, 2035, 2040, 2045, and 2050
  - Season: Annual
  - Vehicle Category: LHDT1, LHDT2, MHDT, HHDT
  - Model Year: Aggregated
  - Fuel: By Fuel
  - Speed:[17] 5 mph
  - Temperature and Humidity:[17] 64, 46
  - Pollutants: PM_{10}

The output data from these queries were used to develop the emission factors for this analysis. **Table A-1** and **A-2** in **Appendix A** present the outputs from these database

[16] CARB. Mobile Source Emissions Inventory – Categories. Available at: https://www.arb.ca.gov/msei/categories.htm#emfac2017. Accessed: August 2018.

[17] Idling exhaust emission factors are independent of Speed, Temperature and Humidity. However, to run the EMFAC desktop tool, the lowest speed and the annual average temperature and humidity were used.

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queries. Emission factors for consolidated vehicle categories (LHDT, MHDT, and HHDT) for calendar years 2020, 2025, 2030, 2035, 2040, 2045, and 2050 were estimated using a VMT-weighted approach as shown in **Tables A-3 through A-5 in Appendix A**. A single emission factor for project related heavy-duty trucks in each calendar year (**Table A-6**) was calculated using a fleet weighted average approach based on the project specific fleet mix shown in **Table 2**. Emission factors for intermediate calendar years were interpolated based on this data. **Table 5** presents a summary of the running exhaust and idling exhaust emission factors for calendar years 2020 through 2050.

2.3 Emission Estimates

DPM emissions from truck travel on the nearby roadways and on-site roadways were estimated as a product of the VMT on the road segments and the emission factors in grams per mile. Emissions from on-site truck idling were calculated using the emission factors in grams per idle-minute and an idle duration of 15 minutes per round trip (i.e., 5 minutes at three locations per trip: at entry to project site, exit from the project site, and the docking locations.[18] **Table 6** presents annual DPM emission estimates from project related trucks for each modeled roadway segment and modeled on-site idling location during calendar years 2020 through 2050.

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[18] SCAQMD. SCAQMD Comment Letter on Oakmont Industrial Project. Available online at: http://www.aqmd.gov/docs/default-source/ceqa/comment-letters/2007/february/proposed-oakmont-industrial-project.pdf. February 2007.

3. AIR DISPERSION MODELING METHODOLOGY

Air dispersion modeling was performed to estimate the concentrations of DPM at receptors in the project vicinity. The following sections describe the methodology used for modeling, including model selection, source characterization, meteorological data, land use, and receptor placement.

3.1 Model Selection

The AMS/EPA Regulatory Model Improvement Committee (AERMIC) Model (AERMOD) (Version 18081) was used to estimate concentrations of ambient air pollutants. AERMOD has been approved for use in various regulatory applications by USEPA, CARB, and SCAQMD. AERMOD uses mathematical equations to simulate the movement and dispersion of air contaminants in the atmosphere. This model, which has been approved for use by USEPA, CARB, and SCAQMD, incorporates multiple variables in its algorithms including:

- Meteorological data representative of surface and upper air conditions;
- Local terrain data to account for elevation changes;
- Multiple receptor locations;
- Physical specification of emission sources including information such as:
  - Location;
  - Release height; and
  - Source dimensions.

For each receptor location, the model generates air concentrations (or air dispersion factors as unit emissions were modeled) that result from emissions from multiple sources.

The regulatory default option, urban dispersion characteristics, and PERIOD averaging time were selected based the SCAQMD modeling recommendations.[19] Dispersion model averaging times are specified based on the averaging times of ambient air quality standards and the air quality significance thresholds established by the appropriate regulatory agencies. For the HRA, the PERIOD averaging time was used to evaluate chronic (long-term) health effects. Emissions from diesel combustion were assumed to occur 24 hours per day, 7 days per week, and 365 days per year based on the operation schedule of the warehouse. Emissions were modeled using the χ/Q ("chi over cue") method, such that each source group had unit emission rates (i.e., a total of 1 gram per second [g/s]) and the model estimated dispersion factors (with units of microgram per cubic meter [$\mu g/m^3$]/[g/s]). The model output was used in a post-processing calculation with actual emission rates to estimate the DPM concentrations at each receptor (see **Section 3.5** for additional information regarding receptors). The air dispersion model files are included electronically in **Appendix B**.

3.2 Source Characterization

This HRA evaluates the on-site truck travel, on-site truck idling, and off-site truck travel associated with the Project operation. Off-site truck travel was evaluated to the nearest highway or intersection based on data provided in the TIA. Line (area) sources were used in

[19] SCAQMD Modeling Guidance for AERMOD. Available at: https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance. Accessed: August 2018.

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the air dispersion model to represent the on-site and off-site truck travel. Areapoly sources were used to represent truck idling. Off-site truck routes are shown in **Figure 2**. **Figure 3** displays the location of the on-site emission sources for truck routes and idling.

Source parameters (**Table 7**) were developed based on USEPA's Particulate Matter Conformity Guidance for Hotspot Analysis[20] and the USEPA AERMOD user guide.[21] **Table 8** presents a list of sources and emission rates. A source group was created for each roadway segment. As described earlier, modeling was done using the χ/Q method and emission rates were set to 1 gram per second for each source group.

3.3 Meteorology

SCAQMD provides AERMOD model-ready meteorological data sets for use in air quality and risk impact analyses in the SCAB. SCAQMD's Riverside Airport meteorological data set was selected to analyze the Project's impacts, based on that station's close geographic proximity to the Project Site and best representation of the facility's meteorological conditions (such as prevailing winds), terrain, and surrounding land use.[22] The SCAQMD meteorological data set is for January 1, 2012 to December 31, 2016.[23] Miramar was used as upper air meteorological station in this data set. **Figure 4** depicts the location of the meteorological station with respect to the Project site. The wind rose in **Figure 5** shows the distribution of wind speeds and directions, which directly affect the dispersion of the air emissions. The "petals" of the wind rose indicate the direction from which the wind blows from, and the colors represent the wind speed. The air dispersion model uses this data to evaluate how emissions are dispersed through the air.

3.4 Land Use and Terrain Data

The Project Site is currently vacant land, but much of the surrounding area is developed. Residential uses are to the east and north and commercial uses are to the north. The March Air Reserve Base is located just south of the Project site. AERMOD offers the option of using either rural or urban dispersion characteristics. While selection of rural or urban dispersion characteristics can be based on the predominant land use within a three-kilometer radius of the site, per SCAQMD Modeling Guidance, AERMOD was run using the urban modeling option and population of 2,189,641 people for Riverside County.[24]

Data specifying terrain elevations of sources and receptors are imported into the model. Elevations are based on National Elevation Datasets (NEDs) and consist of an array of regularly spaced points on a horizontal plane for which an elevation is specified. NEDs used

[20] EPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas Appendix J: Additional Reference Information on Air Quality Models and Data Inputs. Available at: https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100NN22.pdf. Accessed: August 2018.

[21] USEPA. User's Guide for the AMS/EPA Regulatory Model (AERMOD). Available at: https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf. Accessed: August 2018.

[22] SCAQMD. 2017. Risk Assessment Procedures for Rules 1401, 1401.1 and 212. Version 8.1. September. Available at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf?sfvrsn=12. Accessed: August 2018.

[23] SCAQMD. 2018. Data for AERMOD. Available at: https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/data-for-aermod. Accessed: August 2018.

[24] SCAQMD. 2018. SCAQMD Modeling Guidance for AERMOD. Available at: https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance. Accessed: August 2018.

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in this analysis were obtained from the United States Geologic Survey. [25] The elevation data for the I-215 on- and off-ramps were obtained from Google Earth.

3.5 Receptors

Analyzing impacts of receptors close to sources of TACs is important in determining cancer and non-cancer health risk impacts. Receptor exposure to emission sources is greatest nearest to the emission source. ARB and SCAQMD emissions and modeling analyses showed an 80-percent drop-off in pollutant concentration at approximately 1,000 feet from distribution centers.[26] In order to evaluate health impacts to off-site receptors, including nearby residential and sensitive receptor populations, the geographic scope of this assessment was extended to a one-quarter mile radius or 1,320 feet from the modeled Project sources. Receptors around the project development were covered in two grids of receptors:

- Fine Grid 25 m x 25 m up to 200 m from modeled Project sources; and
- Coarse Grid 100 m x 100 m from 200 m to 1,320 feet from modeled Project sources.

Grid receptors were classified as residential or worker based on the current land use. The receptor grid includes worker receptors in vacant lots, which is conservative.

SCAQMD requires inclusion of sensitive receptors in a health risk analysis and identifies the following as sensitive receptors: long-term health care facilities, rehabilitation centers, convalescent centers, retirement homes, residences, schools, playgrounds, child care centers, and athletic facilities.[27] Sensitive receptor locations were also identified within a one-quarter mile (1,320 feet) radius of the modeled Project sources, based on databases as listed below.

- California Department of Education, California School Directory (http://www.cde.ca.gov/re/sd)
- California Community Care Licensing Division - licensed care facilities including adult residential facilities and daycares (https://secure.dss.ca.gov/CareFacilitySearch/home/selecttype/)
- California Office of Statewide Health Planning and Development, Automated Licensing Information and Report Tracking System - hospitals and long-term care facilities (http://www.oshpd.ca.gov/hid/Products/Listings.html)
- Davis Demographics School Site Locator – K-12 Schools (https://www.davisdemographics.com/videos/schoolsite-locator/)

Databases were searched for all zip codes surrounding the Project Site. Google Earth Pro was also used to identify other schools and day care centers in the Project vicinity.

Based on the database search, four sensitive receptors were identified within a one-quarter mile radius from the modeled Project sources.

[25] Multi-Resolution Land Characteristics Consortium (MRLC) -National Land Cover Database. Available online at: https://www.mrlc.gov/viewerjs/. Accessed May 2018.

[26] CARB. Air Quality and Land Use Handbook: A Community Health Perspective. 2005. Available at: https://www.arb.ca.gov/ch/handbook.pdf. Accessed: August 2018.

[27] SCAQMD. 1993. CEQA Air Quality Handbook. April.

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- Emagine U At Play, Daycare Center, Moreno Valley CA
- Think Together Learning Center, Moreno Valley, CA
- Innovation High School San Diego – Moreno Valley, Moreno Valley, CA
- Serrano Elementary School, Moreno Valley, CA

Receptor locations are illustrated in **Figure 6**. Receptor heights were assumed to be at ground-level based on SCAQMD guidance.[28]

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[28] SCAQMD. 2018. SCAQMD Modeling Guidance for AERMOD. Available at: https://www.aqmd.gov/home/air-quality/air-quality-data-studies/meteorological-data/modeling-guidance. Accessed: August 2018.

4. HEALTH RISK ASSESSMENT

In this HRA as stated in **Section 2**, the chemicals of potential concern is diesel exhaust. Under California regulatory guidelines, DPM is used as a surrogate measure of carcinogen exposure for the mixture of chemicals that make up diesel exhaust as a whole. This health risk assessment was performed to estimate cancer and non-cancer risks associated with the DPM emissions from heavy duty trucks associated with Project operation. The following sections describe the methodology used for estimating health risk impacts particularly the exposure assessment, toxicity criteria, and equations for estimating cancer and non-cancer risk impacts.

4.1 Exposure Assessment

The components of the exposure assessment include the identification of potentially exposed populations, the estimation of exposure point concentrations, identification of exposure pathways, and the selection of exposure assumptions to quantify chemical intakes that may result from potential Project emissions. The exposure assessment step determines the quantity of contaminants people are exposed to during a specific time period. Ramboll used dispersion factors from AERMOD and emission rates to estimate the concentrations of DPM at each receptor. These steps are described in the following sub-sections.

4.1.1 Identification of Potentially Exposed Populations

The potentially exposed populations considered include workers, residents, and sensitive receptors located within the grid of receptors as further described in **Section 3.5**. Locations of potentially exposed residential populations were identified based on review of aerial photographs.[29] The locations of nearby worker, residential, and sensitive receptors are shown in **Figure 6**.

As previously discussed in **Section 3.5**, SCAQMD specifies various non-residential sensitive receptors that must be included in an HRA. The search for existing non-residential sensitive receptors showed that there are four existing non-residential sensitive receptor locations within one-quarter mile of the modeled Project sources including two child care centers, an elementary school, and a high school. In addition to the receptor grid outlined above, non-residential sensitive receptors within one-quarter mile of the modeled Project sources were modeled as discrete receptors. Non-residential sensitive receptors were conservatively modeled using the residential exposure scenario.

4.1.2 Estimation of Exposure Point Concentrations

Exposure point concentrations are the concentrations of each TAC to which an individual may be exposed at a given receptor location. The exposure point concentrations used to estimate cancer risk and chronic non-cancer hazard index (HI) are the annual average ground-level concentrations of each TAC. Ground-level ambient air DPM concentrations at each receptor location were estimated using the methodologies for emissions estimation and air dispersion modeling described in **Sections 2 and 3**, respectively.

4.2 Dose-Response Assessment

The dose-response assessment (also referred to as the toxicity assessment) characterizes the relationship between the magnitude of exposure and the nature and magnitude of

[29] Google Earth Pro. 2018. Imagery date of February 6, 2018. Available for download at: https://www.google.com/earth/.

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adverse health effects that may result from such exposure. A brief description of dose-response assessment and key adverse health effects are provided in the following sub-sections.

4.2.1 Toxicity Criteria

Developing toxicity criteria involves using toxicity studies with laboratory animals or epidemiological studies of humans. Toxicological values are published by CARB in the Consolidated Table of Approved Risk Assessment Health Values.[30] OEHHA periodically revises toxicity values for air toxics. This HRA evaluated theoretical exposures to DPM for two categories of potential adverse health effects, cancer and chronic endpoints. The toxicity values used in health risk calculations are summarized in **Table 9.**

4.2.2 Exposure Pathways

The exposure pathways evaluated in this HRA were selected in accordance with the OEHHA Guidance. The inhalation pathway must be evaluated for all chemicals. The OEHHA Guidance also requires the evaluation of non-inhalation exposure pathways, referred to as a multi-pathway analysis, for specific chemicals. However, the exposure pathway for DPM is limited to inhalation and the multi-pathway factor for DPM is 1.0.

4.2.3 Exposure Assumptions

The exposure parameters used to estimate excess lifetime cancer risks (over a lifetime of 70 years) for all potentially exposed populations were obtained using risk assessment guidelines from OEHHA and are presented in **Table 10 and Table 11**.[31] For residential exposure, the total exposure duration analyzed is 30 years, in accordance with OEHHA guidance default assumptions, and begins in the third trimester to accommodate the increased susceptibility of exposures in early life. These exposure assumptions, designed to be protective of children younger than age 16, are assumed to be adequately protective of residents older than 30 years of age, including the elderly. For worker exposure, the total exposure duration analyzed is 25 years. Non-residential sensitive receptors are conservatively analyzed using the residential exposure factors.

Under OEHHA guidance, breathing rates change over time for different age groups for residential exposure. Following the SCAQMD risk assessment procedures, 95th percentile daily breathing rates for age groups less than 2 years old and 80th percentile daily breathing rates for age groups that are greater than or equal to 2 years old were used. Breathing rates were referenced from SCAQMD Risk Assessment Guidance.[32]

The age groups used for the residential exposure analysis are shown in **Table 10.** These age groups are needed in order to use age-sensitivity factors (ASFs). Per SCAQMD Risk Assessment Guidance, ASFs of 10 for ages less than 2 years, 3 for ages 2 years to 16 years, and 1 for ages 16 years or older were used in this analysis. These factors account for increased sensitivity of children to carcinogens. To incorporate ASFs, cancer risk estimates

[30] CARB. 2018. Consolidated Table of OEHHA / ARB Approved Risk Assessment Health Values. May. Available at: http://www.arb.ca.gov/toxics/healthval/healthval.htm. Accessed: August 2018.

[31] OEHHA. 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. March. Available at: https://oehha.ca.gov/air/crnr/notice-adoption-air-toxics-hot-spots-program-guidance-manual-preparation-health-risk-0. Accessed: August 2018.

[32] SCAQMD. 2017. Risk Assessment Procedures for Rules 1401, 1401.1 and 212. Version 8.1. September. Available at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/riskassessproc-v8-1.pdf?sfvrsn=12. Accessed: August 2018.

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are weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 and older. For the residential exposure, the fraction of time spent at home is 100% for ages up to 16 years and 73% for ages greater than 16 years as referenced from SCAQMD Risk Assessment Guidance. As shown in **Table 11**, there are no ASFs for the worker exposure analysis; hence, there is only one age group for worker exposure, age 16 through 41.

4.3 Risk Characterization Methodology

This section describes the methods used to estimate potential adverse effects associated with off-site exposures to chemicals emitted from operation of the Project Site. The results of this HRA are presented in **Section 5**.

4.3.1 Cancer Risk Calculations

Most regulatory agencies consider carcinogens to pose a risk of cancer at all exposure levels. This "no threshold" assumption means than any increase in dose is assumed to be associated with an increase in the probability of developing cancer.

Cancer risks impacts at receptors on the Project site were estimated as the incremental probability that an individual will develop cancer over a 70-year lifetime as a direct result of exposure to DPM emitted by project related truck traffic.[33, 34] The estimated risk is expressed as a unitless probability. The exposure factor assumptions and toxicity values used in risk calculations are summarized in **Table 9, Table 10, and Table 11**.

The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). For carcinogenic chemicals, both inhalation and non-inhalation pathways must be considered. For simplicity, SCAQMD multi-pathway factors were used for chemicals with multi exposure pathways in this analysis. As stated earlier the exposure pathway for DPM is limited to inhalation and its multi-pathway factor is 1.0

The following equations were used to calculate the maximum individual cancer risk (MICR) from DPM at each modeled receptor (note, all sensitive receptors were modeled with the residential exposure scenario):

$$MICR_R = CP \times Q \times {}^{\chi}/_{Q} \times MWAF \times CEF_R \times MP_R \times 10^{-6}$$

$$MICR_W = CP \times Q \times {}^{\chi}/_{Q} \times MWAF \times CEF_W \times MP_W \times WAF \times 10^{-6}$$

Where:

$MICR_R$	=	Maximum Individual Cancer Risk for Resident (in a million)
$MICR_W$	=	Maximum Individual Cancer Risk for Worker (in a million)

[33] USEPA. 1989. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response. EPA-540/1-89/002. Washington, DC. December. Available online at: http://rais.ornl.gov/documents/HHEMA.pdf. Accessed: August 2018.

[34] Cal/EPA. 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines. August.

CP	=	Cancer Potency Factor for DPM $(mg/kg/day)^{-1}$
Q	=	Emissions rate in g/s
χ/Q	=	Annual Average Air concentration for DPM [$(\mu g/m^3)/(g/s)$] output based on AERMOD dispersion factor for each source
MWAF	=	Molecular Weight Adjustment Factor is 1.0 for DPM
CEF_R	=	Combined Exposure Factor for a Resident
CEF_W	=	Combined Exposure Factor for a Worker
MPR	=	Multi-pathway factor for residential exposure
MPW	=	Multi-pathway factor for worker exposure
WAF	=	Worker adjustment factor of 1.0 was used based on the operation schedule of 24 hours/day, 7 days/week

4.3.2 Non-Cancer Risk Calculations

The potential for exposure to result in adverse chronic non-cancer effect is evaluated by comparing the estimated annual average air concentration of DPM to its non-cancer chronic reference exposure level (cREL). Th following equations are used to estimate the Chronic Hazard Index for residents and workers:

$$HIC_R = \frac{Q \times {}^{\chi}/_{Q} \times MP_R \times MWAF}{cREL}$$

$$HIC_W = \frac{Q \times {}^{\chi}/_{Q} \times MP_W \times MWAF * WAF}{cREL}$$

Where:

HIC_R	=	Chronic Hazard index for Resident
HIC_W	=	Chronic Hazard index for Worker
Q	=	Emissions rate in g/s
χ/Q	=	Annual Average Air concentration for DPM [$(\mu g/m^3)/(g/s)$] output based on AERMOD dispersion factor for each source
MP_R	=	Multi-pathway factor for Resident
MP_R	=	Multi-pathway factor for Worker
WAF	=	Worker Adjustment Factor is 1.0 for Workers
MWAF	=	Molecular Weight Adjustment Factor is 1.0 for DPM
cREL	=	Chronic non-cancer reference exposure level for DPM ($\mu g/m^3$)

DPM does not have an acute non-cancer toxicity value; therefore, the potential of exposure to acute health impacts was not assessed as part of this analysis.

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5. RISK CHARACTERIZATION RESULTS

The risk characterization results of this HRA were compared to SCAQMD thresholds of 10 in one million for cancer risk, and 1.0 for chronic HI.[35]

Table C-1 in Appendix C provides the estimated MICR and HIC associated with DPM emissions from Project operation for each modeled receptor. **Table 12** shows a summary of the maximum MICR and HIC for each receptor type (worker, residential, and sensitive). The maximum MICR of 1.3 in a million is less than the SCAQMD significance threshold of 10 in one million. Similarly, the HIC of 0.004 is less than the SCAQMD significance threshold of 1.0. **Figure 7** shows the location of the maximum worker, residential, and sensitive cancer risks. While DPM emissions will also be emitted during Project construction, the short-term duration of the Project construction and the lower level of on-site construction DPM emissions compared to operational emissions suggests that it is unlikely for construction emissions to substantially change the findings and results reported for the operational emissions.

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[35] SCAQMD. 2015. Air Quality Significance Thresholds. March. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf?sfvrsn=2. Accessed: August 2018.

6. UNCERTAINTIES

While Ramboll has used appropriate engineering and scientific methods in the HRA presented in this report, there is a great deal of uncertainty associated with the process of risk assessment. In this context, uncertainty may be defined as what is not known and may be reduced with further scientific studies. Lack of data in many areas necessitates the use of assumptions, thus increasing the uncertainty. This section briefly describes some of the uncertainties that may influence the risk estimates produced in this analysis.

6.1.1 Exposure Assumptions

Consistent with OEHHA Guidance, risks were estimated assuming that hypothetical residents at the receptor points spend a continuous 30 years at one location. However, the United States Environmental Protection Agency (USEPA) has estimated that 50% of the population lives in the same residence for only eight years, while only 10% remain in the same house for 32 years.[36] Accordingly, the actual risks to hypothetical residents at the modeled receptor locations are likely lower than those calculated in this assessment.

In addition, the sensitive receptors identified in this assessment were modeled using the residential scenario. Since these locations provide child care and education, individuals would be there for a shorter period of time than modeled in the residential scenario. Therefore, the actual risks at the modeled sensitive receptor locations are likely lower than those calculated in this assessment.

6.1.2 Dose-Response Assessment

The primary uncertainties associated with the toxicity assessment are related to derivation of toxicity values. Standard RELs and CPFs established by OEHHA were used to estimate potential carcinogenic and non-cancer health effects from exposures to compounds emitted from the Project operation activities. These values are derived by applying conservative assumptions and are intended to protect the most sensitive individuals in the potentially exposed populations.

To derive the toxicity values, OEHHA makes several assumptions that tend to overestimate the actual hazard or risk to human health. Because data from human studies are generally unavailable, RELs are typically derived from animal studies. Uncertainty factors and modifying factors are then applied to these data to ensure that the RELs are adequately protective of human health. For many compounds, it is anticipated that this approach overestimates the potential for non-cancer effects.

CPFs used to estimate carcinogenic risk are also typically derived based on data from animal studies. These data are based on studies in which high doses of a test chemical were administered to laboratory animals, and the reported response is extrapolated to the much lower doses typical of human exposure. Very little experimental data are available on the nature of the dose-response relationship at low doses, such as whether a threshold exists or if the dose-response curve passes through the origin. Because of this uncertainty, a conservative model is used to estimate the low-dose relationship and uses an upper bound

[36] USEPA. 2011. Exposure Factors Handbook: 2011 Edition. Office of Research and Development. Washington, D.C. September. Available at: https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252. Accessed: August 2018.

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estimate (the 95 percent upper confidence limit of the slope predicted by the extrapolation model) as the CPF. With this factor, an upper-bound estimate of potential cancer risks is obtained.

6.1.3 Risk Calculation

The USEPA notes that the conservative assumptions used in a risk assessment are intended to assure that the estimated risks do not underestimate the actual risks posed by a site and that the estimated risks do not necessarily represent actual risks experienced by populations at or near a site.[37] The estimated risks in this risk assessment are based primarily on a series of conservative assumptions related to predicted environmental concentrations, exposure, and chemical toxicity. The use of conservative assumptions tends to produce upper-bound estimates of risk. Although it is difficult to quantify the uncertainties associated with all the assumptions made in this risk assessment, the use of conservative assumptions is likely to result in substantial overestimates of exposure, and hence, risk.

6.1.4 Estimation of Emissions

There are uncertainties associated with the estimation of emissions from trucks. Emissions depend on emission factors estimated using EMFAC2017. Thus, uncertainties associated with EMFAC2017 apply to this analysis. In particular, this analysis takes into account emissions for future years, which are unknown. Thus, EMFAC2017's assumptions of how regulations will effect emissions in the future are a source of uncertainty.

6.1.5 Estimation of Exposure Concentrations

In addition to uncertainty associated with emission estimates, there is also uncertainty associated with the estimated exposure concentrations. The limitations of the air dispersion model provide a source of uncertainty in the estimation of exposure concentrations. According to USEPA, errors due to the limitation of the algorithms implemented in the air dispersion model in the highest estimated concentrations of +/- 10 percent to 40 percent are typical.[38] Ramboll's methodologies consistently produce conservative results; thus, predicted exposure concentrations are likely to be at or above actual exposure concentrations.

6.1.6 Source Representation

The source parameters used to model emission sources add uncertainty. For all emission sources, Ramboll used source parameters which are either recommended as defaults or expected to produce more conservative (i.e., overestimation of) results.[39] Discrepancies might exist between the actual emissions characteristics of a source and its representation in the model; exposure concentrations used in this assessment represent approximate exposure concentrations.

[37] USEPA. 1989. Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part A). Interim Final. Office of Emergency and Remedial Response. EPA-540/1-89/002. Washington, DC. December. Available online at: http://rais.ornl.gov/documents/HHEMA.pdf. Accessed: August 2018.

[38] USEPA. 2005. Revision to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions; Final Rule. 40 CFR Part 51, Appendix W (Federal Register) 70216.

[39] USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas. November. Available at: https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses#pmguidance. Accessed: August 2018.

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TABLES

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Table ES-1. Project Health Impacts
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor Type	Maximum Incremental Cancer Risk[1] (in a million)	Maximum Incremental HIC[2]
Worker	0.6	0.004
Residential	0.5	0.0002
Sensitive	1.3	0.0006
SCAQMD Significance Threshold[3]	**10**	**1**
Exceeds Threshold?	**NO**	**NO**

Notes:

[1] Maximum incremental cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens.

[2] The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration to the non-cancer chronic reference exposure level for each chemical.

[3] SCAQMD Air Quality Significance Thresholds. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. Accessed: August 2018.

Abbreviations:

HIC - chronic hazard index

SCAQMD - South Coast Air Quality Management District

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Table 1. Project Land Uses
K4 and Cactus Channel Improvement Project
Riverside County, California

Project Land Use	CalEEMod® Land Use Type	CalEEMod® Land Use Subtype[1]	Land Use Unit Amount	Size Metric	Acreage
On-Site Construction					
Warehouse	Industrial	Unrefrigerated Warehouse - No Rail	718	1000 sqft	20
Parking Lot	Parking	Parking Lot	670	1000 sqft	15.4
Off-Site Construction					
Cactus Channel[2]	Parking	Other Non-Asphalt Surfaces	3.45	acres	3.45

Notes:
[1] Land uses as defined in CalEEMod®.
[2] Cactus Channel land use acreage is based on the expected area that will be disturbed during construction.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
sqft - square feet

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Table 2. Heavy Duty Truck Trips and Fleet Mix Associated with Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

Vehicle Type	EMFAC Vehicle Category	Peak Period Daily Trips[1,2]	Non-Peak Period Daily Trips[3]	Annual Average Trips[4]	Project Specific Heavy Duty Truck Fleet Mix[5]
2-Axle Trucks	LHDT	86	57	22,704	17%
3-Axle Trucks	MHDT	107	71	28,248	21%
4-Axle+ Trucks	HHDT	324	216	85,536	63%
			Total	136,488	--

Notes:

[1] Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018.

[2] Peak period daily trip rates in this table represent the maximum daily one-way trips that would occur during the holiday season (November 15th to January 15th).

[3] Non-peak period daily trips are estimated to be 2/3rd of the peak daily trips based on the Project specific ratio of peak period to non-peak period employment.

[4] Annual trips are calculated using the daily trip estimates for each time period (peak and non-peak) and the number of days in that time period, assuming 7 days per week.

[5] Project specific fleet mix is estimated based on the ratio of truck trips for each vehicle type to the total truck trips as provided by Urban Crossroads.

Abbreviations:

HHDT - heavy-heavy duty trucks
MHDT - medium-heavy duty trucks
LHDT - light-heavy duty trucks
sqft - square feet

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Table 3. Vehicle Miles Traveled on Modeled Roadway Segments
K4 and Cactus Channel Improvement Project
Riverside County, California

Source Type	Roadway Segment ID[1]	Roadway Segment Description[1]	Percent of Incoming Truck Trips[2]	Percent of Outgoing Truck Trips[2]	Annual Truck Trips[3] (one-way trips/year)	Roadway Segment Length[4] (miles)	Annual Truck VMT[5] (miles/year)
Off-Site Truck Routes	A	I-215S on-ramp	0%	35%	23,885	0.58	13,802
	B	I-215S off-ramp	55%	0%	37,534	0.39	14,547
	C	I-215N on-ramp	0%	55%	37,534	0.24	8,866
	D	I-215N off-ramp	35%	0%	23,885	0.55	13,049
	E	Cactus Av. I-215 Overpass	55%	35%	61,420	0.13	7,701
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	55%	90%	98,954	0.28	27,718
	G	Cactus Av. West of Veterans Way	90%	90%	122,839	0.45	55,523
	H	Cactus Av. Between Veterans Way and Frederick St.	45%	45%	61,420	0.31	19,111
	I	Cactus Av. Between Frederick St. and Graham St.	5%	5%	6,824	0.50	3,420
	J	Cactus Av. Between Graham St. and Heacock St.	3%	3%	4,095	0.50	2,063
	K	Frederick St.	5%	5%	6,824	0.24	1,611
	L	Graham St.	2%	2%	2,730	0.24	654
	M	Heacock St. North	2%	2%	2,730	0.24	648
	N	Heacock St. South	1%	1%	1,365	0.26	349
On-Site Truck Routes	O	West Gate	45%	45%	61,420	0.06	3,824
	P	Site Docking	100%	100%	136,488	0.29	39,551
	Q	East Gate	55%	55%	75,068	0.04	3,247

Notes:

[1] Figure 2 and Figure 3 present locations of off-site and on-site modeled roadway segments.

[2] Percent of incoming and outgoing truck trips on each roadway segment were obtained from Exhibit 4 in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018. Note that the number of incoming/outgoing trips is equal to one round-trip (i.e., half the total annual average one-way trips as shown in Table 2).

[3] Calculated as sum of incoming or outgoing trips on each traffic segment.

[4] Roadway segment length was measured on aerial.

[5] Annual truck VMT were calculated as the product of annual truck trips and roadway segment lengths presented in this table.

Abbreviations:

Av - Avenue
N - North
S - South
St - Street
I-215 - Interstate 215
VMT - Vehicular Miles Traveled

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Table 4. Number of Truck Stops at Modeled On-Site Idling Locations
K4 and Cactus Channel Improvement Project
Riverside County, California

Source Type	Roadway Segment ID[1]	Roadway Segment Description[1]	Number of Truck Stops per Year[2]
On-Site Idling	DOCKIDL	Dock Idling	68,244
	WGIDL	West Gate Idling	61,420
	EGIDL	East Gate Idling	75,068

Notes:

[1] Figure 3 presents locations of on-site idling locations.

[2] For idling at the dock, the number of truck stops was assumed to be equal to the number of round-trips (i.e., half of the total annual average one-way truck trips shown in Table 2), as trucks are expected to idle only once while docking at the site. At the Project site access points (East Gate and West Gate), the number of truck stops were assumed to be equal to the number of annual one-way truck trips at these locations obtained from Table 3, as the trucks are expected to idle once while entering and once while exiting the site.

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Table 5. DPM Emission Factors for Heavy Duty Trucks Associated with Project Operation During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Running Exhaust[1] (g/mile)	Idling Exhaust[1] (g/idle-minute)
2020	0.0650	0.0024
2021	0.0558	0.0022
2022	0.0465	0.0020
2023	0.0373	0.0019
2024	0.0280	0.0017
2025	0.0187	0.0015
2026	0.0186	0.0015
2027	0.0185	0.0014
2028	0.0183	0.0014
2029	0.0182	0.0014
2030	0.0180	0.0014
2031	0.0178	0.0014
2032	0.0175	0.0014
2033	0.0172	0.0014
2034	0.0170	0.0014
2035	0.0167	0.0014
2036	0.0167	0.0014
2037	0.0166	0.0014
2038	0.0165	0.0014
2039	0.0164	0.0014
2040	0.0164	0.0014
2041	0.0164	0.0014
2042	0.0163	0.0014
2043	0.0163	0.0014
2044	0.0163	0.0014
2045	0.0163	0.0014
2046	0.0163	0.0014
2047	0.0163	0.0014
2048	0.0163	0.0014
2049	0.0163	0.0014
2050	0.0163	0.0014

Notes:

[1] Emission factors for calendar years 2020, 2025, 2030, 2035, 2040, 2045 and 2050 were estimated using EMFAC2017. See Appendix A for details. Emission factors for intermediate years were estimated by interpolation.

Abbreviations:

CARB - California Air Resources Board

EMFAC - CARB's mobile source emission inventory model

g -grams

hr - hour

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2020	A	I-215S on-ramp	897
	B	I-215S off-ramp	946
	C	I-215N on-ramp	576
	D	I-215N off-ramp	848
	E	Cactus Av. I-215 Overpass	501
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	1,802
	G	Cactus Av. West of Veterans Way	3,609
	H	Cactus Av. Between Veterans Way and Frederick St.	1,242
	I	Cactus Av. Between Frederick St. and Graham St.	222
	J	Cactus Av. Between Graham St. and Heacock St.	134
	K	Frederick St.	105
	L	Graham St.	43
	M	Heacock St. North	42
	N	Heacock St. South	23
	O	West Gate	249
	P	Site Docking	2,571
	Q	East Gate	211
	DOCKIDL	Dock Idling	832
	WGIDL	West Gate Idling	748
	EGIDL	East Gate Idling	915
2021	A	I-215S on-ramp	770
	B	I-215S off-ramp	811
	C	I-215N on-ramp	494
	D	I-215N off-ramp	728
	E	Cactus Av. I-215 Overpass	429
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	1,545
	G	Cactus Av. West of Veterans Way	3,096
	H	Cactus Av. Between Veterans Way and Frederick St.	1,066
	I	Cactus Av. Between Frederick St. and Graham St.	191
	J	Cactus Av. Between Graham St. and Heacock St.	115
	K	Frederick St.	90
	L	Graham St.	36
	M	Heacock St. North	36
	N	Heacock St. South	19
	O	West Gate	213
	P	Site Docking	2,205
	Q	East Gate	181
	DOCKIDL	Dock Idling	765
	WGIDL	West Gate Idling	689
	EGIDL	East Gate Idling	842
2022	A	I-215S on-ramp	642
	B	I-215S off-ramp	677
	C	I-215N on-ramp	412
	D	I-215N off-ramp	607
	E	Cactus Av. I-215 Overpass	358
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	1,289
	G	Cactus Av. West of Veterans Way	2,582
	H	Cactus Av. Between Veterans Way and Frederick St.	889
	I	Cactus Av. Between Frederick St. and Graham St.	159
	J	Cactus Av. Between Graham St. and Heacock St.	96
	K	Frederick St.	75
	L	Graham St.	30
	M	Heacock St. North	30
	N	Heacock St. South	16
	O	West Gate	178
	P	Site Docking	1,839
	Q	East Gate	151
	DOCKIDL	Dock Idling	699
	WGIDL	West Gate Idling	629
	EGIDL	East Gate Idling	769

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2023	A	I-215S on-ramp	514
	B	I-215S off-ramp	542
	C	I-215N on-ramp	330
	D	I-215N off-ramp	486
	E	Cactus Av. I-215 Overpass	287
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	1,033
	G	Cactus Av. West of Veterans Way	2,068
	H	Cactus Av. Between Veterans Way and Frederick St.	712
	I	Cactus Av. Between Frederick St. and Graham St.	127
	J	Cactus Av. Between Graham St. and Heacock St.	77
	K	Frederick St.	60
	L	Graham St.	24
	M	Heacock St. North	24
	N	Heacock St. South	13
	O	West Gate	142
	P	Site Docking	1,473
	Q	East Gate	121
	DOCKIDL	Dock Idling	632
	WGIDL	West Gate Idling	569
	EGIDL	East Gate Idling	696
2024	A	I-215S on-ramp	386
	B	I-215S off-ramp	407
	C	I-215N on-ramp	248
	D	I-215N off-ramp	365
	E	Cactus Av. I-215 Overpass	216
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	776
	G	Cactus Av. West of Veterans Way	1,555
	H	Cactus Av. Between Veterans Way and Frederick St.	535
	I	Cactus Av. Between Frederick St. and Graham St.	96
	J	Cactus Av. Between Graham St. and Heacock St.	58
	K	Frederick St.	45
	L	Graham St.	18
	M	Heacock St. North	18
	N	Heacock St. South	10
	O	West Gate	107
	P	Site Docking	1,107
	Q	East Gate	91
	DOCKIDL	Dock Idling	566
	WGIDL	West Gate Idling	509
	EGIDL	East Gate Idling	623
2025	A	I-215S on-ramp	259
	B	I-215S off-ramp	273
	C	I-215N on-ramp	166
	D	I-215N off-ramp	245
	E	Cactus Av. I-215 Overpass	144
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	520
	G	Cactus Av. West of Veterans Way	1,041
	H	Cactus Av. Between Veterans Way and Frederick St.	358
	I	Cactus Av. Between Frederick St. and Graham St.	64
	J	Cactus Av. Between Graham St. and Heacock St.	39
	K	Frederick St.	30
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	7
	O	West Gate	72
	P	Site Docking	742
	Q	East Gate	61
	DOCKIDL	Dock Idling	500
	WGIDL	West Gate Idling	450
	EGIDL	East Gate Idling	550

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2026	A	I-215S on-ramp	257
	B	I-215S off-ramp	271
	C	I-215N on-ramp	165
	D	I-215N off-ramp	243
	E	Cactus Av. I-215 Overpass	143
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	516
	G	Cactus Av. West of Veterans Way	1,033
	H	Cactus Av. Between Veterans Way and Frederick St.	356
	I	Cactus Av. Between Frederick St. and Graham St.	64
	J	Cactus Av. Between Graham St. and Heacock St.	38
	K	Frederick St.	30
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	71
	P	Site Docking	736
	Q	East Gate	60
	DOCKIDL	Dock Idling	495
	WGIDL	West Gate Idling	446
	EGIDL	East Gate Idling	545
2027	A	I-215S on-ramp	255
	B	I-215S off-ramp	268
	C	I-215N on-ramp	164
	D	I-215N off-ramp	241
	E	Cactus Av. I-215 Overpass	142
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	512
	G	Cactus Av. West of Veterans Way	1,025
	H	Cactus Av. Between Veterans Way and Frederick St.	353
	I	Cactus Av. Between Frederick St. and Graham St.	63
	J	Cactus Av. Between Graham St. and Heacock St.	38
	K	Frederick St.	30
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	71
	P	Site Docking	730
	Q	East Gate	60
	DOCKIDL	Dock Idling	491
	WGIDL	West Gate Idling	442
	EGIDL	East Gate Idling	540
2028	A	I-215S on-ramp	253
	B	I-215S off-ramp	266
	C	I-215N on-ramp	162
	D	I-215N off-ramp	239
	E	Cactus Av. I-215 Overpass	141
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	508
	G	Cactus Av. West of Veterans Way	1,017
	H	Cactus Av. Between Veterans Way and Frederick St.	350
	I	Cactus Av. Between Frederick St. and Graham St.	63
	J	Cactus Av. Between Graham St. and Heacock St.	38
	K	Frederick St.	30
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	70
	P	Site Docking	724
	Q	East Gate	59
	DOCKIDL	Dock Idling	487
	WGIDL	West Gate Idling	438
	EGIDL	East Gate Idling	535

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2029	A	I-215S on-ramp	251
	B	I-215S off-ramp	264
	C	I-215N on-ramp	161
	D	I-215N off-ramp	237
	E	Cactus Av. I-215 Overpass	140
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	503
	G	Cactus Av. West of Veterans Way	1,008
	H	Cactus Av. Between Veterans Way and Frederick St.	347
	I	Cactus Av. Between Frederick St. and Graham St.	62
	J	Cactus Av. Between Graham St. and Heacock St.	37
	K	Frederick St.	29
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	69
	P	Site Docking	718
	Q	East Gate	59
	DOCKIDL	Dock Idling	483
	WGIDL	West Gate Idling	434
	EGIDL	East Gate Idling	531
2030	A	I-215S on-ramp	249
	B	I-215S off-ramp	262
	C	I-215N on-ramp	160
	D	I-215N off-ramp	235
	E	Cactus Av. I-215 Overpass	139
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	499
	G	Cactus Av. West of Veterans Way	1,000
	H	Cactus Av. Between Veterans Way and Frederick St.	344
	I	Cactus Av. Between Frederick St. and Graham St.	62
	J	Cactus Av. Between Graham St. and Heacock St.	37
	K	Frederick St.	29
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	69
	P	Site Docking	713
	Q	East Gate	58
	DOCKIDL	Dock Idling	478
	WGIDL	West Gate Idling	430
	EGIDL	East Gate Idling	526
2031	A	I-215S on-ramp	245
	B	I-215S off-ramp	258
	C	I-215N on-ramp	157
	D	I-215N off-ramp	232
	E	Cactus Av. I-215 Overpass	137
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	492
	G	Cactus Av. West of Veterans Way	986
	H	Cactus Av. Between Veterans Way and Frederick St.	339
	I	Cactus Av. Between Frederick St. and Graham St.	61
	J	Cactus Av. Between Graham St. and Heacock St.	37
	K	Frederick St.	29
	L	Graham St.	12
	M	Heacock St. North	12
	N	Heacock St. South	6
	O	West Gate	68
	P	Site Docking	702
	Q	East Gate	58
	DOCKIDL	Dock Idling	476
	WGIDL	West Gate Idling	428
	EGIDL	East Gate Idling	524

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2032	A	I-215S on-ramp	242
	B	I-215S off-ramp	255
	C	I-215N on-ramp	155
	D	I-215N off-ramp	228
	E	Cactus Av. I-215 Overpass	135
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	485
	G	Cactus Av. West of Veterans Way	972
	H	Cactus Av. Between Veterans Way and Frederick St.	335
	I	Cactus Av. Between Frederick St. and Graham St.	60
	J	Cactus Av. Between Graham St. and Heacock St.	36
	K	Frederick St.	28
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	67
	P	Site Docking	692
	Q	East Gate	57
	DOCKIDL	Dock Idling	474
	WGIDL	West Gate Idling	426
	EGIDL	East Gate Idling	521
2033	A	I-215S on-ramp	238
	B	I-215S off-ramp	251
	C	I-215N on-ramp	153
	D	I-215N off-ramp	225
	E	Cactus Av. I-215 Overpass	133
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	478
	G	Cactus Av. West of Veterans Way	958
	H	Cactus Av. Between Veterans Way and Frederick St.	330
	I	Cactus Av. Between Frederick St. and Graham St.	59
	J	Cactus Av. Between Graham St. and Heacock St.	36
	K	Frederick St.	28
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	66
	P	Site Docking	682
	Q	East Gate	56
	DOCKIDL	Dock Idling	472
	WGIDL	West Gate Idling	424
	EGIDL	East Gate Idling	519
2034	A	I-215S on-ramp	234
	B	I-215S off-ramp	247
	C	I-215N on-ramp	151
	D	I-215N off-ramp	222
	E	Cactus Av. I-215 Overpass	131
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	471
	G	Cactus Av. West of Veterans Way	943
	H	Cactus Av. Between Veterans Way and Frederick St.	325
	I	Cactus Av. Between Frederick St. and Graham St.	58
	J	Cactus Av. Between Graham St. and Heacock St.	35
	K	Frederick St.	27
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	65
	P	Site Docking	672
	Q	East Gate	55
	DOCKIDL	Dock Idling	469
	WGIDL	West Gate Idling	422
	EGIDL	East Gate Idling	516

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2035	A	I-215S on-ramp	231
	B	I-215S off-ramp	243
	C	I-215N on-ramp	148
	D	I-215N off-ramp	218
	E	Cactus Av. I-215 Overpass	129
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	464
	G	Cactus Av. West of Veterans Way	929
	H	Cactus Av. Between Veterans Way and Frederick St.	320
	I	Cactus Av. Between Frederick St. and Graham St.	57
	J	Cactus Av. Between Graham St. and Heacock St.	35
	K	Frederick St.	27
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	64
	P	Site Docking	662
	Q	East Gate	54
	DOCKIDL	Dock Idling	467
	WGIDL	West Gate Idling	420
	EGIDL	East Gate Idling	514
2036	A	I-215S on-ramp	230
	B	I-215S off-ramp	242
	C	I-215N on-ramp	148
	D	I-215N off-ramp	217
	E	Cactus Av. I-215 Overpass	128
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	462
	G	Cactus Av. West of Veterans Way	925
	H	Cactus Av. Between Veterans Way and Frederick St.	318
	I	Cactus Av. Between Frederick St. and Graham St.	57
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	27
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	64
	P	Site Docking	659
	Q	East Gate	54
	DOCKIDL	Dock Idling	466
	WGIDL	West Gate Idling	420
	EGIDL	East Gate Idling	513
2037	A	I-215S on-ramp	229
	B	I-215S off-ramp	241
	C	I-215N on-ramp	147
	D	I-215N off-ramp	216
	E	Cactus Av. I-215 Overpass	128
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	460
	G	Cactus Av. West of Veterans Way	921
	H	Cactus Av. Between Veterans Way and Frederick St.	317
	I	Cactus Av. Between Frederick St. and Graham St.	57
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	27
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	63
	P	Site Docking	656
	Q	East Gate	54
	DOCKIDL	Dock Idling	465
	WGIDL	West Gate Idling	419
	EGIDL	East Gate Idling	512

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2038	A	I-215S on-ramp	228
	B	I-215S off-ramp	240
	C	I-215N on-ramp	146
	D	I-215N off-ramp	216
	E	Cactus Av. I-215 Overpass	127
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	458
	G	Cactus Av. West of Veterans Way	917
	H	Cactus Av. Between Veterans Way and Frederick St.	316
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	27
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	63
	P	Site Docking	653
	Q	East Gate	54
	DOCKIDL	Dock Idling	465
	WGIDL	West Gate Idling	418
	EGIDL	East Gate Idling	511
2039	A	I-215S on-ramp	227
	B	I-215S off-ramp	239
	C	I-215N on-ramp	146
	D	I-215N off-ramp	215
	E	Cactus Av. I-215 Overpass	127
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	456
	G	Cactus Av. West of Veterans Way	913
	H	Cactus Av. Between Veterans Way and Frederick St.	314
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	63
	P	Site Docking	650
	Q	East Gate	53
	DOCKIDL	Dock Idling	464
	WGIDL	West Gate Idling	417
	EGIDL	East Gate Idling	510
2040	A	I-215S on-ramp	226
	B	I-215S off-ramp	238
	C	I-215N on-ramp	145
	D	I-215N off-ramp	214
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	454
	G	Cactus Av. West of Veterans Way	909
	H	Cactus Av. Between Veterans Way and Frederick St.	313
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	63
	P	Site Docking	648
	Q	East Gate	53
	DOCKIDL	Dock Idling	463
	WGIDL	West Gate Idling	417
	EGIDL	East Gate Idling	509

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2041	A	I-215S on-ramp	226
	B	I-215S off-ramp	238
	C	I-215N on-ramp	145
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	453
	G	Cactus Av. West of Veterans Way	908
	H	Cactus Av. Between Veterans Way and Frederick St.	313
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	63
	P	Site Docking	647
	Q	East Gate	53
	DOCKIDL	Dock Idling	463
	WGIDL	West Gate Idling	417
	EGIDL	East Gate Idling	509
2042	A	I-215S on-ramp	226
	B	I-215S off-ramp	238
	C	I-215N on-ramp	145
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	453
	G	Cactus Av. West of Veterans Way	907
	H	Cactus Av. Between Veterans Way and Frederick St.	312
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	646
	Q	East Gate	53
	DOCKIDL	Dock Idling	463
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	509
2043	A	I-215S on-ramp	225
	B	I-215S off-ramp	238
	C	I-215N on-ramp	145
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	453
	G	Cactus Av. West of Veterans Way	907
	H	Cactus Av. Between Veterans Way and Frederick St.	312
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	646
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	509

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2044	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	145
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	452
	G	Cactus Av. West of Veterans Way	906
	H	Cactus Av. Between Veterans Way and Frederick St.	312
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	645
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	509
2045	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	126
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	452
	G	Cactus Av. West of Veterans Way	905
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	645
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	508
2046	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	125
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	452
	G	Cactus Av. West of Veterans Way	905
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	644
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	508

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2047	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	125
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	452
	G	Cactus Av. West of Veterans Way	904
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	644
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	508
2048	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	213
	E	Cactus Av. I-215 Overpass	125
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	451
	G	Cactus Av. West of Veterans Way	904
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	644
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	508
2049	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	212
	E	Cactus Av. I-215 Overpass	125
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	451
	G	Cactus Av. West of Veterans Way	904
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	644
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	509

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Table 6. DPM Emission Estimates from Project Related Trucks on the Modeled On-Site and Off-Site Locations During Calendar Years 2020 through 2050
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Roadway Segment ID[1]	Roadway Segment Description[1]	Annual DPM Emissions[2] (g/year)
2050	A	I-215S on-ramp	225
	B	I-215S off-ramp	237
	C	I-215N on-ramp	144
	D	I-215N off-ramp	212
	E	Cactus Av. I-215 Overpass	125
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	451
	G	Cactus Av. West of Veterans Way	904
	H	Cactus Av. Between Veterans Way and Frederick St.	311
	I	Cactus Av. Between Frederick St. and Graham St.	56
	J	Cactus Av. Between Graham St. and Heacock St.	34
	K	Frederick St.	26
	L	Graham St.	11
	M	Heacock St. North	11
	N	Heacock St. South	6
	O	West Gate	62
	P	Site Docking	644
	Q	East Gate	53
	DOCKIDL	Dock Idling	462
	WGIDL	West Gate Idling	416
	EGIDL	East Gate Idling	509

Notes:

[1] Figure 2 and Figure 3 present locations of modeled roadway segments.

[2] Running exhaust emissions for each segment are estimated as a product of VMT in Table 3 and running exhaust emission factors in Table 5. Idling emissions are estimated as the product of idle duration (5 minutes per truck stop), the number of truck stops in Table 4, and the idling emission factors in Table 5.

Abbreviations:

Av - Avenue
DPM - diesel particulate matter
g - gram
I-215 - Interstate 215
lb - pounds
mi - miles
N - North
S - South
St - Street
VMT - vehicle miles traveled

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Table 7. Modeled Source Parameters
K4 and Cactus Channel Improvement Project
Riverside County, California

Source Parameters	Off-site Truck Traffic	On-site Truck Traffic	Onsite Idling
Source Type	Line	Line	Areapoly
Width (m)	Road Width[1]	15.24	N/A
Initial Vertical Dimension[2] (m)	6.8	6.8	6.8
Initial Vertical Dispersion Coefficient[3,4] (m)	3.16	3.16	0.79
Release Height[5] (m)	3.4	3.4	3.4

Notes:

[1] Road width is estimated as a product of the number of lanes and width of a lane. The width of the lane is defined as 12 feet for I-215 on- and off- ramps and 11 feet for arterial roads based on the USEPA Transportation Conformity Guidance..

[2] The initial vertical dimension for truck exhaust is assumed to be equal to 1.7 times the vehicle height. Truck vehicle height is 4 meters based on the USEPA Transportation Conformity Guidance.

[3] The initial vertical dispersion coefficient for off-site and on-site traffic is estimated as the initial vertical dimension divided by 2.15 based on the USEPA Transportation Conformity Guidance.

[4] For on-site idling emission sources, the initial vertical dispersion coefficient is estimated as the initial vertical dimension divided by 4.3, based on the USEPA AERMOD User Guide.

[5] Release height is estimated as half of the initial vertical dimension based on the USEPA Transportation Conformity Guidance.

Abbreviations:

AERMOD - American Meteorological Society/Environmental Protection Agency Regulatory Model

ft - feet

m - meters

N/A - not applicable

PM - particulate matter

USEPA - United States Environmental Protection Agency

I-215 - Interstate 215

References:

USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas Appendices. November. Available at: https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100NN22.pdf. Accessed: August 2018.

USEPA. 2018. User's Guide for the AMS/EPA Regulatory Model. April. Available at: https://www3.epa.gov/ttn/scram/models/aermod/aermod_userguide.pdf. Accessed: August 2018.

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Table 8. List of Sources and Emission Rates
K4 and Cactus Channel Improvement Project
Riverside County, California

Source Type	Roadway Segment ID or Source Group[1]	Roadway Segment Description	Source ID[1]	Unit Emissions Rate[2] ($g/s/m^2$)
Offsite Truck Routes	A	I-215S on-ramp	A1	2.94E-04
			A2	2.94E-04
			A3	2.94E-04
			A4	2.94E-04
			A5	2.94E-04
			A6	2.94E-04
			A7	2.94E-04
	B	I-215S off-ramp	B1	4.38E-04
			B2	4.38E-04
			B3	4.38E-04
			B4	4.38E-04
			B5	4.38E-04
			B6	4.38E-04
			B7	4.38E-04
			B8	4.38E-04
			B9	4.38E-04
	C	I-215N on-ramp	C1	7.19E-04
			C2	7.19E-04
			C3	7.19E-04
			C4	7.19E-04
			C5	7.19E-04
	D	I-215N off-ramp	D1	3.11E-04
			D2	3.11E-04
			D3	3.11E-04
			D4	3.11E-04
			D5	3.11E-04
			D6	3.11E-04
			D7	3.11E-04
			D8	3.11E-04
			D9	3.11E-04
	E	Cactus Av. I-215 Overpass	E	3.70E-04
	F	Cactus Av. Between I-215N on-ramp and I215N off-ramp	F	1.65E-04
	G	Cactus Av. West of Veterans Way	G	6.83E-05
	H	Cactus Av. Between Veterans Way and Frederick St.	H	9.93E-05
	I	Cactus Av. Between Frederick St. and Graham St.	I	6.16E-05
	J	Cactus Av. Between Graham St. and Heacock St.	J	6.13E-05
	K	Frederick St.	K	1.96E-04
	L	Graham St.	L	1.93E-04
	M	Heacock St. North	M	1.95E-04
	N	Heacock St. South	N	1.81E-04

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Table 8. List of Sources and Emission Rates
K4 and Cactus Channel Improvement Project
Riverside County, California

Source Type	Roadway Segment ID or Source Group[1]	Roadway Segment Description	Source ID[1]	Unit Emissions Rate[2] (g/s/m^2)
Onsite Truck Routes	O	West Gate	O1	6.55E-04
			O2	6.55E-04
	P	Site Docking	P	1.41E-04
	Q	East Gate	Q	9.43E-04
Onsite Idling	DOCKIDL	Dock Idling	DOCKIDL	2.25E-04
	WGIDL	West Gate Idling	WGIDL	1.44E-03
	EGIDL	East Gate Idling	EGIDL	1.45E-03

Notes:

[1] Source groups are assigned based on representation of the roadway segments which are shown in Figures 2 and 3. Source groups are broken down into multiple sources to accurately capture road curvatures.

[2] The emissions rate for each source group is calculated as 1 g/s divided by the total area of all sources within that source group.

Abbreviations:

I-215 - Interstate 215
St - Street
Av - Avenue
g - grams
N - North
S - South
s - seconds
g/s/m^2 - gram per second per square meter

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Table 9. Toxicity Values Used to Estimate Health Impacts
K4 and Cactus Channel Improvement Project
Riverside County, California

Toxic Air Contaminant	Cancer Potency Factor[1] $(mg/kg\text{-}day)^{-1}$	Residential and Worker Multi-Pathway Adjustment Factor[1]	Chronic Reference Exposure Level[1] ($\mu g/m^3$)	Target Organs for Chronic Hazard Index[2]
DPM	1.1	1.0	5.0	Respiratory

Notes

[1] Obtained from ARB's Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. Available at: https://www.arb.ca.gov/toxics/healthval/contable.pdf. Accessed: August 2018. There is no 8-Hour Chronic and Acute Reference Exposure Levels for DPM.

[2] Obtained from ARB's OEHHA/ARB Acute Reference Exposure Levels and Target Organs. Available at: https://www.arb.ca.gov/toxics/healthval/totables.pdf. Accessed: August 2018.

Abbreviations

$(mg/kg\text{-}day)^{-1}$ - per milligram per kilogram-day

$\mu g/m^3$ - micrograms per cubic meter

ARB - Air Resources Board

OEHHA - Office of Environmental Health Hazard Assessment

DPM - Diesel Particulate Matter

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Table 10. Exposure Parameters for Residential Exposure Scenario
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Receptor Age Group	Exposure Parameters[1,2]					
		Daily Breathing Rate, DBR (L/kg-day)	Age Sensitivity Factor, ASF	Exposure Duration, ED (years)	Fraction of Time at Home, FAH	Exposure Frequency, EF	Averaging Time, AT (years)
2020	Third Trimester	361	10	0.25	1	0.96	70
2020	0 - 2	1090	10	0.75	1	0.96	70
2021	0 - 2	1090	10	1	1	0.96	70
2022	0 - 2	1090	10	0.25	1	0.96	70
2022	2 - 16	572	3	0.75	1	0.96	70
2023	2 - 16	572	3	1	1	0.96	70
2024	2 - 16	572	3	1	1	0.96	70
2025	2 - 16	572	3	1	1	0.96	70
2026	2 - 16	572	3	1	1	0.96	70
2027	2 - 16	572	3	1	1	0.96	70
2028	2 - 16	572	3	1	1	0.96	70
2029	2 - 16	572	3	1	1	0.96	70
2030	2 - 16	572	3	1	1	0.96	70
2031	2 - 16	572	3	1	1	0.96	70
2032	2 - 16	572	3	1	1	0.96	70
2033	2 - 16	572	3	1	1	0.96	70
2034	2 - 16	572	3	1	1	0.96	70
2035	2 - 16	572	3	1	1	0.96	70
2036	2 - 16	572	3	0.25	1	0.96	70
2036	16 - 30	261	1	0.75	0.73	0.96	70
2037	16 - 30	261	1	1	0.73	0.96	70
2038	16 - 30	261	1	1	0.73	0.96	70
2039	16 - 30	261	1	1	0.73	0.96	70
2040	16 - 30	261	1	1	0.73	0.96	70
2041	16 - 30	261	1	1	0.73	0.96	70
2042	16 - 30	261	1	1	0.73	0.96	70
2043	16 - 30	261	1	1	0.73	0.96	70
2044	16 - 30	261	1	1	0.73	0.96	70
2045	16 - 30	261	1	1	0.73	0.96	70
2046	16 - 30	261	1	1	0.73	0.96	70
2047	16 - 30	261	1	1	0.73	0.96	70
2048	16 - 30	261	1	1	0.73	0.96	70
2049	16 - 30	261	1	1	0.73	0.96	70
2050	16 - 30	261	1	0.25	0.73	0.96	70

Notes:

[1] Exposure parameters obtained from SCAQMD Permit Application Package "N" for Use in Conjunction with the Risk Assessment Procedures for Rules 1401, 1401.1 and 212 Version 8.1. Available at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/attachmentn-v8-1.pdf?sfvrsn=4. Accessed: August 2018.

[2] Non-residential sensitive receptors, such as child care centers and schools, were conservatively modeled using the residential exposure scenario.

Abbreviations

AT - averaging time
ASF - age specific factor
DBR - daily breathing rate
ED - exposure duration
EF - exposure frequency
FAH - fraction of time spent at home
kg - kilogram
L - liter
SCAQMD - South Coast Air Quality Management District

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Table 11. Exposure Parameters for Worker Exposure Scenario
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Receptor Age Group	Exposure Parameters[1]			
		Daily Breathing Rate, DBR (L/kg-day)	Exposure Duration, ED (years)	Exposure Frequency, EF	Averaging Time, AT (years)
2020	16 - 41	230	1	0.68	70
2021	16 - 41	230	1	0.68	70
2022	16 - 41	230	1	0.68	70
2023	16 - 41	230	1	0.68	70
2024	16 - 41	230	1	0.68	70
2025	16 - 41	230	1	0.68	70
2026	16 - 41	230	1	0.68	70
2027	16 - 41	230	1	0.68	70
2028	16 - 41	230	1	0.68	70
2029	16 - 41	230	1	0.68	70
2030	16 - 41	230	1	0.68	70
2031	16 - 41	230	1	0.68	70
2032	16 - 41	230	1	0.68	70
2033	16 - 41	230	1	0.68	70
2034	16 - 41	230	1	0.68	70
2035	16 - 41	230	1	0.68	70
2036	16 - 41	230	1	0.68	70
2037	16 - 41	230	1	0.68	70
2038	16 - 41	230	1	0.68	70
2039	16 - 41	230	1	0.68	70
2040	16 - 41	230	1	0.68	70
2041	16 - 41	230	1	0.68	70
2042	16 - 41	230	1	0.68	70
2043	16 - 41	230	1	0.68	70
2044	16 - 41	230	1	0.68	70

Notes:

[1] Exposure parameters obtained from SCAQMD Permit Application Package "N" for Use in Conjunction with the Risk Assessment Procedures for Rules 1401, 1401.1 and 212 Version 8.1. Available at: http://www.aqmd.gov/docs/default-source/permitting/rule-1401-risk-assessment/attachmentn-v8-1.pdf?sfvrsn=4. Accessed: August 2018. A worker adjustment factor of 1.0 was used based on the Project operation schedule of 24 hours/day, 7 days/week.

Abbreviations
AT - averaging time
ASF - age specific factor
DBR - daily breathing rate
ED - exposure duration
SCAQMD - South Coast Air Quality Management District

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Table 12. Project Health Impacts
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor Type	Maximum Incremental Cancer Risk[1] (in a million)	Maximum Incremental HIC[2]
Worker	0.6	0.004
Residential	0.5	0.0002
Sensitive	1.3	0.0006
SCAQMD Significance Threshold[3]	**10**	**1**
Exceeds Threshold?	**NO**	**NO**

Notes:

[1] Maximum incremental cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens.

[2] The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration to the non-cancer chronic reference exposure level for each chemical.

[3] SCAQMD Air Quality Significance Thresholds. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. Accessed: August 2018.

Abbreviations:

HIC - chronic hazard index

SCAQMD - South Coast Air Quality Management District

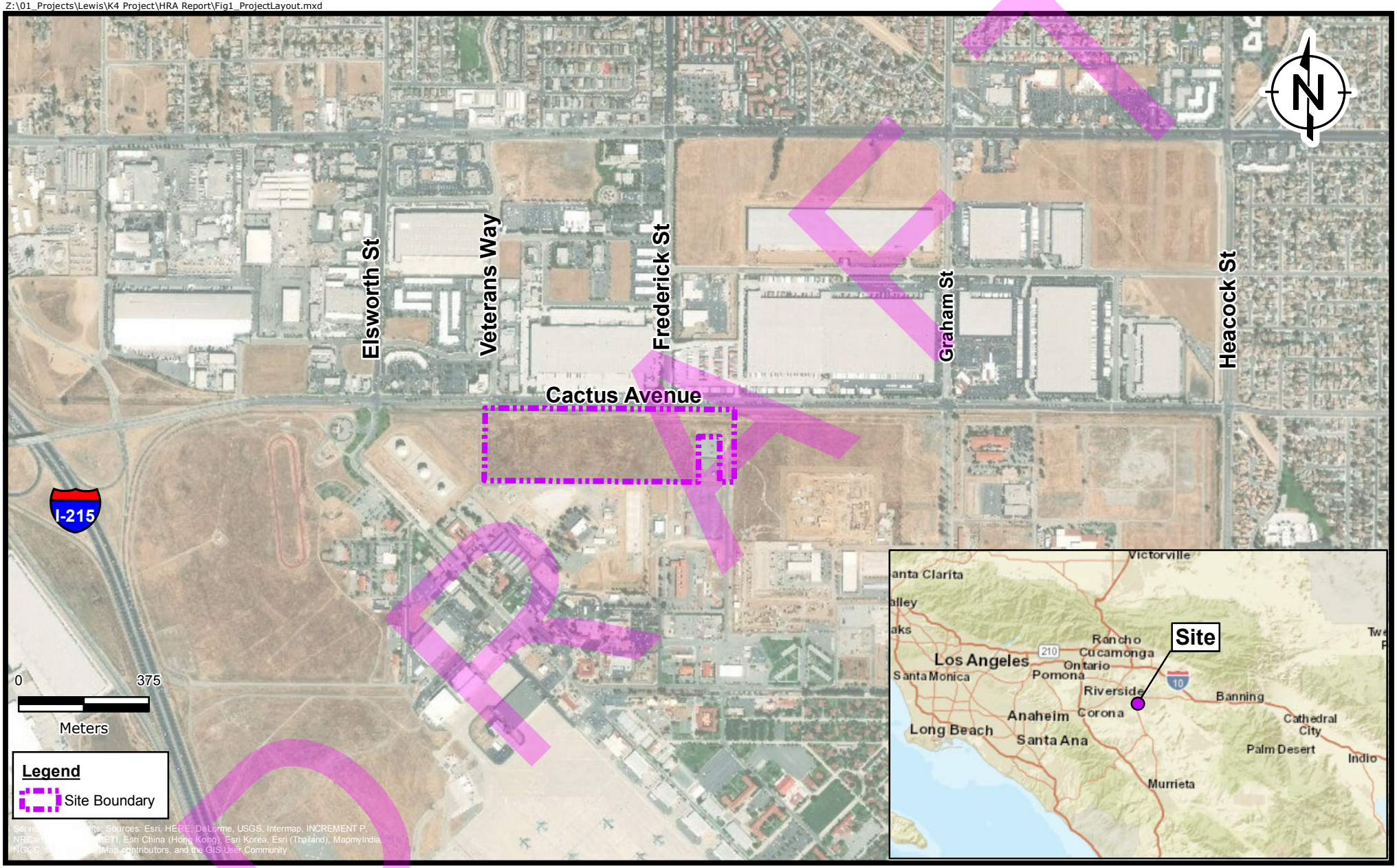
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FIGURES

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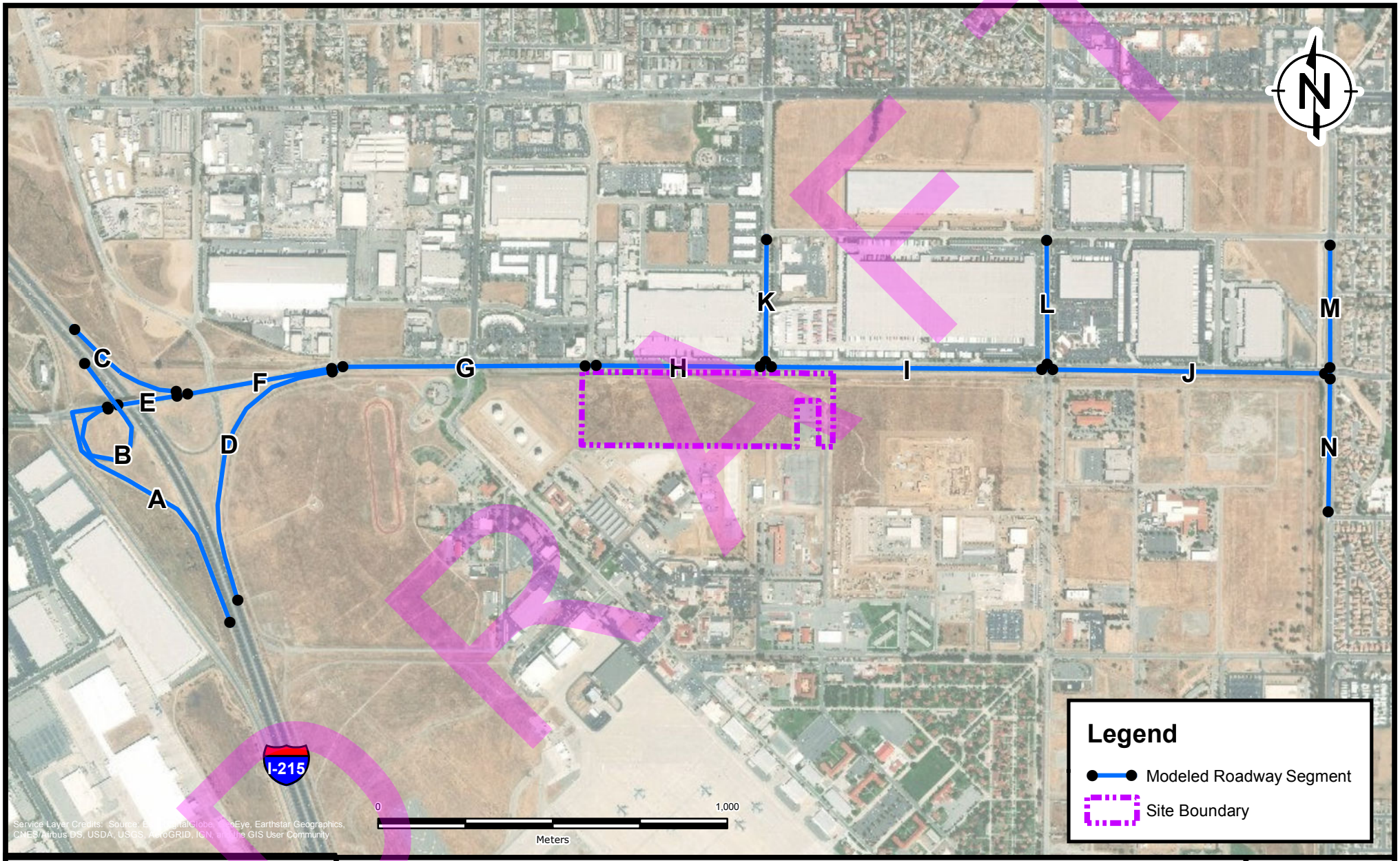
RAMBOLL

K4 Parcel Project Location

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
1

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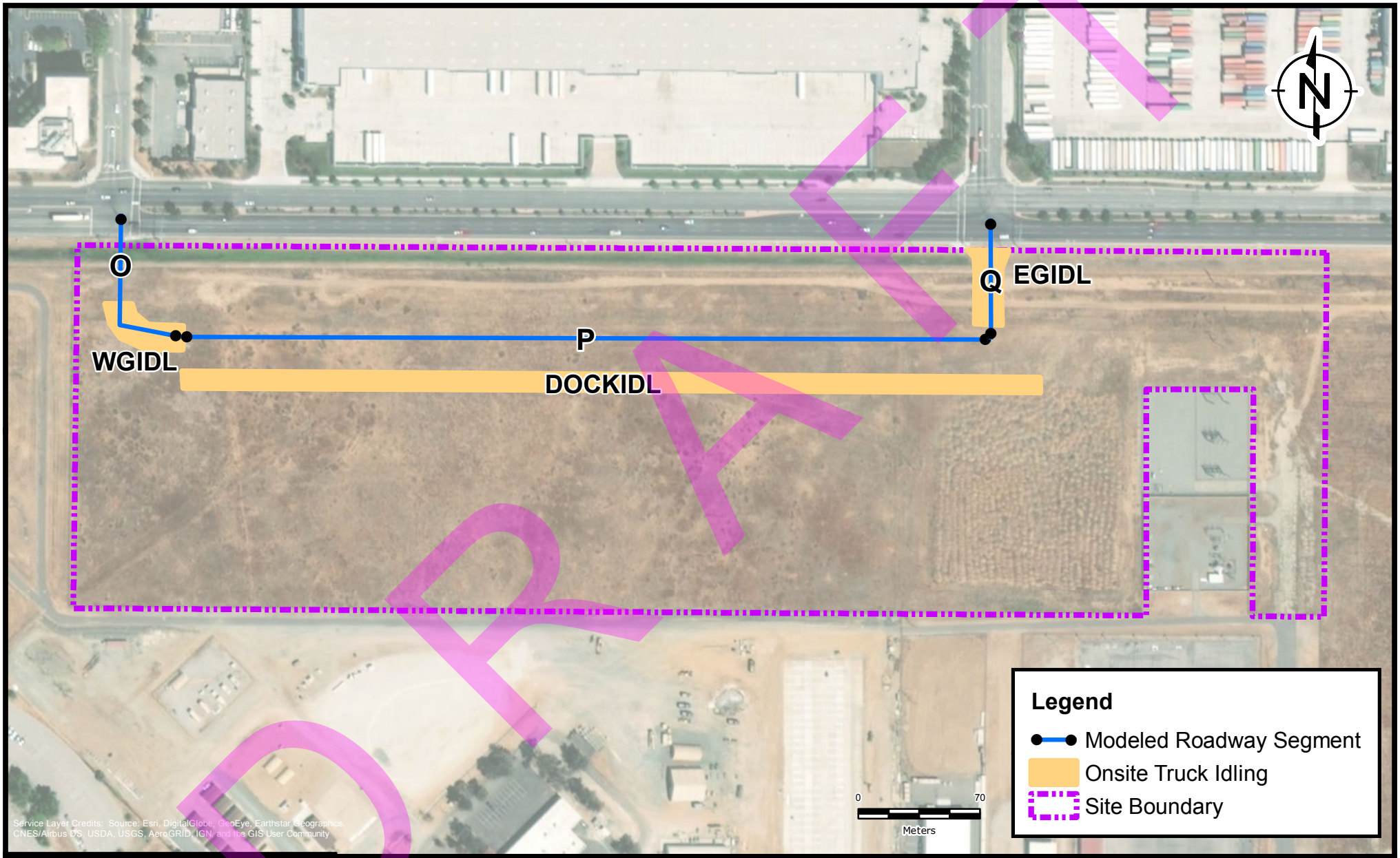
RAMBOLL

Modeled Truck Routes (Off-Site)

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
2

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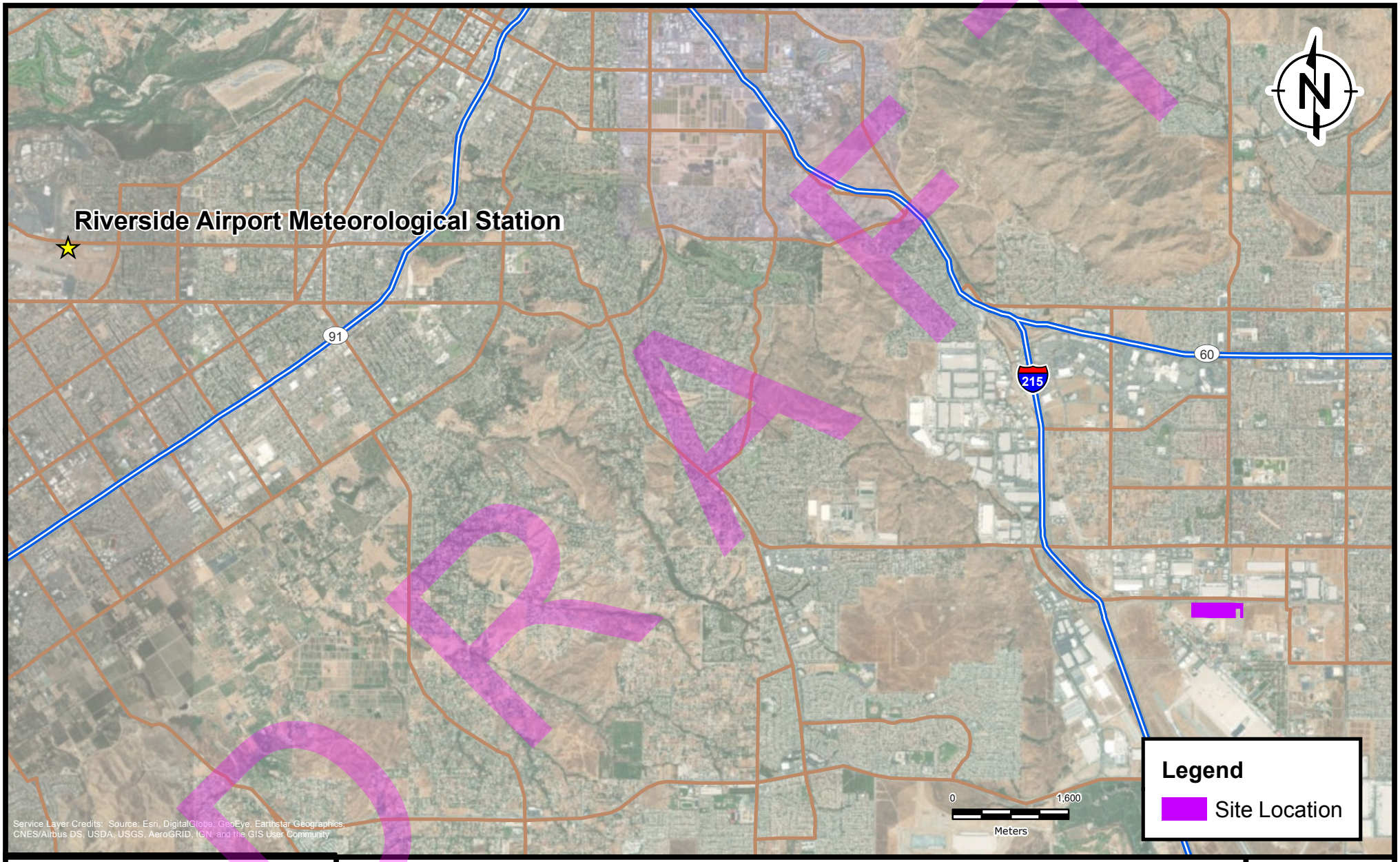
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Modeled Truck Routes (On-Site) and Idling Emission Sources

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
3

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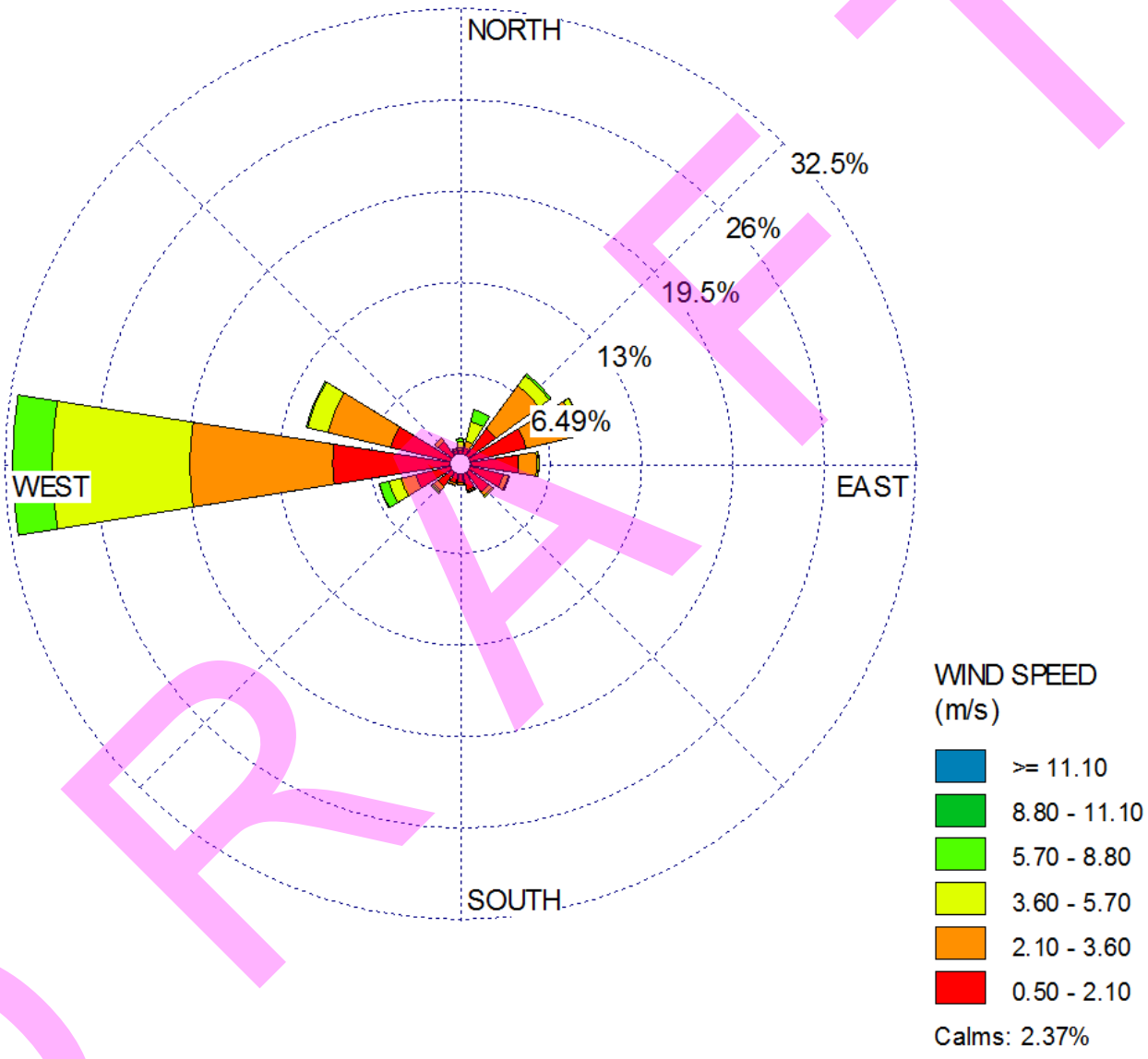
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Meteorological Station Location

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
4

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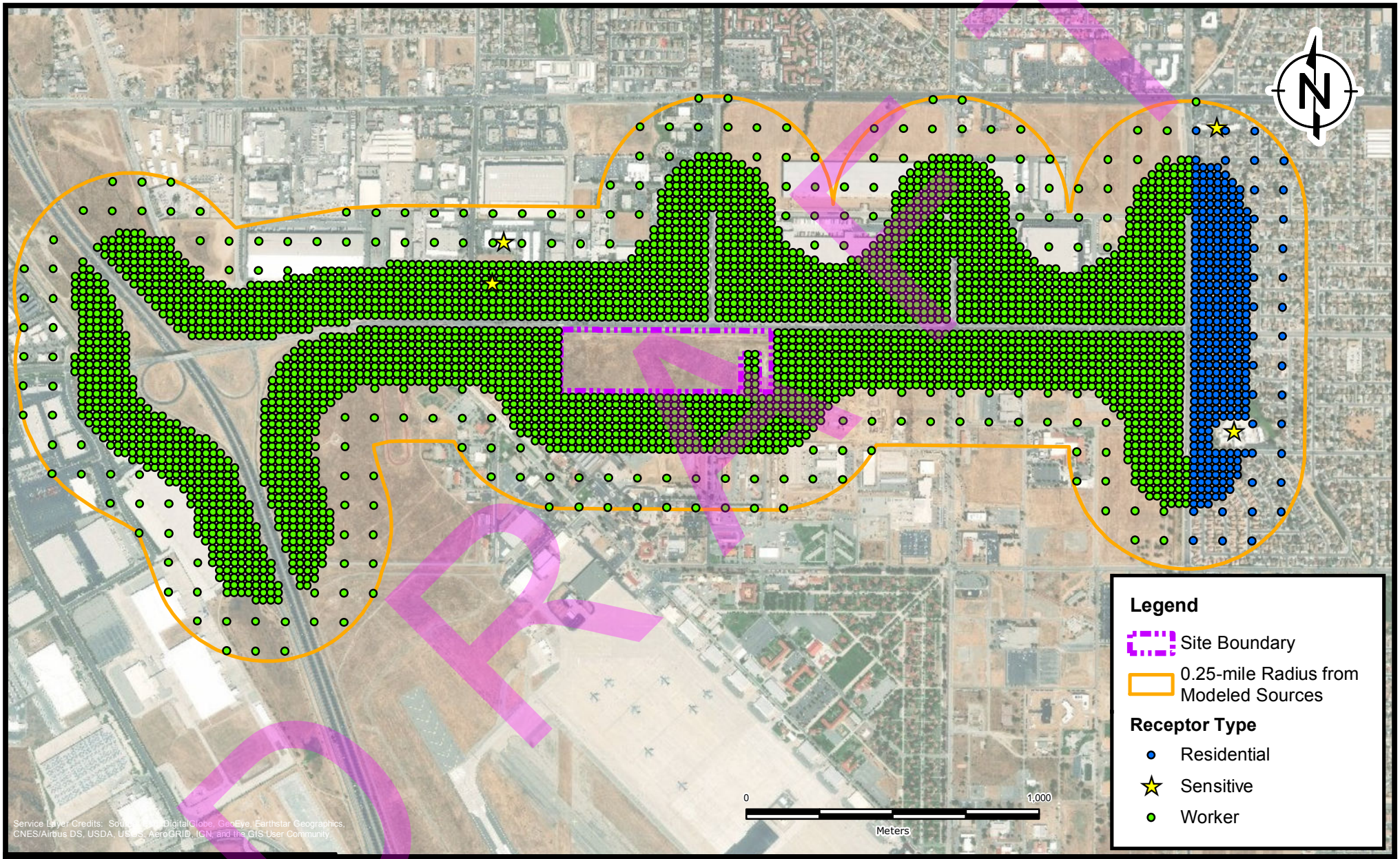
Wind Rose for Riverside Airport Meteorological Station

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE

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PROJECT: 1690008459



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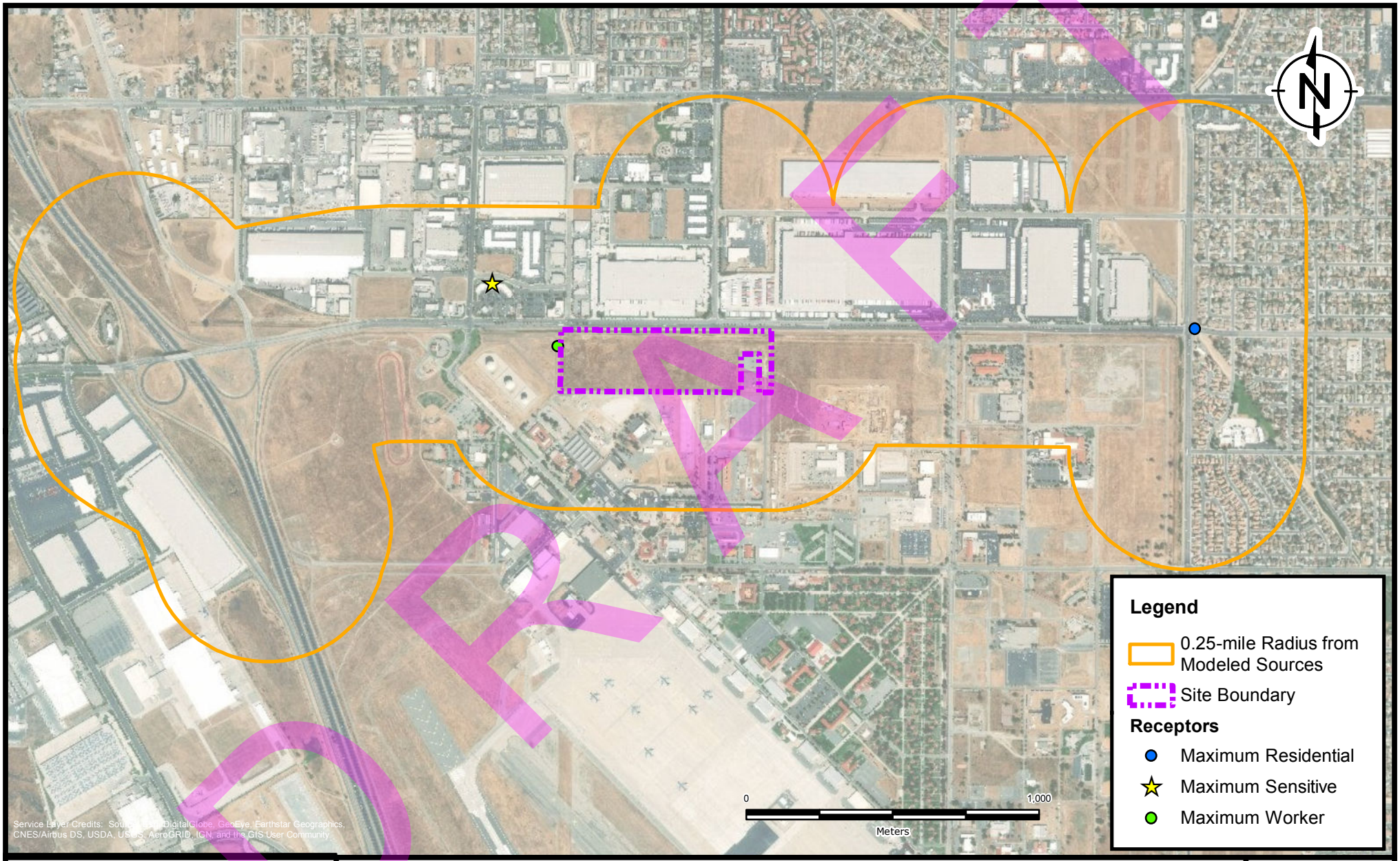
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Modeled Receptor Locations

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
6

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Maximum Incremental Cancer Risk Locations

K4 and Cactus Channel Improvement Project
Riverside County, California

FIGURE
7

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APPENDIX A
EMFAC2017 MODEL OUTPUTS AND EMISSION FACTOR CALCULATIONS

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Table A-1. EMFAC2017 Model Output for Vehicle Miles Traveled and PM_{10} Running Exhaust in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC2017 (v1.0.2) Emission Rates
Region Type: Sub-Area
Region: Riverside (SC)
Calendar Year: 2020, 2025, 2030, 2035, 2040, 2045, 2050
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HTSK and RUNLS, g/vehicle/day for IDLEX, RESTL and DIURN

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	PM10_RUNEX
Riverside (SC)	2020	HHDT	Aggregated	Aggregated	GAS	496	0.00102769
Riverside (SC)	2020	HHDT	Aggregated	Aggregated	DSL	1,849,784	0.06696871
Riverside (SC)	2020	HHDT	Aggregated	Aggregated	NG	7,927	0.006194139
Riverside (SC)	2020	LHDT1	Aggregated	Aggregated	GAS	522,854	0.001101617
Riverside (SC)	2020	LHDT1	Aggregated	Aggregated	DSL	546,498	0.022522638
Riverside (SC)	2020	LHDT2	Aggregated	Aggregated	GAS	74,925	0.000929939
Riverside (SC)	2020	LHDT2	Aggregated	Aggregated	DSL	210,206	0.020072457
Riverside (SC)	2020	MHDT	Aggregated	Aggregated	GAS	51,276	0.000933885
Riverside (SC)	2020	MHDT	Aggregated	Aggregated	DSL	722,760	0.109699609
Riverside (SC)	2025	HHDT	Aggregated	Aggregated	GAS	489	0.000969778
Riverside (SC)	2025	HHDT	Aggregated	Aggregated	DSL	2,073,942	0.024457296
Riverside (SC)	2025	HHDT	Aggregated	Aggregated	NG	14,929	0.004068207
Riverside (SC)	2025	LHDT1	Aggregated	Aggregated	GAS	474,380	0.001012825
Riverside (SC)	2025	LHDT1	Aggregated	Aggregated	DSL	511,420	0.016650376
Riverside (SC)	2025	LHDT2	Aggregated	Aggregated	GAS	71,801	0.000900229
Riverside (SC)	2025	LHDT2	Aggregated	Aggregated	DSL	200,055	0.016921988
Riverside (SC)	2025	MHDT	Aggregated	Aggregated	GAS	58,388	0.000922024
Riverside (SC)	2025	MHDT	Aggregated	Aggregated	DSL	763,295	0.010204085
Riverside (SC)	2030	HHDT	Aggregated	Aggregated	GAS	576	0.000967012
Riverside (SC)	2030	HHDT	Aggregated	Aggregated	DSL	2,271,030	0.023934565
Riverside (SC)	2030	HHDT	Aggregated	Aggregated	NG	21,688	0.003459739
Riverside (SC)	2030	LHDT1	Aggregated	Aggregated	GAS	462,837	0.001001648
Riverside (SC)	2030	LHDT1	Aggregated	Aggregated	DSL	495,406	0.011610761
Riverside (SC)	2030	LHDT2	Aggregated	Aggregated	GAS	71,348	0.000919152
Riverside (SC)	2030	LHDT2	Aggregated	Aggregated	DSL	195,813	0.014520836
Riverside (SC)	2030	MHDT	Aggregated	Aggregated	GAS	65,180	0.000956884
Riverside (SC)	2030	MHDT	Aggregated	Aggregated	DSL	791,350	0.010439496
Riverside (SC)	2035	HHDT	Aggregated	Aggregated	GAS	648	0.000983727
Riverside (SC)	2035	HHDT	Aggregated	Aggregated	DSL	2,426,809	0.022474637
Riverside (SC)	2035	HHDT	Aggregated	Aggregated	NG	27,025	0.003265738
Riverside (SC)	2035	LHDT1	Aggregated	Aggregated	GAS	472,684	0.000981205
Riverside (SC)	2035	LHDT1	Aggregated	Aggregated	DSL	498,473	0.008292392
Riverside (SC)	2035	LHDT2	Aggregated	Aggregated	GAS	72,850	0.000947382
Riverside (SC)	2035	LHDT2	Aggregated	Aggregated	DSL	197,800	0.012948328
Riverside (SC)	2035	MHDT	Aggregated	Aggregated	GAS	70,663	0.000977872
Riverside (SC)	2035	MHDT	Aggregated	Aggregated	DSL	813,377	0.010034182
Riverside (SC)	2040	HHDT	Aggregated	Aggregated	GAS	695	0.000990215
Riverside (SC)	2040	HHDT	Aggregated	Aggregated	DSL	2,606,721	0.022227151
Riverside (SC)	2040	HHDT	Aggregated	Aggregated	NG	30,683	0.003182833
Riverside (SC)	2040	LHDT1	Aggregated	Aggregated	GAS	490,933	0.000984531
Riverside (SC)	2040	LHDT1	Aggregated	Aggregated	DSL	509,105	0.006226138
Riverside (SC)	2040	LHDT2	Aggregated	Aggregated	GAS	75,451	0.000972971
Riverside (SC)	2040	LHDT2	Aggregated	Aggregated	DSL	202,538	0.01219333
Riverside (SC)	2040	MHDT	Aggregated	Aggregated	GAS	74,873	0.000986766
Riverside (SC)	2040	MHDT	Aggregated	Aggregated	DSL	847,358	0.00985437
Riverside (SC)	2045	HHDT	Aggregated	Aggregated	GAS	727	0.000991169
Riverside (SC)	2045	HHDT	Aggregated	Aggregated	DSL	2,780,448	0.022271765
Riverside (SC)	2045	HHDT	Aggregated	Aggregated	NG	33,231	0.003099436

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Table A-1. EMFAC2017 Model Output for Vehicle Miles Traveled and PM_{10} Running Exhaust in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	PM10_RUNEX
Riverside (SC)	2045	LHDT1	Aggregated	Aggregated	GAS	508,958	0.000989536
Riverside (SC)	2045	LHDT1	Aggregated	Aggregated	DSL	524,334	0.005165769
Riverside (SC)	2045	LHDT2	Aggregated	Aggregated	GAS	78,386	0.000987518
Riverside (SC)	2045	LHDT2	Aggregated	Aggregated	DSL	209,371	0.011871979
Riverside (SC)	2045	MHDT	Aggregated	Aggregated	GAS	78,186	0.000989955
Riverside (SC)	2045	MHDT	Aggregated	Aggregated	DSL	884,261	0.009749614
Riverside (SC)	2050	HHDT	Aggregated	Aggregated	GAS	753	0.000991623
Riverside (SC)	2050	HHDT	Aggregated	Aggregated	DSL	2,973,575	0.022317378
Riverside (SC)	2050	HHDT	Aggregated	Aggregated	NG	35,214	0.00303276
Riverside (SC)	2050	LHDT1	Aggregated	Aggregated	GAS	524,024	0.000992198
Riverside (SC)	2050	LHDT1	Aggregated	Aggregated	DSL	540,447	0.004656749
Riverside (SC)	2050	LHDT2	Aggregated	Aggregated	GAS	81,201	0.000994281
Riverside (SC)	2050	LHDT2	Aggregated	Aggregated	DSL	214,831	0.011455077
Riverside (SC)	2050	MHDT	Aggregated	Aggregated	GAS	81,030	0.00099123
Riverside (SC)	2050	MHDT	Aggregated	Aggregated	DSL	932,032	0.009727804

Abbreviations:

CalYr - calendar year
CARB - California Air Resources Board
DSL - diesel
EMFAC - CARB's mobile source emission inventory model
g - grams
GAS - gasoline
GVWR - gross vehicle weight rating
HHDT - heavy-heavy duty truck
lbs - pounds
LHDT1 - Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs)
LHDT2 - Light-Heavy-Duty Trucks (GVWR 10001-14000 lbs)
MHDT - medium-heavy duty truck
NG - natural gas
PM10 - particulate matter smaller than 10 microns in diameter
RUNEX - running exhaust
SC - South Coast
VMT - vehicle miles travelled

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Table A-2. EMFAC2017 Model Output for PM_{10} Idling Exhaust in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season	Sub Area	Vehicle Category	Fuel	Process	PM_{10} Emission Rate (g/idle-hour)
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.026557912
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.080912662
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.790306238
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.785839796
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.291445124
2025	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.01210294
2025	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.033960111
2025	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.785094309
2025	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.790410314
2025	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.03288677
2030	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.011067041
2030	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.020018909
2030	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.785082088
2030	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.797478006
2030	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.016870505
2035	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.010436629
2035	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.015271309
2035	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.788905223
2035	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.791222368
2035	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.010585537
2040	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.010237792
2040	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.013391859
2040	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.793718154
2040	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.7920981
2040	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.008434492
2045	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.010151202
2045	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.011782048
2045	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.796536215
2045	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.793922977
2045	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.007617293
2050	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	0.010092817
2050	Annual	Riverside (SC)	HHDT	NG	IDLEX	0.010452842
2050	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	0.798025725
2050	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	0.796661049
2050	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	0.007339059

Abbreviations:
CalYr - calendar year
CARB - California Air Resources Board
DSL - diesel
EMFAC - CARB's mobile source emission inventory model
g - grams
GAS - gasoline
GVWR - gross vehicle weight rating
HHDT - heavy-heavy duty truck
lbs - pounds
IDLEX - idle exhaust
LHDT1 - Light-Heavy-Duty Trucks (GVWR 8501-10000 lbs)
LHDT2 - Light-Heavy-Duty Trucks (GVWR 10001-14000 lbs)
MHDT - medium-heavy duty truck
NG - natural gas
PM_{10} - particulate matter smaller than 10 microns in diameter
SC - South Coast
VMT - vehicle miles travelled

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Table A-3. Diesel Particulate Matter Emission Factors for Light-Heavy Duty Trucks Traveling in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Category	Fuel	EMFAC VMT Output[1]	Running Exhaust Emission Factor[2] (g/mile)	Idling Exhaust Emission Factor[2] (g/idle-minute)
2020				
LHDT1	GAS	522,854	0	0
LHDT1	DSL	546,498	0.0225	0.0132
LHDT2	GAS	74,925	0	0
LHDT2	DSL	210,206	0.0201	0.0131
2020 LHDT Weighted Average Emission Factor[3]			**0.0122**	**0.0073**
2025				
LHDT1	GAS	474,380	0	0
LHDT1	DSL	511,420	0.0167	0.0131
LHDT2	GAS	71,801	0	0
LHDT2	DSL	200,055	0.0169	0.0132
2025 LHDT Weighted Average Emission Factor[3]			**0.0095**	**0.0074**
2030				
LHDT1	GAS	462,837	0	0
LHDT1	DSL	495,406	0.0116	0.0131
LHDT2	GAS	71,348	0	0
LHDT2	DSL	195,813	0.0145	0.0133
2030 LHDT Weighted Average Emission Factor[3]			**0.0070**	**0.0074**
2035				
LHDT1	GAS	472,684	0	0
LHDT1	DSL	498,473	0.0083	0.0131
LHDT2	GAS	72,850	0	0
LHDT2	DSL	197,800	0.0129	0.0132
2035 LHDT Weighted Average Emission Factor[3]			**0.0054**	**0.0074**
2040				
LHDT1	GAS	490,933	0	0
LHDT1	DSL	509,105	0.0062	0.0132
LHDT2	GAS	75,451	0	0
LHDT2	DSL	202,538	0.0122	0.0132
2040 LHDT Weighted Average Emission Factor[3]			**0.0044**	**0.0074**
2045				
LHDT1	GAS	508,958	0	0
LHDT1	DSL	524,334	0.0052	0.0133
LHDT2	GAS	78,386	0	0
LHDT2	DSL	209,371	0.0119	0.0132
2045 LHDT Weighted Average Emission Factor[3]			**0.0039**	**0.0074**

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Table A-3. Diesel Particulate Matter Emission Factors for Light-Heavy Duty Trucks Traveling in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Category	Fuel	EMFAC VMT Output[1]	Running Exhaust Emission Factor[2] (g/mile)	Idling Exhaust Emission Factor[2] (g/idle-minute)
2050				
LHDT1	GAS	524,024	0	0
LHDT1	DSL	540,447	0.0047	0.0133
LHDT2	GAS	81,201	0	0
LHDT2	DSL	214,831	0.0115	0.0133
2050 LHDT Weighted Average Emission Factor[3]			**0.0037**	**0.0074**

Notes:

[1] Data obtained from Table A-1.

[2] For purposes of this analysis, diesel particulate matter emissions are assumed to be equal to PM_{10} exhaust emissions from diesel vehicles. Therefore, emission factors for the gasoline vehicles are set to zero. For diesel vehicles, emission factors for each combination of vehicle class and calendar year are obtained from Table A-1 (running exhaust) and Table A-2 (idling exhaust).

[3] LHDT emission factors for each calendar year are estimated as VMT weighted average across all EMFAC vehicle category-fuel combinations that represent light-heavy duty trucks.

Abbreviations:

CARB - California Air Resources Board
DSL - diesel
EMFAC - CARB's mobile source emission inventory model
GAS - gasoline
g - grams
LHDT1 - light-heavy duty trucks (8501-10000 pounds)
LHDT2 - light-heavy duty trucks (10001-14000 pounds)
PM_{10} - particulate matter less than 10 microns in diameter
VMT - vehicle miles travelled

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Table A-4. Diesel Particulate Matter Emission Factors for Medium-Heavy Duty Trucks Traveling in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Category	Fuel	EMFAC VMT Output[1]	Running Exhaust Emission Factor[2] (g/mile)	Idling Exhaust Emission Factor[2] (g/idle-minute)
2020				
MHDT	GAS	51,276	0	0
MHDT	DSL	722,760	0.1097	0.0049
2020 MHDT Weighted Average Emission Factor[3]			**0.1024**	**0.0045**
2025				
MHDT	GAS	58,388	0	0
MHDT	DSL	763,295	0.0102	0.0005
2025 MHDT Weighted Average Emission Factor[3]			**0.0095**	**0.0005**
2030				
MHDT	GAS	65,180	0	0
MHDT	DSL	791,350	0.0104	0.0003
2030 MHDT Weighted Average Emission Factor[3]			**0.0096**	**0.0003**
2040				
MHDT	GAS	74,873	0	0
MHDT	DSL	847,358	0.0099	0.0001
2040 MHDT Weighted Average Emission Factor[3]			**0.0091**	**0.0001**
2045				
MHDT	GAS	78,186	0	0
MHDT	DSL	884,261	0.0097	0.0001
2045 MHDT Weighted Average Emission Factor[3]			**0.0090**	**0.0001**
2050				
MHDT	GAS	81,030	0	0
MHDT	DSL	932,032	0.0097	0.0001
2050 MHDT Weighted Average Emission Factor[3]			**0.0089**	**0.0001**

Notes:

[1] Data obtained from Table A-1.

[2] For purposes of this analysis, diesel particulate matter emissions are assumed to be equal to PM_{10} exhaust emissions from diesel vehicles. Therefore, emission factors for the gasoline vehicles are set to zero. For diesel vehicles, emission factors for each combination of vehicle class and calendar year are obtained from Table A-1 (running exhaust) and Table A-2 (idling exhaust).

[3] MHDT emission factors for each calendar year are estimated as VMT weighted average across all EMFAC vehicle category-fuel combinations that represent medium-heavy duty trucks.

Abbreviations:

CARB - California Air Resources Board
DSL - diesel
EMFAC - CARB's mobile source emission inventory model
GAS - gasoline
g- grams
MHDT - medium-heavy duty truck
PM_{10} - particulate matter less than 10 microns in diameter
VMT - vehicle miles travelled

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Table A-5. Diesel Particulate Matter Emission Factors for Heavy-Heavy Duty Trucks Traveling in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Category	Fuel	EMFAC VMT Output[1]	Running Exhaust Emission Factor[2] (g/mile)	Idling Exhaust Emission Factor[2] (g/idle-minute)
2020				
HHDT	GAS	496	0	0
HHDT	DSL	1,849,784	0.0670	0.0004
HHDT	NG	7,927	0	0
2020 HHDT Weighted Average Emission Factor[3]			**0.0667**	**0.0004**
2025				
HHDT	GAS	489	0	0
HHDT	DSL	2,073,942	0.0245	0.0002
HHDT	NG	14,929	0	0
2025 HHDT Weighted Average Emission Factor[3]			**0.0243**	**0.0002**
2030				
HHDT	GAS	576	0	0
HHDT	DSL	2,271,030	0.0239	0.0002
HHDT	NG	21,688	0	0
2030 HHDT Weighted Average Emission Factor[3]			**0.0237**	**0.0002**
2035				
HHDT	GAS	648	0	0
HHDT	DSL	2,426,809	0.0225	0.0002
HHDT	NG	27,025	0	0
2035 HHDT Weighted Average Emission Factor[3]			**0.0222**	**0.0002**
2040				
HHDT	GAS	695	0	0
HHDT	DSL	2,606,721	0.0222	0.0002
HHDT	NG	30,683	0	0
2040 HHDT Weighted Average Emission Factor[3]			**0.0220**	**0.0002**
2045				
HHDT	GAS	727	0	0
HHDT	DSL	2,780,448	0.0223	0.0002
HHDT	NG	33,231	0	0
2045 HHDT Weighted Average Emission Factor[3]			**0.0220**	**0.0002**
2050				
HHDT	GAS	753	0	0
HHDT	DSL	2,973,575	0.0223	0.0002
HHDT	NG	35,214	0	0
2050 HHDT Weighted Average Emission Factor[3]			**0.0221**	**0.0002**

Notes:

[1] Data obtained from Table A-1.

[2] For purposes of this analysis, diesel particulate matter emissions are assumed to be equal to PM_{10} exhaust emissions from diesel vehicles. Therefore, emission factors for the gasoline vehicles are set to zero. For diesel vehicles, emission factors for each combination of vehicle class and calendar year are obtained from Table A-1 (running exhaust) and Table A-2 (idling exhaust).

[3] HHDT emission factors for each calendar year are estimated as VMT weighted average across all EMFAC vehicle category-fuel combinations that represent heavy-heavy duty trucks.

Abbreviations:

CARB - California Air Resources Board
DSL - diesel
EMFAC - CARB's mobile source emission inventory model
GAS - gasoline
g - grams
HHDT - heavy-heavy duty truck
NG - Natural Gas
PM_{10} - particulate matter less than 10 microns in diameter
VMT - vehicle miles travelled

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Table A-6. Diesel Particulate Matter Emission Factors for Heavy Duty Trucks Associated with Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	EMFAC Vehicle Category			Heavy Duty Truck Emission Factor[4]
	LHDT[1] (2-Axle Truck)	MHDT[2] (3-Axle Truck)	HHDT[3] (4-Axle Truck)	
Running Exhaust (g/mile)				
2020	0.0122	0.1024	0.0667	0.0650
2025	0.0095	0.0095	0.0243	0.0187
2030	0.0070	0.0096	0.0237	0.0180
2035	0.0054	0.0092	0.0222	0.0167
2040	0.0044	0.0091	0.0220	0.0164
2045	0.0039	0.0090	0.0220	0.0163
2050	0.0037	0.0089	0.0221	0.0163
Idling Exhaust (g/idle-minute)				
2020	0.0073	0.0045	0.0004	0.0024
2025	0.0074	0.0005	0.0002	0.0015
2030	0.0074	0.0003	0.0002	0.0014
2035	0.0074	0.0002	0.0002	0.0014
2040	0.0074	0.0001	0.0002	0.0014
2045	0.0074	0.0001	0.0002	0.0014
2050	0.0074	0.0001	0.0002	0.0014

Notes:

[1] Obtained from Table A-3.

[2] Obtained from Table A-4.

[3] Obtained from Table A-5.

[4] The heavy duty truck emission factors associated with Project operation are estimated using the project specific fleet mix shown in Table 2.

Abbreviations:

g - grams

HHDT - heavy-heavy duty truck

LHDT- light-heavy duty truck

MHDT - medium-heavy duty truck

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APPENDIX B
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APPENDIX C
HEALTH RISK ASSESSMENT RESULTS

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0001	474,200	3,751,100	Worker	0.010	0.00008
R0002	474,300	3,751,100	Worker	0.010	0.00008
R0003	474,400	3,751,100	Worker	0.010	0.00008
R0004	474,100	3,751,200	Worker	0.012	0.00010
R0005	474,200	3,751,200	Worker	0.012	0.00010
R0006	474,300	3,751,200	Worker	0.012	0.00009
R0007	474,400	3,751,200	Worker	0.011	0.00009
R0008	474,500	3,751,200	Worker	0.011	0.00009
R0009	474,600	3,751,200	Worker	0.011	0.00009
R0010	474,000	3,751,300	Worker	0.015	0.00013
R0011	474,100	3,751,300	Worker	0.015	0.00013
R0012	474,200	3,751,300	Worker	0.015	0.00012
R0013	474,500	3,751,300	Worker	0.014	0.00011
R0014	474,600	3,751,300	Worker	0.014	0.00011
R0015	474,700	3,751,300	Worker	0.014	0.00011
R0016	474,000	3,751,400	Worker	0.019	0.00016
R0017	474,100	3,751,400	Worker	0.019	0.00016
R0018	474,600	3,751,400	Worker	0.019	0.00016
R0019	474,700	3,751,400	Worker	0.019	0.00015
R0020	473,900	3,751,500	Worker	0.021	0.00018
R0021	474,000	3,751,500	Worker	0.022	0.00019
R0022	474,100	3,751,500	Worker	0.025	0.00022
R0023	474,600	3,751,500	Worker	0.027	0.00022
R0024	474,700	3,751,500	Worker	0.025	0.00020
R0025	477,300	3,751,500	Worker	0.011	0.00009
R0026	477,400	3,751,500	Worker	0.010	0.00008
R0027	477,500	3,751,500	Residential	0.189	0.00008
R0028	477,600	3,751,500	Residential	0.184	0.00008
R0029	477,700	3,751,500	Residential	0.179	0.00008
R0030	473,800	3,751,600	Worker	0.023	0.00020
R0031	473,900	3,751,600	Worker	0.025	0.00022
R0032	474,000	3,751,600	Worker	0.027	0.00024
R0033	474,600	3,751,600	Worker	0.033	0.00028
R0034	474,700	3,751,600	Worker	0.031	0.00026
R0035	475,300	3,751,600	Worker	0.023	0.00019
R0036	475,400	3,751,600	Worker	0.021	0.00017
R0037	475,500	3,751,600	Worker	0.019	0.00016
R0038	475,600	3,751,600	Worker	0.017	0.00014
R0039	475,700	3,751,600	Worker	0.016	0.00013
R0040	475,800	3,751,600	Worker	0.015	0.00013
R0041	475,900	3,751,600	Worker	0.015	0.00012
R0042	476,000	3,751,600	Worker	0.015	0.00012
R0043	476,100	3,751,600	Worker	0.015	0.00012
R0044	477,200	3,751,600	Worker	0.013	0.00011
R0045	477,300	3,751,600	Worker	0.013	0.00010

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0046	477,400	3,751,600	Worker	0.012	0.00010
R0047	477,500	3,751,600	Residential	0.219	0.00009
R0048	477,600	3,751,600	Residential	0.211	0.00009
R0049	477,700	3,751,600	Residential	0.203	0.00009
R0050	477,800	3,751,600	Residential	0.196	0.00008
R0051	473,600	3,751,700	Worker	0.025	0.00022
R0052	473,700	3,751,700	Worker	0.027	0.00024
R0053	473,800	3,751,700	Worker	0.029	0.00025
R0054	473,900	3,751,700	Worker	0.030	0.00027
R0055	474,600	3,751,700	Worker	0.039	0.00033
R0056	474,700	3,751,700	Worker	0.037	0.00031
R0057	475,100	3,751,700	Worker	0.036	0.00028
R0058	475,200	3,751,700	Worker	0.034	0.00027
R0059	475,300	3,751,700	Worker	0.032	0.00025
R0060	475,400	3,751,700	Worker	0.029	0.00023
R0061	475,500	3,751,700	Worker	0.027	0.00021
R0062	475,600	3,751,700	Worker	0.024	0.00019
R0063	475,700	3,751,700	Worker	0.022	0.00018
R0064	475,800	3,751,700	Worker	0.020	0.00017
R0065	475,900	3,751,700	Worker	0.020	0.00016
R0066	476,000	3,751,700	Worker	0.020	0.00016
R0067	476,100	3,751,700	Worker	0.020	0.00016
R0068	476,200	3,751,700	Worker	0.020	0.00016
R0069	476,300	3,751,700	Worker	0.020	0.00016
R0070	477,100	3,751,700	Worker	0.016	0.00013
R0071	477,200	3,751,700	Worker	0.016	0.00012
R0072	477,300	3,751,700	Worker	0.015	0.00012
R0073	477,700	3,751,700	Residential	0.228	0.00010
R0074	477,800	3,751,700	Residential	0.219	0.00009
R0075	473,600	3,751,800	Worker	0.028	0.00025
R0076	473,700	3,751,800	Worker	0.033	0.00030
R0077	474,500	3,751,800	Worker	0.048	0.00042
R0078	474,600	3,751,800	Worker	0.045	0.00039
R0079	475,000	3,751,800	Worker	0.047	0.00038
R0080	475,100	3,751,800	Worker	0.048	0.00038
R0081	475,200	3,751,800	Worker	0.047	0.00037
R0082	476,100	3,751,800	Worker	0.029	0.00023
R0083	476,200	3,751,800	Worker	0.029	0.00023
R0084	476,300	3,751,800	Worker	0.029	0.00023
R0085	476,400	3,751,800	Worker	0.028	0.00022
R0086	477,100	3,751,800	Worker	0.019	0.00015
R0087	477,200	3,751,800	Worker	0.018	0.00014
R0088	477,700	3,751,800	Residential	0.254	0.00011
R0089	477,800	3,751,800	Residential	0.240	0.00010
R0090	473,500	3,751,900	Worker	0.024	0.00022

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0091	473,600	3,751,900	Worker	0.031	0.00027
R0092	473,700	3,751,900	Worker	0.040	0.00036
R0093	474,600	3,751,900	Worker	0.056	0.00048
R0094	474,700	3,751,900	Worker	0.055	0.00047
R0095	474,800	3,751,900	Worker	0.056	0.00047
R0096	474,900	3,751,900	Worker	0.058	0.00048
R0097	475,000	3,751,900	Worker	0.062	0.00050
R0098	475,100	3,751,900	Worker	0.066	0.00052
R0099	476,300	3,751,900	Worker	0.041	0.00032
R0100	476,400	3,751,900	Worker	0.039	0.00030
R0101	476,500	3,751,900	Worker	0.036	0.00028
R0102	476,600	3,751,900	Worker	0.033	0.00025
R0103	476,700	3,751,900	Worker	0.030	0.00023
R0104	476,800	3,751,900	Worker	0.028	0.00022
R0105	476,900	3,751,900	Worker	0.026	0.00020
R0106	477,000	3,751,900	Worker	0.024	0.00019
R0107	477,100	3,751,900	Worker	0.022	0.00017
R0108	477,200	3,751,900	Worker	0.020	0.00016
R0109	477,700	3,751,900	Residential	0.275	0.00012
R0110	477,800	3,751,900	Residential	0.257	0.00011
R0111	473,500	3,752,000	Worker	0.023	0.00021
R0112	473,600	3,752,000	Worker	0.031	0.00027
R0113	474,700	3,752,000	Worker	0.073	0.00064
R0114	474,800	3,752,000	Worker	0.074	0.00063
R0115	474,900	3,752,000	Worker	0.076	0.00064
R0116	475,000	3,752,000	Worker	0.081	0.00067
R0117	476,400	3,752,000	Worker	0.052	0.00039
R0118	476,500	3,752,000	Worker	0.045	0.00035
R0119	476,600	3,752,000	Worker	0.040	0.00031
R0120	476,700	3,752,000	Worker	0.036	0.00028
R0121	476,800	3,752,000	Worker	0.032	0.00025
R0122	476,900	3,752,000	Worker	0.029	0.00023
R0123	477,000	3,752,000	Worker	0.027	0.00021
R0124	477,100	3,752,000	Worker	0.024	0.00019
R0125	477,700	3,752,000	Residential	0.289	0.00013
R0126	477,800	3,752,000	Residential	0.269	0.00012
R0127	473,500	3,752,100	Worker	0.021	0.00019
R0128	473,600	3,752,100	Worker	0.028	0.00025
R0129	477,700	3,752,100	Residential	0.298	0.00013
R0130	477,800	3,752,100	Residential	0.274	0.00012
R0131	473,500	3,752,200	Worker	0.019	0.00017
R0132	473,600	3,752,200	Worker	0.024	0.00021
R0133	477,700	3,752,200	Residential	0.296	0.00013
R0134	477,800	3,752,200	Residential	0.268	0.00012
R0135	473,500	3,752,300	Worker	0.016	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0136	473,600	3,752,300	Worker	0.020	0.00017
R0137	477,700	3,752,300	Residential	0.272	0.00012
R0138	477,800	3,752,300	Residential	0.248	0.00011
R0139	473,500	3,752,400	Worker	0.014	0.00012
R0140	473,600	3,752,400	Worker	0.016	0.00014
R0141	474,100	3,752,400	Worker	0.028	0.00024
R0142	474,200	3,752,400	Worker	0.029	0.00026
R0143	474,300	3,752,400	Worker	0.031	0.00028
R0144	474,400	3,752,400	Worker	0.034	0.00030
R0145	474,500	3,752,400	Worker	0.036	0.00032
R0146	477,700	3,752,400	Residential	0.238	0.00010
R0147	477,800	3,752,400	Residential	0.219	0.00010
R0148	473,600	3,752,500	Worker	0.013	0.00012
R0149	474,000	3,752,500	Worker	0.019	0.00016
R0150	474,100	3,752,500	Worker	0.020	0.00017
R0151	474,200	3,752,500	Worker	0.021	0.00018
R0152	474,300	3,752,500	Worker	0.022	0.00019
R0153	474,400	3,752,500	Worker	0.023	0.00020
R0154	474,500	3,752,500	Worker	0.025	0.00021
R0155	474,600	3,752,500	Worker	0.026	0.00022
R0156	474,700	3,752,500	Worker	0.028	0.00023
R0157	474,800	3,752,500	Worker	0.029	0.00025
R0158	474,900	3,752,500	Worker	0.031	0.00026
R0159	475,000	3,752,500	Worker	0.032	0.00027
R0160	475,100	3,752,500	Worker	0.034	0.00028
R0161	475,200	3,752,500	Worker	0.035	0.00029
R0162	475,300	3,752,500	Worker	0.036	0.00029
R0163	475,400	3,752,500	Worker	0.036	0.00029
R0164	475,500	3,752,500	Worker	0.036	0.00029
R0165	475,600	3,752,500	Worker	0.035	0.00028
R0166	476,200	3,752,500	Worker	0.023	0.00019
R0167	476,300	3,752,500	Worker	0.022	0.00018
R0168	476,400	3,752,500	Worker	0.021	0.00017
R0169	477,000	3,752,500	Worker	0.015	0.00012
R0170	477,100	3,752,500	Worker	0.014	0.00012
R0171	477,200	3,752,500	Worker	0.014	0.00011
R0172	477,700	3,752,500	Residential	0.202	0.00009
R0173	477,800	3,752,500	Residential	0.188	0.00008
R0174	473,700	3,752,600	Worker	0.012	0.00011
R0175	473,800	3,752,600	Worker	0.013	0.00011
R0176	473,900	3,752,600	Worker	0.014	0.00012
R0177	474,000	3,752,600	Worker	0.015	0.00013
R0178	474,100	3,752,600	Worker	0.015	0.00013
R0179	474,600	3,752,600	Worker	0.019	0.00016
R0180	474,700	3,752,600	Worker	0.020	0.00017

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0181	474,800	3,752,600	Worker	0.021	0.00018
R0182	474,900	3,752,600	Worker	0.022	0.00018
R0183	475,000	3,752,600	Worker	0.023	0.00019
R0184	475,100	3,752,600	Worker	0.024	0.00019
R0185	475,200	3,752,600	Worker	0.024	0.00020
R0186	475,300	3,752,600	Worker	0.024	0.00020
R0187	475,400	3,752,600	Worker	0.024	0.00019
R0188	475,500	3,752,600	Worker	0.024	0.00019
R0189	475,600	3,752,600	Worker	0.023	0.00018
R0190	476,100	3,752,600	Worker	0.017	0.00014
R0191	476,200	3,752,600	Worker	0.016	0.00013
R0192	476,300	3,752,600	Worker	0.015	0.00012
R0193	476,400	3,752,600	Worker	0.014	0.00012
R0194	476,900	3,752,600	Worker	0.012	0.00010
R0195	477,000	3,752,600	Worker	0.012	0.00009
R0196	477,100	3,752,600	Worker	0.011	0.00009
R0197	477,200	3,752,600	Worker	0.011	0.00009
R0198	477,700	3,752,600	Residential	0.165	0.00007
R0199	477,800	3,752,600	Residential	0.157	0.00007
R0200	473,800	3,752,700	Worker	0.011	0.00009
R0201	473,900	3,752,700	Worker	0.012	0.00010
R0202	474,000	3,752,700	Worker	0.012	0.00010
R0203	475,500	3,752,700	Worker	0.017	0.00013
R0204	475,600	3,752,700	Worker	0.016	0.00013
R0205	476,100	3,752,700	Worker	0.012	0.00010
R0206	476,200	3,752,700	Worker	0.012	0.00009
R0207	476,300	3,752,700	Worker	0.011	0.00009
R0208	476,400	3,752,700	Worker	0.011	0.00009
R0209	476,900	3,752,700	Worker	0.009	0.00007
R0210	477,000	3,752,700	Worker	0.009	0.00007
R0211	477,100	3,752,700	Worker	0.009	0.00007
R0212	477,200	3,752,700	Worker	0.008	0.00007
R0213	477,700	3,752,700	Residential	0.133	0.00006
R0214	477,800	3,752,700	Residential	0.128	0.00006
R0215	475,600	3,752,800	Worker	0.012	0.00010
R0216	475,700	3,752,800	Worker	0.012	0.00009
R0217	475,800	3,752,800	Worker	0.011	0.00009
R0218	476,000	3,752,800	Worker	0.010	0.00008
R0219	476,100	3,752,800	Worker	0.009	0.00007
R0220	476,200	3,752,800	Worker	0.009	0.00007
R0221	476,400	3,752,800	Worker	0.008	0.00007
R0222	476,500	3,752,800	Worker	0.008	0.00006
R0223	476,800	3,752,800	Worker	0.007	0.00006
R0224	476,900	3,752,800	Worker	0.007	0.00006
R0225	477,000	3,752,800	Worker	0.007	0.00006

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0226	477,200	3,752,800	Worker	0.007	0.00005
R0227	477,300	3,752,800	Worker	0.006	0.00005
R0228	477,400	3,752,800	Worker	0.006	0.00005
R0229	477,600	3,752,800	Residential	0.111	0.00005
R0230	477,700	3,752,800	Residential	0.108	0.00005
R0231	477,800	3,752,800	Residential	0.105	0.00005
R0232	475,600	3,752,900	Worker	0.010	0.00008
R0233	475,700	3,752,900	Worker	0.009	0.00007
R0234	475,800	3,752,900	Worker	0.008	0.00007
R0235	475,900	3,752,900	Worker	0.008	0.00006
R0236	476,000	3,752,900	Worker	0.008	0.00006
R0237	476,100	3,752,900	Worker	0.007	0.00006
R0238	476,400	3,752,900	Worker	0.006	0.00005
R0239	476,500	3,752,900	Worker	0.006	0.00005
R0240	476,600	3,752,900	Worker	0.006	0.00005
R0241	476,700	3,752,900	Worker	0.006	0.00005
R0242	476,800	3,752,900	Worker	0.005	0.00004
R0243	476,900	3,752,900	Worker	0.005	0.00004
R0244	477,300	3,752,900	Worker	0.005	0.00004
R0245	477,400	3,752,900	Worker	0.005	0.00004
R0246	477,500	3,752,900	Residential	0.090	0.00004
R0247	477,600	3,752,900	Residential	0.088	0.00004
R0248	477,700	3,752,900	Residential	0.083	0.00004
R0249	475,800	3,753,000	Worker	0.007	0.00006
R0250	475,900	3,753,000	Worker	0.007	0.00005
R0251	476,600	3,753,000	Worker	0.005	0.00004
R0252	476,700	3,753,000	Worker	0.005	0.00004
R0253	477,500	3,753,000	Worker	0.004	0.00003
R0254	474,300	3,751,275	Worker	0.013	0.00011
R0255	474,325	3,751,275	Worker	0.013	0.00011
R0256	474,350	3,751,275	Worker	0.013	0.00011
R0257	474,375	3,751,275	Worker	0.013	0.00011
R0258	474,225	3,751,300	Worker	0.015	0.00012
R0259	474,250	3,751,300	Worker	0.014	0.00012
R0260	474,275	3,751,300	Worker	0.014	0.00011
R0261	474,300	3,751,300	Worker	0.014	0.00011
R0262	474,325	3,751,300	Worker	0.014	0.00011
R0263	474,350	3,751,300	Worker	0.014	0.00011
R0264	474,375	3,751,300	Worker	0.014	0.00011
R0265	474,200	3,751,325	Worker	0.016	0.00013
R0266	474,225	3,751,325	Worker	0.015	0.00013
R0267	474,250	3,751,325	Worker	0.015	0.00013
R0268	474,275	3,751,325	Worker	0.015	0.00012
R0269	474,300	3,751,325	Worker	0.015	0.00012
R0270	474,325	3,751,325	Worker	0.015	0.00012

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0271	474,350	3,751,325	Worker	0.015	0.00012
R0272	474,375	3,751,325	Worker	0.015	0.00012
R0273	474,450	3,751,325	Worker	0.015	0.00012
R0274	474,475	3,751,325	Worker	0.015	0.00012
R0275	474,175	3,751,350	Worker	0.017	0.00014
R0276	474,200	3,751,350	Worker	0.017	0.00014
R0277	474,225	3,751,350	Worker	0.017	0.00014
R0278	474,250	3,751,350	Worker	0.016	0.00014
R0279	474,275	3,751,350	Worker	0.016	0.00013
R0280	474,300	3,751,350	Worker	0.016	0.00013
R0281	474,325	3,751,350	Worker	0.015	0.00013
R0282	474,350	3,751,350	Worker	0.015	0.00012
R0283	474,450	3,751,350	Worker	0.016	0.00013
R0284	474,475	3,751,350	Worker	0.016	0.00013
R0285	474,500	3,751,350	Worker	0.016	0.00013
R0286	474,175	3,751,375	Worker	0.018	0.00015
R0287	474,200	3,751,375	Worker	0.018	0.00015
R0288	474,225	3,751,375	Worker	0.018	0.00015
R0289	474,250	3,751,375	Worker	0.018	0.00015
R0290	474,275	3,751,375	Worker	0.018	0.00014
R0291	474,300	3,751,375	Worker	0.017	0.00014
R0292	474,325	3,751,375	Worker	0.017	0.00014
R0293	474,350	3,751,375	Worker	0.016	0.00013
R0294	474,425	3,751,375	Worker	0.017	0.00014
R0295	474,450	3,751,375	Worker	0.017	0.00014
R0296	474,475	3,751,375	Worker	0.017	0.00014
R0297	474,500	3,751,375	Worker	0.017	0.00014
R0298	474,150	3,751,400	Worker	0.020	0.00017
R0299	474,175	3,751,400	Worker	0.020	0.00017
R0300	474,200	3,751,400	Worker	0.020	0.00017
R0301	474,225	3,751,400	Worker	0.020	0.00017
R0302	474,250	3,751,400	Worker	0.020	0.00017
R0303	474,275	3,751,400	Worker	0.020	0.00016
R0304	474,300	3,751,400	Worker	0.019	0.00016
R0305	474,325	3,751,400	Worker	0.018	0.00015
R0306	474,350	3,751,400	Worker	0.018	0.00015
R0307	474,425	3,751,400	Worker	0.019	0.00015
R0308	474,450	3,751,400	Worker	0.019	0.00015
R0309	474,475	3,751,400	Worker	0.019	0.00016
R0310	474,500	3,751,400	Worker	0.019	0.00016
R0311	474,525	3,751,400	Worker	0.019	0.00016
R0312	474,150	3,751,425	Worker	0.022	0.00018
R0313	474,175	3,751,425	Worker	0.022	0.00019
R0314	474,200	3,751,425	Worker	0.022	0.00019
R0315	474,225	3,751,425	Worker	0.023	0.00019

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0316	474,250	3,751,425	Worker	0.023	0.00019
R0317	474,275	3,751,425	Worker	0.023	0.00019
R0318	474,300	3,751,425	Worker	0.022	0.00019
R0319	474,325	3,751,425	Worker	0.021	0.00017
R0320	474,425	3,751,425	Worker	0.021	0.00018
R0321	474,450	3,751,425	Worker	0.021	0.00018
R0322	474,475	3,751,425	Worker	0.021	0.00018
R0323	474,500	3,751,425	Worker	0.021	0.00018
R0324	474,525	3,751,425	Worker	0.021	0.00017
R0325	474,150	3,751,450	Worker	0.023	0.00020
R0326	474,175	3,751,450	Worker	0.024	0.00021
R0327	474,200	3,751,450	Worker	0.025	0.00021
R0328	474,225	3,751,450	Worker	0.026	0.00022
R0329	474,250	3,751,450	Worker	0.027	0.00023
R0330	474,275	3,751,450	Worker	0.028	0.00024
R0331	474,300	3,751,450	Worker	0.029	0.00025
R0332	474,325	3,751,450	Worker	0.027	0.00023
R0333	474,400	3,751,450	Worker	0.026	0.00022
R0334	474,425	3,751,450	Worker	0.025	0.00021
R0335	474,450	3,751,450	Worker	0.025	0.00021
R0336	474,475	3,751,450	Worker	0.024	0.00020
R0337	474,500	3,751,450	Worker	0.024	0.00020
R0338	474,525	3,751,450	Worker	0.023	0.00020
R0339	474,125	3,751,475	Worker	0.024	0.00021
R0340	474,150	3,751,475	Worker	0.025	0.00022
R0341	474,175	3,751,475	Worker	0.026	0.00023
R0342	474,200	3,751,475	Worker	0.028	0.00024
R0343	474,225	3,751,475	Worker	0.029	0.00025
R0344	474,250	3,751,475	Worker	0.031	0.00027
R0345	474,275	3,751,475	Worker	0.035	0.00030
R0346	474,300	3,751,475	Worker	0.041	0.00036
R0347	474,400	3,751,475	Worker	0.033	0.00028
R0348	474,425	3,751,475	Worker	0.030	0.00026
R0349	474,450	3,751,475	Worker	0.029	0.00024
R0350	474,475	3,751,475	Worker	0.028	0.00023
R0351	474,500	3,751,475	Worker	0.027	0.00023
R0352	474,525	3,751,475	Worker	0.026	0.00022
R0353	474,550	3,751,475	Worker	0.025	0.00021
R0354	474,125	3,751,500	Worker	0.026	0.00023
R0355	474,150	3,751,500	Worker	0.027	0.00024
R0356	474,175	3,751,500	Worker	0.029	0.00025
R0357	474,200	3,751,500	Worker	0.031	0.00026
R0358	474,225	3,751,500	Worker	0.033	0.00029
R0359	474,250	3,751,500	Worker	0.037	0.00032
R0360	474,275	3,751,500	Worker	0.042	0.00037

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0361	474,300	3,751,500	Worker	0.054	0.00048
R0362	474,400	3,751,500	Worker	0.039	0.00034
R0363	474,425	3,751,500	Worker	0.036	0.00031
R0364	474,450	3,751,500	Worker	0.033	0.00028
R0365	474,475	3,751,500	Worker	0.031	0.00027
R0366	474,500	3,751,500	Worker	0.030	0.00025
R0367	474,525	3,751,500	Worker	0.029	0.00024
R0368	474,550	3,751,500	Worker	0.028	0.00023
R0369	474,100	3,751,525	Worker	0.027	0.00023
R0370	474,125	3,751,525	Worker	0.028	0.00024
R0371	474,150	3,751,525	Worker	0.029	0.00025
R0372	474,175	3,751,525	Worker	0.031	0.00027
R0373	474,200	3,751,525	Worker	0.034	0.00029
R0374	474,225	3,751,525	Worker	0.037	0.00032
R0375	474,250	3,751,525	Worker	0.042	0.00037
R0376	474,275	3,751,525	Worker	0.051	0.00045
R0377	474,300	3,751,525	Worker	0.071	0.00063
R0378	474,375	3,751,525	Worker	0.058	0.00051
R0379	474,400	3,751,525	Worker	0.048	0.00042
R0380	474,425	3,751,525	Worker	0.042	0.00036
R0381	474,450	3,751,525	Worker	0.038	0.00032
R0382	474,475	3,751,525	Worker	0.035	0.00030
R0383	474,500	3,751,525	Worker	0.033	0.00028
R0384	474,525	3,751,525	Worker	0.031	0.00026
R0385	474,550	3,751,525	Worker	0.030	0.00025
R0386	474,100	3,751,550	Worker	0.028	0.00025
R0387	474,125	3,751,550	Worker	0.030	0.00026
R0388	474,150	3,751,550	Worker	0.031	0.00027
R0389	474,175	3,751,550	Worker	0.034	0.00029
R0390	474,200	3,751,550	Worker	0.037	0.00032
R0391	474,225	3,751,550	Worker	0.041	0.00036
R0392	474,250	3,751,550	Worker	0.048	0.00042
R0393	474,275	3,751,550	Worker	0.061	0.00054
R0394	474,375	3,751,550	Worker	0.075	0.00067
R0395	474,400	3,751,550	Worker	0.056	0.00049
R0396	474,425	3,751,550	Worker	0.046	0.00041
R0397	474,450	3,751,550	Worker	0.041	0.00036
R0398	474,475	3,751,550	Worker	0.038	0.00032
R0399	474,500	3,751,550	Worker	0.035	0.00030
R0400	474,525	3,751,550	Worker	0.033	0.00028
R0401	474,550	3,751,550	Worker	0.032	0.00027
R0402	474,100	3,751,575	Worker	0.030	0.00026
R0403	474,125	3,751,575	Worker	0.032	0.00027
R0404	474,150	3,751,575	Worker	0.034	0.00029
R0405	474,175	3,751,575	Worker	0.036	0.00032

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0406	474,200	3,751,575	Worker	0.040	0.00035
R0407	474,225	3,751,575	Worker	0.045	0.00040
R0408	474,250	3,751,575	Worker	0.054	0.00048
R0409	474,275	3,751,575	Worker	0.072	0.00064
R0410	474,375	3,751,575	Worker	0.072	0.00064
R0411	474,400	3,751,575	Worker	0.057	0.00050
R0412	474,425	3,751,575	Worker	0.048	0.00042
R0413	474,450	3,751,575	Worker	0.043	0.00037
R0414	474,475	3,751,575	Worker	0.040	0.00034
R0415	474,500	3,751,575	Worker	0.037	0.00032
R0416	474,525	3,751,575	Worker	0.035	0.00030
R0417	474,550	3,751,575	Worker	0.034	0.00029
R0418	474,075	3,751,600	Worker	0.030	0.00026
R0419	474,100	3,751,600	Worker	0.032	0.00028
R0420	474,125	3,751,600	Worker	0.034	0.00029
R0421	474,150	3,751,600	Worker	0.036	0.00031
R0422	474,175	3,751,600	Worker	0.039	0.00034
R0423	474,200	3,751,600	Worker	0.043	0.00038
R0424	474,225	3,751,600	Worker	0.050	0.00044
R0425	474,250	3,751,600	Worker	0.061	0.00055
R0426	474,275	3,751,600	Worker	0.088	0.00079
R0427	474,350	3,751,600	Worker	0.095	0.00085
R0428	474,375	3,751,600	Worker	0.069	0.00061
R0429	474,400	3,751,600	Worker	0.056	0.00049
R0430	474,425	3,751,600	Worker	0.049	0.00043
R0431	474,450	3,751,600	Worker	0.044	0.00038
R0432	474,475	3,751,600	Worker	0.041	0.00035
R0433	474,500	3,751,600	Worker	0.039	0.00033
R0434	474,525	3,751,600	Worker	0.037	0.00031
R0435	474,075	3,751,625	Worker	0.032	0.00028
R0436	474,100	3,751,625	Worker	0.033	0.00029
R0437	474,125	3,751,625	Worker	0.036	0.00031
R0438	474,150	3,751,625	Worker	0.038	0.00033
R0439	474,175	3,751,625	Worker	0.042	0.00037
R0440	474,200	3,751,625	Worker	0.047	0.00041
R0441	474,225	3,751,625	Worker	0.055	0.00049
R0442	474,250	3,751,625	Worker	0.070	0.00063
R0443	474,350	3,751,625	Worker	0.085	0.00076
R0444	474,375	3,751,625	Worker	0.065	0.00058
R0445	474,400	3,751,625	Worker	0.055	0.00048
R0446	474,425	3,751,625	Worker	0.049	0.00043
R0447	474,450	3,751,625	Worker	0.045	0.00039
R0448	474,475	3,751,625	Worker	0.042	0.00036
R0449	474,500	3,751,625	Worker	0.040	0.00034
R0450	474,525	3,751,625	Worker	0.038	0.00032

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0451	477,400	3,751,625	Worker	0.013	0.00010
R0452	477,425	3,751,625	Worker	0.013	0.00010
R0453	477,450	3,751,625	Worker	0.012	0.00010
R0454	477,475	3,751,625	Worker	0.012	0.00010
R0455	477,500	3,751,625	Residential	0.226	0.00010
R0456	477,525	3,751,625	Residential	0.224	0.00010
R0457	477,550	3,751,625	Residential	0.222	0.00010
R0458	474,050	3,751,650	Worker	0.032	0.00028
R0459	474,075	3,751,650	Worker	0.034	0.00029
R0460	474,100	3,751,650	Worker	0.035	0.00031
R0461	474,125	3,751,650	Worker	0.038	0.00033
R0462	474,150	3,751,650	Worker	0.041	0.00036
R0463	474,175	3,751,650	Worker	0.045	0.00039
R0464	474,200	3,751,650	Worker	0.051	0.00045
R0465	474,225	3,751,650	Worker	0.061	0.00054
R0466	474,250	3,751,650	Worker	0.082	0.00073
R0467	474,350	3,751,650	Worker	0.079	0.00070
R0468	474,375	3,751,650	Worker	0.063	0.00056
R0469	474,400	3,751,650	Worker	0.054	0.00048
R0470	474,425	3,751,650	Worker	0.049	0.00043
R0471	474,450	3,751,650	Worker	0.045	0.00039
R0472	474,475	3,751,650	Worker	0.043	0.00037
R0473	474,500	3,751,650	Worker	0.041	0.00035
R0474	474,525	3,751,650	Worker	0.039	0.00033
R0475	477,350	3,751,650	Worker	0.013	0.00011
R0476	477,375	3,751,650	Worker	0.013	0.00011
R0477	477,400	3,751,650	Worker	0.013	0.00011
R0478	477,425	3,751,650	Worker	0.013	0.00010
R0479	477,450	3,751,650	Worker	0.013	0.00010
R0480	477,475	3,751,650	Worker	0.013	0.00010
R0481	477,500	3,751,650	Residential	0.234	0.00010
R0482	477,525	3,751,650	Residential	0.231	0.00010
R0483	477,550	3,751,650	Residential	0.229	0.00010
R0484	477,575	3,751,650	Residential	0.227	0.00010
R0485	477,600	3,751,650	Residential	0.225	0.00010
R0486	474,000	3,751,675	Worker	0.031	0.00028
R0487	474,025	3,751,675	Worker	0.033	0.00029
R0488	474,050	3,751,675	Worker	0.034	0.00030
R0489	474,075	3,751,675	Worker	0.035	0.00031
R0490	474,100	3,751,675	Worker	0.037	0.00033
R0491	474,125	3,751,675	Worker	0.040	0.00035
R0492	474,150	3,751,675	Worker	0.043	0.00038
R0493	474,175	3,751,675	Worker	0.048	0.00043
R0494	474,200	3,751,675	Worker	0.055	0.00049
R0495	474,225	3,751,675	Worker	0.068	0.00061

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0496	474,325	3,751,675	Worker	0.101	0.00090
R0497	474,350	3,751,675	Worker	0.074	0.00066
R0498	474,375	3,751,675	Worker	0.061	0.00054
R0499	474,400	3,751,675	Worker	0.054	0.00047
R0500	474,425	3,751,675	Worker	0.049	0.00043
R0501	474,450	3,751,675	Worker	0.046	0.00040
R0502	474,475	3,751,675	Worker	0.043	0.00038
R0503	474,500	3,751,675	Worker	0.042	0.00036
R0504	477,325	3,751,675	Worker	0.014	0.00011
R0505	477,350	3,751,675	Worker	0.014	0.00011
R0506	477,375	3,751,675	Worker	0.014	0.00011
R0507	477,400	3,751,675	Worker	0.014	0.00011
R0508	477,425	3,751,675	Worker	0.014	0.00011
R0509	477,450	3,751,675	Worker	0.013	0.00011
R0510	477,475	3,751,675	Worker	0.013	0.00011
R0511	477,500	3,751,675	Residential	0.241	0.00010
R0512	477,525	3,751,675	Residential	0.239	0.00010
R0513	477,550	3,751,675	Residential	0.236	0.00010
R0514	477,575	3,751,675	Residential	0.234	0.00010
R0515	477,600	3,751,675	Residential	0.231	0.00010
R0516	477,625	3,751,675	Residential	0.229	0.00010
R0517	473,975	3,751,700	Worker	0.032	0.00028
R0518	474,000	3,751,700	Worker	0.033	0.00029
R0519	474,025	3,751,700	Worker	0.034	0.00030
R0520	474,050	3,751,700	Worker	0.036	0.00032
R0521	474,075	3,751,700	Worker	0.038	0.00033
R0522	474,100	3,751,700	Worker	0.040	0.00035
R0523	474,125	3,751,700	Worker	0.043	0.00038
R0524	474,150	3,751,700	Worker	0.047	0.00041
R0525	474,175	3,751,700	Worker	0.052	0.00046
R0526	474,200	3,751,700	Worker	0.061	0.00054
R0527	474,225	3,751,700	Worker	0.078	0.00070
R0528	474,325	3,751,700	Worker	0.092	0.00083
R0529	474,350	3,751,700	Worker	0.071	0.00063
R0530	474,375	3,751,700	Worker	0.060	0.00053
R0531	474,400	3,751,700	Worker	0.054	0.00047
R0532	474,425	3,751,700	Worker	0.050	0.00043
R0533	474,450	3,751,700	Worker	0.047	0.00040
R0534	474,475	3,751,700	Worker	0.044	0.00038
R0535	474,500	3,751,700	Worker	0.043	0.00037
R0536	477,325	3,751,700	Worker	0.015	0.00012
R0537	477,350	3,751,700	Worker	0.015	0.00012
R0538	477,375	3,751,700	Worker	0.014	0.00011
R0539	477,400	3,751,700	Worker	0.014	0.00011
R0540	477,425	3,751,700	Worker	0.014	0.00011

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0541	477,450	3,751,700	Worker	0.014	0.00011
R0542	477,475	3,751,700	Worker	0.014	0.00011
R0543	477,500	3,751,700	Residential	0.249	0.00011
R0544	477,525	3,751,700	Residential	0.246	0.00011
R0545	477,550	3,751,700	Residential	0.244	0.00011
R0546	477,575	3,751,700	Residential	0.241	0.00010
R0547	477,600	3,751,700	Residential	0.239	0.00010
R0548	477,625	3,751,700	Residential	0.236	0.00010
R0549	473,925	3,751,725	Worker	0.033	0.00029
R0550	473,950	3,751,725	Worker	0.033	0.00029
R0551	473,975	3,751,725	Worker	0.034	0.00030
R0552	474,000	3,751,725	Worker	0.035	0.00031
R0553	474,025	3,751,725	Worker	0.037	0.00032
R0554	474,050	3,751,725	Worker	0.038	0.00034
R0555	474,075	3,751,725	Worker	0.040	0.00035
R0556	474,100	3,751,725	Worker	0.043	0.00038
R0557	474,125	3,751,725	Worker	0.046	0.00041
R0558	474,150	3,751,725	Worker	0.051	0.00045
R0559	474,175	3,751,725	Worker	0.057	0.00051
R0560	474,200	3,751,725	Worker	0.068	0.00061
R0561	474,225	3,751,725	Worker	0.092	0.00083
R0562	474,325	3,751,725	Worker	0.086	0.00077
R0563	474,350	3,751,725	Worker	0.069	0.00061
R0564	474,375	3,751,725	Worker	0.060	0.00053
R0565	474,400	3,751,725	Worker	0.054	0.00047
R0566	474,425	3,751,725	Worker	0.050	0.00044
R0567	474,450	3,751,725	Worker	0.047	0.00041
R0568	474,475	3,751,725	Worker	0.045	0.00039
R0569	474,500	3,751,725	Worker	0.044	0.00038
R0570	477,300	3,751,725	Worker	0.015	0.00012
R0571	477,325	3,751,725	Worker	0.015	0.00012
R0572	477,350	3,751,725	Worker	0.015	0.00012
R0573	477,375	3,751,725	Worker	0.015	0.00012
R0574	477,400	3,751,725	Worker	0.015	0.00012
R0575	477,425	3,751,725	Worker	0.015	0.00012
R0576	477,450	3,751,725	Worker	0.014	0.00011
R0577	477,475	3,751,725	Worker	0.014	0.00011
R0578	477,500	3,751,725	Residential	0.257	0.00011
R0579	477,525	3,751,725	Residential	0.254	0.00011
R0580	477,550	3,751,725	Residential	0.251	0.00011
R0581	477,575	3,751,725	Residential	0.249	0.00011
R0582	477,600	3,751,725	Residential	0.246	0.00011
R0583	477,625	3,751,725	Residential	0.243	0.00010
R0584	477,650	3,751,725	Residential	0.240	0.00010
R0585	473,875	3,751,750	Worker	0.034	0.00030

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0586	473,900	3,751,750	Worker	0.035	0.00031
R0587	473,925	3,751,750	Worker	0.035	0.00031
R0588	473,950	3,751,750	Worker	0.036	0.00032
R0589	473,975	3,751,750	Worker	0.037	0.00032
R0590	474,000	3,751,750	Worker	0.038	0.00033
R0591	474,025	3,751,750	Worker	0.039	0.00035
R0592	474,050	3,751,750	Worker	0.041	0.00036
R0593	474,075	3,751,750	Worker	0.043	0.00038
R0594	474,100	3,751,750	Worker	0.046	0.00041
R0595	474,125	3,751,750	Worker	0.050	0.00045
R0596	474,150	3,751,750	Worker	0.056	0.00050
R0597	474,175	3,751,750	Worker	0.065	0.00058
R0598	474,200	3,751,750	Worker	0.082	0.00074
R0599	474,325	3,751,750	Worker	0.082	0.00073
R0600	474,350	3,751,750	Worker	0.068	0.00060
R0601	474,375	3,751,750	Worker	0.060	0.00053
R0602	474,400	3,751,750	Worker	0.055	0.00048
R0603	474,425	3,751,750	Worker	0.051	0.00045
R0604	474,450	3,751,750	Worker	0.049	0.00042
R0605	474,475	3,751,750	Worker	0.047	0.00040
R0606	474,500	3,751,750	Worker	0.045	0.00039
R0607	477,300	3,751,750	Worker	0.016	0.00013
R0608	477,325	3,751,750	Worker	0.016	0.00013
R0609	477,350	3,751,750	Worker	0.016	0.00012
R0610	477,375	3,751,750	Worker	0.015	0.00012
R0611	477,400	3,751,750	Worker	0.015	0.00012
R0612	477,425	3,751,750	Worker	0.015	0.00012
R0613	477,450	3,751,750	Worker	0.015	0.00012
R0614	477,475	3,751,750	Worker	0.015	0.00012
R0615	477,500	3,751,750	Residential	0.265	0.00011
R0616	477,525	3,751,750	Residential	0.262	0.00011
R0617	477,550	3,751,750	Residential	0.259	0.00011
R0618	477,575	3,751,750	Residential	0.256	0.00011
R0619	477,600	3,751,750	Residential	0.253	0.00011
R0620	477,625	3,751,750	Residential	0.250	0.00011
R0621	477,650	3,751,750	Residential	0.247	0.00011
R0622	473,825	3,751,775	Worker	0.036	0.00032
R0623	473,850	3,751,775	Worker	0.036	0.00032
R0624	473,875	3,751,775	Worker	0.037	0.00033
R0625	473,900	3,751,775	Worker	0.037	0.00033
R0626	473,925	3,751,775	Worker	0.038	0.00034
R0627	473,950	3,751,775	Worker	0.039	0.00034
R0628	473,975	3,751,775	Worker	0.040	0.00035
R0629	474,000	3,751,775	Worker	0.041	0.00036
R0630	474,025	3,751,775	Worker	0.043	0.00038

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0631	474,050	3,751,775	Worker	0.045	0.00040
R0632	474,075	3,751,775	Worker	0.048	0.00043
R0633	474,100	3,751,775	Worker	0.052	0.00046
R0634	474,125	3,751,775	Worker	0.057	0.00051
R0635	474,150	3,751,775	Worker	0.065	0.00058
R0636	474,175	3,751,775	Worker	0.079	0.00071
R0637	474,325	3,751,775	Worker	0.081	0.00072
R0638	474,350	3,751,775	Worker	0.068	0.00060
R0639	474,375	3,751,775	Worker	0.060	0.00053
R0640	474,400	3,751,775	Worker	0.056	0.00049
R0641	474,425	3,751,775	Worker	0.052	0.00046
R0642	474,450	3,751,775	Worker	0.050	0.00043
R0643	474,475	3,751,775	Worker	0.048	0.00042
R0644	477,275	3,751,775	Worker	0.017	0.00013
R0645	477,300	3,751,775	Worker	0.017	0.00013
R0646	477,325	3,751,775	Worker	0.016	0.00013
R0647	477,350	3,751,775	Worker	0.016	0.00013
R0648	477,375	3,751,775	Worker	0.016	0.00013
R0649	477,400	3,751,775	Worker	0.016	0.00013
R0650	477,425	3,751,775	Worker	0.016	0.00012
R0651	477,450	3,751,775	Worker	0.015	0.00012
R0652	477,475	3,751,775	Worker	0.015	0.00012
R0653	477,500	3,751,775	Residential	0.275	0.00012
R0654	477,525	3,751,775	Residential	0.272	0.00012
R0655	477,550	3,751,775	Residential	0.269	0.00012
R0656	477,575	3,751,775	Residential	0.265	0.00011
R0657	477,600	3,751,775	Residential	0.261	0.00011
R0658	477,625	3,751,775	Residential	0.258	0.00011
R0659	477,650	3,751,775	Residential	0.254	0.00011
R0660	473,800	3,751,800	Worker	0.038	0.00034
R0661	473,825	3,751,800	Worker	0.039	0.00035
R0662	473,850	3,751,800	Worker	0.040	0.00035
R0663	473,875	3,751,800	Worker	0.040	0.00036
R0664	473,900	3,751,800	Worker	0.041	0.00036
R0665	473,925	3,751,800	Worker	0.041	0.00037
R0666	473,950	3,751,800	Worker	0.042	0.00038
R0667	473,975	3,751,800	Worker	0.043	0.00039
R0668	474,000	3,751,800	Worker	0.045	0.00040
R0669	474,025	3,751,800	Worker	0.047	0.00042
R0670	474,050	3,751,800	Worker	0.051	0.00045
R0671	474,075	3,751,800	Worker	0.055	0.00049
R0672	474,100	3,751,800	Worker	0.060	0.00054
R0673	474,125	3,751,800	Worker	0.069	0.00062
R0674	474,150	3,751,800	Worker	0.083	0.00074
R0675	474,325	3,751,800	Worker	0.081	0.00072

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0676	474,350	3,751,800	Worker	0.068	0.00061
R0677	474,375	3,751,800	Worker	0.061	0.00054
R0678	474,400	3,751,800	Worker	0.057	0.00050
R0679	474,425	3,751,800	Worker	0.054	0.00047
R0680	474,450	3,751,800	Worker	0.051	0.00045
R0681	474,475	3,751,800	Worker	0.050	0.00043
R0682	475,300	3,751,800	Worker	0.045	0.00036
R0683	475,325	3,751,800	Worker	0.045	0.00035
R0684	475,350	3,751,800	Worker	0.044	0.00035
R0685	475,375	3,751,800	Worker	0.043	0.00034
R0686	475,400	3,751,800	Worker	0.043	0.00034
R0687	475,425	3,751,800	Worker	0.042	0.00033
R0688	475,450	3,751,800	Worker	0.041	0.00032
R0689	475,475	3,751,800	Worker	0.040	0.00032
R0690	475,500	3,751,800	Worker	0.039	0.00031
R0691	475,525	3,751,800	Worker	0.039	0.00030
R0692	475,550	3,751,800	Worker	0.038	0.00030
R0693	475,575	3,751,800	Worker	0.037	0.00029
R0694	475,600	3,751,800	Worker	0.036	0.00028
R0695	475,625	3,751,800	Worker	0.035	0.00027
R0696	475,650	3,751,800	Worker	0.034	0.00027
R0697	475,675	3,751,800	Worker	0.033	0.00026
R0698	475,700	3,751,800	Worker	0.032	0.00025
R0699	475,725	3,751,800	Worker	0.031	0.00025
R0700	475,750	3,751,800	Worker	0.030	0.00024
R0701	475,775	3,751,800	Worker	0.030	0.00024
R0702	475,800	3,751,800	Worker	0.029	0.00024
R0703	475,825	3,751,800	Worker	0.029	0.00023
R0704	475,850	3,751,800	Worker	0.029	0.00023
R0705	475,875	3,751,800	Worker	0.029	0.00023
R0706	475,900	3,751,800	Worker	0.029	0.00023
R0707	475,925	3,751,800	Worker	0.029	0.00023
R0708	475,950	3,751,800	Worker	0.029	0.00023
R0709	475,975	3,751,800	Worker	0.029	0.00023
R0710	476,000	3,751,800	Worker	0.029	0.00023
R0711	476,025	3,751,800	Worker	0.029	0.00023
R0712	476,050	3,751,800	Worker	0.029	0.00023
R0713	476,075	3,751,800	Worker	0.029	0.00023
R0714	477,275	3,751,800	Worker	0.017	0.00014
R0715	477,300	3,751,800	Worker	0.017	0.00014
R0716	477,325	3,751,800	Worker	0.017	0.00013
R0717	477,350	3,751,800	Worker	0.017	0.00013
R0718	477,375	3,751,800	Worker	0.017	0.00013
R0719	477,400	3,751,800	Worker	0.016	0.00013
R0720	477,425	3,751,800	Worker	0.016	0.00013

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0721	477,450	3,751,800	Worker	0.016	0.00013
R0722	477,500	3,751,800	Residential	0.292	0.00013
R0723	477,525	3,751,800	Residential	0.286	0.00012
R0724	477,550	3,751,800	Residential	0.279	0.00012
R0725	477,575	3,751,800	Residential	0.274	0.00012
R0726	477,600	3,751,800	Residential	0.270	0.00012
R0727	477,625	3,751,800	Residential	0.265	0.00011
R0728	477,650	3,751,800	Residential	0.261	0.00011
R0729	477,675	3,751,800	Residential	0.257	0.00011
R0730	473,775	3,751,825	Worker	0.040	0.00036
R0731	473,800	3,751,825	Worker	0.041	0.00037
R0732	473,825	3,751,825	Worker	0.043	0.00038
R0733	473,850	3,751,825	Worker	0.044	0.00039
R0734	473,875	3,751,825	Worker	0.045	0.00040
R0735	473,900	3,751,825	Worker	0.046	0.00041
R0736	473,925	3,751,825	Worker	0.046	0.00041
R0737	473,950	3,751,825	Worker	0.047	0.00042
R0738	473,975	3,751,825	Worker	0.049	0.00044
R0739	474,000	3,751,825	Worker	0.051	0.00045
R0740	474,025	3,751,825	Worker	0.054	0.00049
R0741	474,050	3,751,825	Worker	0.059	0.00053
R0742	474,075	3,751,825	Worker	0.067	0.00060
R0743	474,100	3,751,825	Worker	0.078	0.00070
R0744	474,125	3,751,825	Worker	0.102	0.00092
R0745	474,325	3,751,825	Worker	0.082	0.00073
R0746	474,350	3,751,825	Worker	0.070	0.00062
R0747	474,375	3,751,825	Worker	0.063	0.00056
R0748	474,400	3,751,825	Worker	0.059	0.00052
R0749	474,425	3,751,825	Worker	0.055	0.00049
R0750	474,450	3,751,825	Worker	0.053	0.00047
R0751	474,475	3,751,825	Worker	0.052	0.00045
R0752	475,250	3,751,825	Worker	0.051	0.00040
R0753	475,275	3,751,825	Worker	0.051	0.00040
R0754	475,300	3,751,825	Worker	0.050	0.00039
R0755	475,325	3,751,825	Worker	0.049	0.00039
R0756	475,350	3,751,825	Worker	0.049	0.00038
R0757	475,375	3,751,825	Worker	0.048	0.00038
R0758	475,400	3,751,825	Worker	0.047	0.00037
R0759	475,425	3,751,825	Worker	0.046	0.00037
R0760	475,450	3,751,825	Worker	0.046	0.00036
R0761	475,475	3,751,825	Worker	0.045	0.00035
R0762	475,500	3,751,825	Worker	0.044	0.00034
R0763	475,525	3,751,825	Worker	0.043	0.00034
R0764	475,550	3,751,825	Worker	0.042	0.00033
R0765	475,575	3,751,825	Worker	0.041	0.00032

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0766	475,600	3,751,825	Worker	0.040	0.00031
R0767	475,625	3,751,825	Worker	0.039	0.00030
R0768	475,650	3,751,825	Worker	0.038	0.00030
R0769	475,675	3,751,825	Worker	0.037	0.00029
R0770	475,700	3,751,825	Worker	0.036	0.00028
R0771	475,725	3,751,825	Worker	0.035	0.00028
R0772	475,750	3,751,825	Worker	0.034	0.00027
R0773	475,775	3,751,825	Worker	0.033	0.00026
R0774	475,800	3,751,825	Worker	0.033	0.00026
R0775	475,825	3,751,825	Worker	0.032	0.00026
R0776	475,850	3,751,825	Worker	0.032	0.00026
R0777	475,875	3,751,825	Worker	0.032	0.00025
R0778	475,900	3,751,825	Worker	0.032	0.00025
R0779	475,925	3,751,825	Worker	0.032	0.00025
R0780	475,950	3,751,825	Worker	0.032	0.00025
R0781	475,975	3,751,825	Worker	0.032	0.00025
R0782	476,000	3,751,825	Worker	0.032	0.00025
R0783	476,025	3,751,825	Worker	0.032	0.00025
R0784	476,050	3,751,825	Worker	0.032	0.00025
R0785	476,075	3,751,825	Worker	0.032	0.00025
R0786	476,100	3,751,825	Worker	0.032	0.00025
R0787	476,125	3,751,825	Worker	0.032	0.00025
R0788	476,150	3,751,825	Worker	0.032	0.00025
R0789	477,275	3,751,825	Worker	0.018	0.00014
R0790	477,300	3,751,825	Worker	0.018	0.00014
R0791	477,325	3,751,825	Worker	0.017	0.00014
R0792	477,350	3,751,825	Worker	0.017	0.00014
R0793	477,375	3,751,825	Worker	0.017	0.00014
R0794	477,400	3,751,825	Worker	0.017	0.00014
R0795	477,425	3,751,825	Worker	0.017	0.00014
R0796	477,450	3,751,825	Worker	0.017	0.00014
R0797	477,500	3,751,825	Residential	0.315	0.00014
R0798	477,525	3,751,825	Residential	0.300	0.00013
R0799	477,550	3,751,825	Residential	0.290	0.00013
R0800	473,750	3,751,850	Worker	0.041	0.00037
R0801	473,775	3,751,850	Worker	0.043	0.00039
R0802	473,800	3,751,850	Worker	0.045	0.00041
R0803	473,825	3,751,850	Worker	0.047	0.00042
R0804	473,850	3,751,850	Worker	0.049	0.00044
R0805	473,875	3,751,850	Worker	0.051	0.00045
R0806	473,900	3,751,850	Worker	0.052	0.00047
R0807	473,925	3,751,850	Worker	0.053	0.00048
R0808	473,950	3,751,850	Worker	0.055	0.00049
R0809	473,975	3,751,850	Worker	0.057	0.00051
R0810	474,000	3,751,850	Worker	0.061	0.00054

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0811	474,025	3,751,850	Worker	0.067	0.00060
R0812	474,050	3,751,850	Worker	0.076	0.00069
R0813	474,075	3,751,850	Worker	0.095	0.00086
R0814	474,325	3,751,850	Worker	0.086	0.00077
R0815	474,350	3,751,850	Worker	0.072	0.00064
R0816	474,375	3,751,850	Worker	0.065	0.00058
R0817	474,400	3,751,850	Worker	0.061	0.00054
R0818	474,425	3,751,850	Worker	0.058	0.00051
R0819	474,450	3,751,850	Worker	0.056	0.00049
R0820	474,475	3,751,850	Worker	0.054	0.00047
R0821	474,500	3,751,850	Worker	0.053	0.00046
R0822	475,200	3,751,850	Worker	0.057	0.00045
R0823	475,225	3,751,850	Worker	0.056	0.00044
R0824	475,250	3,751,850	Worker	0.056	0.00044
R0825	475,275	3,751,850	Worker	0.056	0.00044
R0826	475,300	3,751,850	Worker	0.055	0.00043
R0827	475,325	3,751,850	Worker	0.054	0.00043
R0828	475,350	3,751,850	Worker	0.054	0.00042
R0829	475,375	3,751,850	Worker	0.053	0.00042
R0830	475,400	3,751,850	Worker	0.052	0.00041
R0831	475,425	3,751,850	Worker	0.052	0.00041
R0832	475,450	3,751,850	Worker	0.051	0.00040
R0833	475,475	3,751,850	Worker	0.050	0.00039
R0834	475,500	3,751,850	Worker	0.049	0.00039
R0835	475,525	3,751,850	Worker	0.049	0.00038
R0836	475,550	3,751,850	Worker	0.048	0.00037
R0837	475,575	3,751,850	Worker	0.047	0.00036
R0838	475,600	3,751,850	Worker	0.045	0.00035
R0839	475,625	3,751,850	Worker	0.044	0.00034
R0840	475,650	3,751,850	Worker	0.043	0.00033
R0841	475,675	3,751,850	Worker	0.042	0.00033
R0842	475,700	3,751,850	Worker	0.041	0.00032
R0843	475,725	3,751,850	Worker	0.040	0.00031
R0844	475,750	3,751,850	Worker	0.038	0.00030
R0845	475,775	3,751,850	Worker	0.038	0.00030
R0846	475,800	3,751,850	Worker	0.037	0.00029
R0847	475,825	3,751,850	Worker	0.036	0.00029
R0848	475,850	3,751,850	Worker	0.036	0.00028
R0849	475,875	3,751,850	Worker	0.036	0.00028
R0850	475,900	3,751,850	Worker	0.035	0.00028
R0851	475,925	3,751,850	Worker	0.035	0.00028
R0852	475,950	3,751,850	Worker	0.035	0.00028
R0853	475,975	3,751,850	Worker	0.035	0.00028
R0854	476,000	3,751,850	Worker	0.036	0.00028
R0855	476,025	3,751,850	Worker	0.036	0.00028

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0856	476,050	3,751,850	Worker	0.036	0.00028
R0857	476,075	3,751,850	Worker	0.036	0.00028
R0858	476,100	3,751,850	Worker	0.036	0.00028
R0859	476,125	3,751,850	Worker	0.036	0.00028
R0860	476,150	3,751,850	Worker	0.036	0.00028
R0861	476,175	3,751,850	Worker	0.035	0.00028
R0862	477,275	3,751,850	Worker	0.018	0.00015
R0863	477,300	3,751,850	Worker	0.018	0.00014
R0864	477,325	3,751,850	Worker	0.018	0.00014
R0865	477,350	3,751,850	Worker	0.018	0.00014
R0866	477,375	3,751,850	Worker	0.018	0.00014
R0867	477,400	3,751,850	Worker	0.017	0.00014
R0868	477,425	3,751,850	Worker	0.017	0.00014
R0869	477,450	3,751,850	Worker	0.018	0.00014
R0870	477,500	3,751,850	Residential	0.326	0.00014
R0871	477,525	3,751,850	Residential	0.310	0.00013
R0872	477,550	3,751,850	Residential	0.299	0.00013
R0873	473,725	3,751,875	Worker	0.041	0.00037
R0874	473,750	3,751,875	Worker	0.044	0.00039
R0875	473,775	3,751,875	Worker	0.047	0.00042
R0876	473,800	3,751,875	Worker	0.050	0.00045
R0877	473,825	3,751,875	Worker	0.053	0.00047
R0878	473,850	3,751,875	Worker	0.056	0.00050
R0879	473,875	3,751,875	Worker	0.059	0.00053
R0880	473,900	3,751,875	Worker	0.061	0.00055
R0881	473,925	3,751,875	Worker	0.064	0.00057
R0882	473,950	3,751,875	Worker	0.067	0.00060
R0883	473,975	3,751,875	Worker	0.071	0.00064
R0884	474,000	3,751,875	Worker	0.079	0.00071
R0885	474,025	3,751,875	Worker	0.096	0.00087
R0886	474,325	3,751,875	Worker	0.090	0.00080
R0887	474,350	3,751,875	Worker	0.076	0.00068
R0888	474,375	3,751,875	Worker	0.068	0.00061
R0889	474,400	3,751,875	Worker	0.064	0.00056
R0890	474,425	3,751,875	Worker	0.060	0.00053
R0891	474,450	3,751,875	Worker	0.058	0.00051
R0892	474,475	3,751,875	Worker	0.057	0.00049
R0893	474,500	3,751,875	Worker	0.055	0.00048
R0894	475,175	3,751,875	Worker	0.062	0.00049
R0895	475,200	3,751,875	Worker	0.062	0.00049
R0896	475,225	3,751,875	Worker	0.062	0.00049
R0897	475,250	3,751,875	Worker	0.062	0.00049
R0898	475,275	3,751,875	Worker	0.062	0.00048
R0899	475,300	3,751,875	Worker	0.061	0.00048
R0900	475,325	3,751,875	Worker	0.060	0.00048

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0901	475,350	3,751,875	Worker	0.060	0.00047
R0902	475,375	3,751,875	Worker	0.059	0.00046
R0903	475,400	3,751,875	Worker	0.058	0.00046
R0904	475,425	3,751,875	Worker	0.058	0.00045
R0905	475,450	3,751,875	Worker	0.057	0.00045
R0906	475,475	3,751,875	Worker	0.056	0.00044
R0907	475,500	3,751,875	Worker	0.056	0.00043
R0908	475,525	3,751,875	Worker	0.055	0.00043
R0909	475,550	3,751,875	Worker	0.054	0.00042
R0910	475,575	3,751,875	Worker	0.053	0.00041
R0911	475,600	3,751,875	Worker	0.052	0.00040
R0912	475,625	3,751,875	Worker	0.051	0.00039
R0913	475,650	3,751,875	Worker	0.049	0.00038
R0914	475,675	3,751,875	Worker	0.048	0.00037
R0915	475,700	3,751,875	Worker	0.047	0.00036
R0916	475,725	3,751,875	Worker	0.045	0.00035
R0917	475,750	3,751,875	Worker	0.044	0.00034
R0918	475,775	3,751,875	Worker	0.043	0.00033
R0919	475,800	3,751,875	Worker	0.042	0.00033
R0920	475,825	3,751,875	Worker	0.041	0.00032
R0921	475,850	3,751,875	Worker	0.041	0.00032
R0922	475,875	3,751,875	Worker	0.040	0.00032
R0923	475,900	3,751,875	Worker	0.040	0.00032
R0924	475,925	3,751,875	Worker	0.040	0.00032
R0925	475,950	3,751,875	Worker	0.040	0.00031
R0926	475,975	3,751,875	Worker	0.040	0.00031
R0927	476,000	3,751,875	Worker	0.040	0.00031
R0928	476,025	3,751,875	Worker	0.040	0.00031
R0929	476,050	3,751,875	Worker	0.040	0.00031
R0930	476,075	3,751,875	Worker	0.040	0.00031
R0931	476,100	3,751,875	Worker	0.040	0.00031
R0932	476,125	3,751,875	Worker	0.040	0.00031
R0933	476,150	3,751,875	Worker	0.040	0.00031
R0934	476,175	3,751,875	Worker	0.039	0.00031
R0935	476,200	3,751,875	Worker	0.039	0.00031
R0936	477,275	3,751,875	Worker	0.019	0.00015
R0937	477,300	3,751,875	Worker	0.019	0.00015
R0938	477,325	3,751,875	Worker	0.018	0.00015
R0939	477,350	3,751,875	Worker	0.018	0.00014
R0940	477,375	3,751,875	Worker	0.018	0.00014
R0941	477,400	3,751,875	Worker	0.018	0.00014
R0942	477,425	3,751,875	Worker	0.018	0.00014
R0943	477,450	3,751,875	Worker	0.018	0.00015
R0944	477,500	3,751,875	Residential	0.334	0.00014
R0945	477,525	3,751,875	Residential	0.317	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0946	477,550	3,751,875	Residential	0.306	0.00013
R0947	473,725	3,751,900	Worker	0.043	0.00039
R0948	473,750	3,751,900	Worker	0.047	0.00042
R0949	473,775	3,751,900	Worker	0.050	0.00045
R0950	473,800	3,751,900	Worker	0.054	0.00049
R0951	473,825	3,751,900	Worker	0.059	0.00053
R0952	473,850	3,751,900	Worker	0.064	0.00058
R0953	473,875	3,751,900	Worker	0.069	0.00063
R0954	473,900	3,751,900	Worker	0.075	0.00068
R0955	473,925	3,751,900	Worker	0.081	0.00073
R0956	473,950	3,751,900	Worker	0.089	0.00081
R0957	473,975	3,751,900	Worker	0.104	0.00094
R0958	474,325	3,751,900	Worker	0.096	0.00086
R0959	474,350	3,751,900	Worker	0.080	0.00071
R0960	474,375	3,751,900	Worker	0.072	0.00064
R0961	474,400	3,751,900	Worker	0.067	0.00059
R0962	474,425	3,751,900	Worker	0.064	0.00056
R0963	474,450	3,751,900	Worker	0.061	0.00054
R0964	474,475	3,751,900	Worker	0.060	0.00052
R0965	474,500	3,751,900	Worker	0.058	0.00051
R0966	475,175	3,751,900	Worker	0.068	0.00054
R0967	475,200	3,751,900	Worker	0.069	0.00054
R0968	475,225	3,751,900	Worker	0.069	0.00054
R0969	475,250	3,751,900	Worker	0.069	0.00054
R0970	475,275	3,751,900	Worker	0.068	0.00054
R0971	475,300	3,751,900	Worker	0.068	0.00053
R0972	475,325	3,751,900	Worker	0.067	0.00053
R0973	475,350	3,751,900	Worker	0.067	0.00052
R0974	475,375	3,751,900	Worker	0.066	0.00052
R0975	475,400	3,751,900	Worker	0.066	0.00051
R0976	475,425	3,751,900	Worker	0.065	0.00051
R0977	475,450	3,751,900	Worker	0.064	0.00050
R0978	475,475	3,751,900	Worker	0.064	0.00050
R0979	475,500	3,751,900	Worker	0.063	0.00049
R0980	475,525	3,751,900	Worker	0.063	0.00048
R0981	475,550	3,751,900	Worker	0.062	0.00048
R0982	475,575	3,751,900	Worker	0.061	0.00047
R0983	475,600	3,751,900	Worker	0.060	0.00046
R0984	475,625	3,751,900	Worker	0.059	0.00045
R0985	475,650	3,751,900	Worker	0.058	0.00044
R0986	475,675	3,751,900	Worker	0.056	0.00043
R0987	475,700	3,751,900	Worker	0.054	0.00042
R0988	475,725	3,751,900	Worker	0.053	0.00040
R0989	475,750	3,751,900	Worker	0.051	0.00039
R0990	475,775	3,751,900	Worker	0.050	0.00038

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R0991	475,800	3,751,900	Worker	0.048	0.00037
R0992	475,825	3,751,900	Worker	0.047	0.00037
R0993	475,850	3,751,900	Worker	0.046	0.00036
R0994	475,875	3,751,900	Worker	0.046	0.00036
R0995	475,900	3,751,900	Worker	0.046	0.00036
R0996	475,925	3,751,900	Worker	0.045	0.00036
R0997	475,950	3,751,900	Worker	0.045	0.00036
R0998	475,975	3,751,900	Worker	0.045	0.00036
R0999	476,000	3,751,900	Worker	0.045	0.00035
R1000	476,025	3,751,900	Worker	0.045	0.00035
R1001	476,050	3,751,900	Worker	0.045	0.00035
R1002	476,075	3,751,900	Worker	0.045	0.00035
R1003	476,100	3,751,900	Worker	0.045	0.00035
R1004	476,125	3,751,900	Worker	0.045	0.00035
R1005	476,150	3,751,900	Worker	0.044	0.00035
R1006	476,175	3,751,900	Worker	0.044	0.00034
R1007	476,200	3,751,900	Worker	0.044	0.00034
R1008	476,225	3,751,900	Worker	0.043	0.00033
R1009	477,275	3,751,900	Worker	0.019	0.00015
R1010	477,300	3,751,900	Worker	0.019	0.00015
R1011	477,325	3,751,900	Worker	0.019	0.00015
R1012	477,350	3,751,900	Worker	0.019	0.00015
R1013	477,375	3,751,900	Worker	0.018	0.00015
R1014	477,400	3,751,900	Worker	0.018	0.00015
R1015	477,425	3,751,900	Worker	0.018	0.00015
R1016	477,450	3,751,900	Worker	0.019	0.00015
R1017	477,500	3,751,900	Residential	0.340	0.00015
R1018	477,525	3,751,900	Residential	0.323	0.00014
R1019	477,550	3,751,900	Residential	0.312	0.00014
R1020	477,575	3,751,900	Residential	0.304	0.00013
R1021	473,700	3,751,925	Worker	0.041	0.00037
R1022	473,725	3,751,925	Worker	0.045	0.00040
R1023	473,750	3,751,925	Worker	0.049	0.00044
R1024	473,775	3,751,925	Worker	0.054	0.00048
R1025	473,800	3,751,925	Worker	0.059	0.00053
R1026	473,825	3,751,925	Worker	0.066	0.00059
R1027	473,850	3,751,925	Worker	0.074	0.00067
R1028	473,875	3,751,925	Worker	0.084	0.00076
R1029	473,900	3,751,925	Worker	0.096	0.00087
R1030	473,925	3,751,925	Worker	0.112	0.00101
R1031	474,325	3,751,925	Worker	0.103	0.00092
R1032	474,350	3,751,925	Worker	0.085	0.00076
R1033	474,375	3,751,925	Worker	0.076	0.00068
R1034	474,400	3,751,925	Worker	0.071	0.00063
R1035	474,425	3,751,925	Worker	0.068	0.00060

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1036	474,450	3,751,925	Worker	0.065	0.00058
R1037	474,475	3,751,925	Worker	0.063	0.00056
R1038	474,500	3,751,925	Worker	0.062	0.00055
R1039	474,525	3,751,925	Worker	0.061	0.00053
R1040	475,150	3,751,925	Worker	0.074	0.00058
R1041	475,175	3,751,925	Worker	0.075	0.00059
R1042	475,200	3,751,925	Worker	0.076	0.00060
R1043	475,225	3,751,925	Worker	0.077	0.00060
R1044	475,250	3,751,925	Worker	0.077	0.00060
R1045	475,275	3,751,925	Worker	0.077	0.00060
R1046	475,300	3,751,925	Worker	0.076	0.00060
R1047	475,325	3,751,925	Worker	0.076	0.00059
R1048	475,350	3,751,925	Worker	0.075	0.00059
R1049	475,375	3,751,925	Worker	0.074	0.00058
R1050	475,400	3,751,925	Worker	0.074	0.00058
R1051	475,425	3,751,925	Worker	0.074	0.00057
R1052	475,450	3,751,925	Worker	0.073	0.00057
R1053	475,475	3,751,925	Worker	0.073	0.00057
R1054	475,500	3,751,925	Worker	0.073	0.00056
R1055	475,525	3,751,925	Worker	0.072	0.00056
R1056	475,550	3,751,925	Worker	0.072	0.00055
R1057	475,575	3,751,925	Worker	0.071	0.00054
R1058	475,600	3,751,925	Worker	0.070	0.00053
R1059	475,625	3,751,925	Worker	0.069	0.00053
R1060	475,650	3,751,925	Worker	0.068	0.00051
R1061	475,675	3,751,925	Worker	0.067	0.00050
R1062	475,700	3,751,925	Worker	0.065	0.00049
R1063	475,725	3,751,925	Worker	0.063	0.00047
R1064	475,750	3,751,925	Worker	0.060	0.00046
R1065	475,775	3,751,925	Worker	0.058	0.00045
R1066	475,800	3,751,925	Worker	0.056	0.00043
R1067	475,825	3,751,925	Worker	0.055	0.00042
R1068	475,850	3,751,925	Worker	0.054	0.00042
R1069	475,875	3,751,925	Worker	0.053	0.00041
R1070	475,900	3,751,925	Worker	0.052	0.00041
R1071	475,925	3,751,925	Worker	0.052	0.00041
R1072	475,950	3,751,925	Worker	0.052	0.00040
R1073	475,975	3,751,925	Worker	0.052	0.00040
R1074	476,000	3,751,925	Worker	0.052	0.00040
R1075	476,025	3,751,925	Worker	0.052	0.00040
R1076	476,050	3,751,925	Worker	0.052	0.00040
R1077	476,075	3,751,925	Worker	0.051	0.00040
R1078	476,100	3,751,925	Worker	0.051	0.00039
R1079	476,125	3,751,925	Worker	0.051	0.00039
R1080	476,150	3,751,925	Worker	0.050	0.00039

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1081	476,175	3,751,925	Worker	0.049	0.00038
R1082	476,200	3,751,925	Worker	0.049	0.00038
R1083	476,225	3,751,925	Worker	0.048	0.00037
R1084	477,250	3,751,925	Worker	0.020	0.00016
R1085	477,275	3,751,925	Worker	0.020	0.00016
R1086	477,300	3,751,925	Worker	0.020	0.00016
R1087	477,325	3,751,925	Worker	0.019	0.00015
R1088	477,350	3,751,925	Worker	0.019	0.00015
R1089	477,375	3,751,925	Worker	0.019	0.00015
R1090	477,400	3,751,925	Worker	0.019	0.00015
R1091	477,425	3,751,925	Worker	0.019	0.00015
R1092	477,450	3,751,925	Worker	0.019	0.00015
R1093	477,500	3,751,925	Residential	0.347	0.00015
R1094	477,525	3,751,925	Residential	0.329	0.00014
R1095	477,550	3,751,925	Residential	0.318	0.00014
R1096	477,575	3,751,925	Residential	0.309	0.00013
R1097	477,600	3,751,925	Residential	0.302	0.00013
R1098	477,625	3,751,925	Residential	0.295	0.00013
R1099	477,650	3,751,925	Residential	0.289	0.00013
R1100	477,675	3,751,925	Residential	0.284	0.00012
R1101	473,700	3,751,950	Worker	0.042	0.00038
R1102	473,725	3,751,950	Worker	0.046	0.00042
R1103	473,750	3,751,950	Worker	0.051	0.00046
R1104	473,775	3,751,950	Worker	0.057	0.00051
R1105	473,800	3,751,950	Worker	0.064	0.00057
R1106	473,825	3,751,950	Worker	0.072	0.00065
R1107	473,850	3,751,950	Worker	0.084	0.00076
R1108	473,875	3,751,950	Worker	0.102	0.00092
R1109	473,900	3,751,950	Worker	0.130	0.00118
R1110	474,325	3,751,950	Worker	0.111	0.00100
R1111	474,350	3,751,950	Worker	0.091	0.00082
R1112	474,375	3,751,950	Worker	0.082	0.00073
R1113	474,400	3,751,950	Worker	0.076	0.00068
R1114	474,425	3,751,950	Worker	0.073	0.00065
R1115	474,450	3,751,950	Worker	0.070	0.00062
R1116	474,475	3,751,950	Worker	0.068	0.00060
R1117	474,500	3,751,950	Worker	0.067	0.00059
R1118	474,525	3,751,950	Worker	0.065	0.00058
R1119	474,550	3,751,950	Worker	0.065	0.00057
R1120	475,150	3,751,950	Worker	0.081	0.00064
R1121	475,175	3,751,950	Worker	0.083	0.00065
R1122	475,200	3,751,950	Worker	0.085	0.00066
R1123	475,225	3,751,950	Worker	0.086	0.00067
R1124	475,250	3,751,950	Worker	0.086	0.00067
R1125	475,275	3,751,950	Worker	0.087	0.00067

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1126	475,300	3,751,950	Worker	0.086	0.00067
R1127	475,325	3,751,950	Worker	0.086	0.00067
R1128	475,350	3,751,950	Worker	0.085	0.00067
R1129	475,375	3,751,950	Worker	0.084	0.00066
R1130	475,400	3,751,950	Worker	0.084	0.00066
R1131	475,425	3,751,950	Worker	0.084	0.00065
R1132	475,450	3,751,950	Worker	0.084	0.00065
R1133	475,475	3,751,950	Worker	0.084	0.00065
R1134	475,500	3,751,950	Worker	0.084	0.00065
R1135	475,525	3,751,950	Worker	0.084	0.00064
R1136	475,550	3,751,950	Worker	0.084	0.00064
R1137	475,575	3,751,950	Worker	0.084	0.00064
R1138	475,600	3,751,950	Worker	0.084	0.00063
R1139	475,625	3,751,950	Worker	0.083	0.00062
R1140	475,650	3,751,950	Worker	0.082	0.00061
R1141	475,675	3,751,950	Worker	0.080	0.00060
R1142	475,700	3,751,950	Worker	0.078	0.00058
R1143	475,725	3,751,950	Worker	0.075	0.00056
R1144	475,750	3,751,950	Worker	0.073	0.00055
R1145	475,775	3,751,950	Worker	0.070	0.00053
R1146	475,800	3,751,950	Worker	0.067	0.00051
R1147	475,825	3,751,950	Worker	0.065	0.00050
R1148	475,850	3,751,950	Worker	0.063	0.00048
R1149	475,875	3,751,950	Worker	0.062	0.00048
R1150	475,900	3,751,950	Worker	0.061	0.00047
R1151	475,925	3,751,950	Worker	0.061	0.00047
R1152	475,950	3,751,950	Worker	0.060	0.00047
R1153	475,975	3,751,950	Worker	0.060	0.00046
R1154	476,000	3,751,950	Worker	0.060	0.00046
R1155	476,025	3,751,950	Worker	0.060	0.00046
R1156	476,050	3,751,950	Worker	0.059	0.00046
R1157	476,075	3,751,950	Worker	0.059	0.00045
R1158	476,100	3,751,950	Worker	0.058	0.00045
R1159	476,125	3,751,950	Worker	0.057	0.00044
R1160	476,150	3,751,950	Worker	0.057	0.00043
R1161	476,175	3,751,950	Worker	0.056	0.00043
R1162	476,200	3,751,950	Worker	0.055	0.00042
R1163	476,225	3,751,950	Worker	0.053	0.00041
R1164	476,250	3,751,950	Worker	0.052	0.00040
R1165	477,225	3,751,950	Worker	0.021	0.00017
R1166	477,250	3,751,950	Worker	0.021	0.00016
R1167	477,275	3,751,950	Worker	0.020	0.00016
R1168	477,300	3,751,950	Worker	0.020	0.00016
R1169	477,325	3,751,950	Worker	0.020	0.00016
R1170	477,350	3,751,950	Worker	0.019	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1171	477,375	3,751,950	Worker	0.019	0.00015
R1172	477,400	3,751,950	Worker	0.019	0.00015
R1173	477,425	3,751,950	Worker	0.019	0.00015
R1174	477,450	3,751,950	Worker	0.019	0.00015
R1175	477,500	3,751,950	Residential	0.352	0.00015
R1176	477,525	3,751,950	Residential	0.334	0.00014
R1177	477,550	3,751,950	Residential	0.323	0.00014
R1178	477,575	3,751,950	Residential	0.314	0.00014
R1179	477,600	3,751,950	Residential	0.306	0.00013
R1180	477,625	3,751,950	Residential	0.300	0.00013
R1181	477,650	3,751,950	Residential	0.294	0.00013
R1182	477,675	3,751,950	Residential	0.288	0.00012
R1183	473,700	3,751,975	Worker	0.043	0.00038
R1184	473,725	3,751,975	Worker	0.047	0.00042
R1185	473,750	3,751,975	Worker	0.052	0.00047
R1186	473,775	3,751,975	Worker	0.059	0.00053
R1187	473,800	3,751,975	Worker	0.067	0.00061
R1188	473,825	3,751,975	Worker	0.078	0.00071
R1189	473,850	3,751,975	Worker	0.094	0.00085
R1190	473,875	3,751,975	Worker	0.119	0.00108
R1191	474,350	3,751,975	Worker	0.101	0.00091
R1192	474,375	3,751,975	Worker	0.090	0.00080
R1193	474,400	3,751,975	Worker	0.083	0.00074
R1194	474,425	3,751,975	Worker	0.079	0.00070
R1195	474,450	3,751,975	Worker	0.076	0.00068
R1196	474,475	3,751,975	Worker	0.074	0.00066
R1197	474,500	3,751,975	Worker	0.072	0.00064
R1198	474,525	3,751,975	Worker	0.071	0.00063
R1199	474,550	3,751,975	Worker	0.070	0.00062
R1200	474,575	3,751,975	Worker	0.069	0.00061
R1201	475,125	3,751,975	Worker	0.087	0.00068
R1202	475,150	3,751,975	Worker	0.089	0.00070
R1203	475,175	3,751,975	Worker	0.092	0.00072
R1204	475,200	3,751,975	Worker	0.095	0.00073
R1205	475,225	3,751,975	Worker	0.097	0.00075
R1206	475,250	3,751,975	Worker	0.098	0.00076
R1207	475,275	3,751,975	Worker	0.099	0.00076
R1208	475,300	3,751,975	Worker	0.099	0.00077
R1209	475,325	3,751,975	Worker	0.098	0.00076
R1210	475,350	3,751,975	Worker	0.097	0.00076
R1211	475,375	3,751,975	Worker	0.097	0.00076
R1212	475,400	3,751,975	Worker	0.097	0.00075
R1213	475,425	3,751,975	Worker	0.097	0.00075
R1214	475,450	3,751,975	Worker	0.097	0.00075
R1215	475,475	3,751,975	Worker	0.098	0.00075

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1216	475,500	3,751,975	Worker	0.099	0.00076
R1217	475,525	3,751,975	Worker	0.100	0.00076
R1218	475,550	3,751,975	Worker	0.100	0.00076
R1219	475,575	3,751,975	Worker	0.101	0.00076
R1220	475,600	3,751,975	Worker	0.101	0.00076
R1221	475,625	3,751,975	Worker	0.101	0.00075
R1222	475,650	3,751,975	Worker	0.100	0.00074
R1223	475,675	3,751,975	Worker	0.098	0.00073
R1224	475,700	3,751,975	Worker	0.096	0.00071
R1225	475,725	3,751,975	Worker	0.093	0.00069
R1226	475,750	3,751,975	Worker	0.089	0.00066
R1227	475,775	3,751,975	Worker	0.085	0.00064
R1228	475,800	3,751,975	Worker	0.081	0.00061
R1229	475,825	3,751,975	Worker	0.078	0.00059
R1230	475,850	3,751,975	Worker	0.075	0.00057
R1231	475,875	3,751,975	Worker	0.073	0.00056
R1232	475,900	3,751,975	Worker	0.072	0.00055
R1233	475,925	3,751,975	Worker	0.071	0.00055
R1234	475,950	3,751,975	Worker	0.071	0.00054
R1235	475,975	3,751,975	Worker	0.070	0.00054
R1236	476,000	3,751,975	Worker	0.070	0.00054
R1237	476,025	3,751,975	Worker	0.069	0.00053
R1238	476,050	3,751,975	Worker	0.069	0.00052
R1239	476,075	3,751,975	Worker	0.068	0.00052
R1240	476,100	3,751,975	Worker	0.067	0.00051
R1241	476,125	3,751,975	Worker	0.065	0.00050
R1242	476,150	3,751,975	Worker	0.064	0.00049
R1243	476,175	3,751,975	Worker	0.063	0.00048
R1244	476,200	3,751,975	Worker	0.061	0.00046
R1245	476,225	3,751,975	Worker	0.059	0.00045
R1246	476,250	3,751,975	Worker	0.058	0.00044
R1247	476,275	3,751,975	Worker	0.056	0.00043
R1248	477,200	3,751,975	Worker	0.022	0.00017
R1249	477,225	3,751,975	Worker	0.022	0.00017
R1250	477,250	3,751,975	Worker	0.021	0.00017
R1251	477,275	3,751,975	Worker	0.021	0.00016
R1252	477,300	3,751,975	Worker	0.020	0.00016
R1253	477,325	3,751,975	Worker	0.020	0.00016
R1254	477,350	3,751,975	Worker	0.020	0.00016
R1255	477,375	3,751,975	Worker	0.020	0.00016
R1256	477,400	3,751,975	Worker	0.019	0.00015
R1257	477,425	3,751,975	Worker	0.019	0.00015
R1258	477,450	3,751,975	Worker	0.020	0.00016
R1259	477,500	3,751,975	Residential	0.357	0.00016
R1260	477,525	3,751,975	Residential	0.339	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1261	477,550	3,751,975	Residential	0.327	0.00014
R1262	477,575	3,751,975	Residential	0.318	0.00014
R1263	477,600	3,751,975	Residential	0.310	0.00013
R1264	477,625	3,751,975	Residential	0.303	0.00013
R1265	477,650	3,751,975	Residential	0.297	0.00013
R1266	477,675	3,751,975	Residential	0.291	0.00013
R1267	473,700	3,752,000	Worker	0.043	0.00038
R1268	473,725	3,752,000	Worker	0.047	0.00042
R1269	473,750	3,752,000	Worker	0.053	0.00048
R1270	473,775	3,752,000	Worker	0.060	0.00054
R1271	473,800	3,752,000	Worker	0.069	0.00063
R1272	473,825	3,752,000	Worker	0.082	0.00074
R1273	473,850	3,752,000	Worker	0.101	0.00092
R1274	473,875	3,752,000	Worker	0.133	0.00121
R1275	474,350	3,752,000	Worker	0.115	0.00104
R1276	474,375	3,752,000	Worker	0.100	0.00090
R1277	474,400	3,752,000	Worker	0.092	0.00083
R1278	474,425	3,752,000	Worker	0.087	0.00078
R1279	474,450	3,752,000	Worker	0.084	0.00075
R1280	474,475	3,752,000	Worker	0.081	0.00072
R1281	474,500	3,752,000	Worker	0.079	0.00071
R1282	474,525	3,752,000	Worker	0.078	0.00069
R1283	474,550	3,752,000	Worker	0.077	0.00068
R1284	474,575	3,752,000	Worker	0.076	0.00067
R1285	474,600	3,752,000	Worker	0.075	0.00066
R1286	474,625	3,752,000	Worker	0.074	0.00065
R1287	475,075	3,752,000	Worker	0.088	0.00071
R1288	475,100	3,752,000	Worker	0.091	0.00073
R1289	475,125	3,752,000	Worker	0.095	0.00075
R1290	475,150	3,752,000	Worker	0.098	0.00077
R1291	475,175	3,752,000	Worker	0.102	0.00080
R1292	475,200	3,752,000	Worker	0.106	0.00082
R1293	475,225	3,752,000	Worker	0.109	0.00084
R1294	475,250	3,752,000	Worker	0.112	0.00086
R1295	475,275	3,752,000	Worker	0.114	0.00088
R1296	475,300	3,752,000	Worker	0.115	0.00088
R1297	475,325	3,752,000	Worker	0.114	0.00088
R1298	475,975	3,752,000	Worker	0.084	0.00064
R1299	476,000	3,752,000	Worker	0.083	0.00063
R1300	476,075	3,752,000	Worker	0.079	0.00059
R1301	476,100	3,752,000	Worker	0.077	0.00058
R1302	476,125	3,752,000	Worker	0.075	0.00056
R1303	476,150	3,752,000	Worker	0.073	0.00055
R1304	476,175	3,752,000	Worker	0.070	0.00053
R1305	476,200	3,752,000	Worker	0.068	0.00051

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1306	476,225	3,752,000	Worker	0.066	0.00050
R1307	476,250	3,752,000	Worker	0.064	0.00048
R1308	476,275	3,752,000	Worker	0.061	0.00047
R1309	476,300	3,752,000	Worker	0.059	0.00045
R1310	476,325	3,752,000	Worker	0.057	0.00044
R1311	477,175	3,752,000	Worker	0.023	0.00018
R1312	477,200	3,752,000	Worker	0.022	0.00018
R1313	477,225	3,752,000	Worker	0.022	0.00017
R1314	477,250	3,752,000	Worker	0.022	0.00017
R1315	477,275	3,752,000	Worker	0.021	0.00017
R1316	477,300	3,752,000	Worker	0.021	0.00017
R1317	477,325	3,752,000	Worker	0.020	0.00016
R1318	477,350	3,752,000	Worker	0.020	0.00016
R1319	477,375	3,752,000	Worker	0.020	0.00016
R1320	477,400	3,752,000	Worker	0.020	0.00016
R1321	477,425	3,752,000	Worker	0.020	0.00016
R1322	477,450	3,752,000	Worker	0.020	0.00016
R1323	477,500	3,752,000	Residential	0.362	0.00016
R1324	477,525	3,752,000	Residential	0.344	0.00015
R1325	477,550	3,752,000	Residential	0.331	0.00014
R1326	477,575	3,752,000	Residential	0.322	0.00014
R1327	477,600	3,752,000	Residential	0.314	0.00014
R1328	477,625	3,752,000	Residential	0.307	0.00013
R1329	477,650	3,752,000	Residential	0.301	0.00013
R1330	477,675	3,752,000	Residential	0.295	0.00013
R1331	473,700	3,752,025	Worker	0.042	0.00038
R1332	473,725	3,752,025	Worker	0.047	0.00042
R1333	473,750	3,752,025	Worker	0.052	0.00047
R1334	473,775	3,752,025	Worker	0.060	0.00054
R1335	473,800	3,752,025	Worker	0.070	0.00063
R1336	473,825	3,752,025	Worker	0.084	0.00076
R1337	473,850	3,752,025	Worker	0.105	0.00096
R1338	473,875	3,752,025	Worker	0.141	0.00129
R1339	474,350	3,752,025	Worker	0.135	0.00122
R1340	474,375	3,752,025	Worker	0.115	0.00104
R1341	474,400	3,752,025	Worker	0.105	0.00094
R1342	474,425	3,752,025	Worker	0.099	0.00088
R1343	474,450	3,752,025	Worker	0.094	0.00084
R1344	474,475	3,752,025	Worker	0.091	0.00081
R1345	474,500	3,752,025	Worker	0.089	0.00079
R1346	474,525	3,752,025	Worker	0.087	0.00077
R1347	474,550	3,752,025	Worker	0.085	0.00075
R1348	474,575	3,752,025	Worker	0.084	0.00074
R1349	474,600	3,752,025	Worker	0.083	0.00073
R1350	474,625	3,752,025	Worker	0.082	0.00072

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1351	474,650	3,752,025	Worker	0.081	0.00071
R1352	474,675	3,752,025	Worker	0.081	0.00071
R1353	474,700	3,752,025	Worker	0.080	0.00070
R1354	474,725	3,752,025	Worker	0.080	0.00070
R1355	474,750	3,752,025	Worker	0.080	0.00070
R1356	474,775	3,752,025	Worker	0.080	0.00069
R1357	474,800	3,752,025	Worker	0.080	0.00069
R1358	474,825	3,752,025	Worker	0.081	0.00069
R1359	474,850	3,752,025	Worker	0.081	0.00070
R1360	474,875	3,752,025	Worker	0.082	0.00070
R1361	474,900	3,752,025	Worker	0.083	0.00070
R1362	474,925	3,752,025	Worker	0.084	0.00071
R1363	474,950	3,752,025	Worker	0.085	0.00071
R1364	474,975	3,752,025	Worker	0.086	0.00072
R1365	475,000	3,752,025	Worker	0.088	0.00073
R1366	475,025	3,752,025	Worker	0.090	0.00074
R1367	475,050	3,752,025	Worker	0.093	0.00076
R1368	475,075	3,752,025	Worker	0.096	0.00078
R1369	475,100	3,752,025	Worker	0.099	0.00080
R1370	475,125	3,752,025	Worker	0.103	0.00082
R1371	475,150	3,752,025	Worker	0.108	0.00085
R1372	475,175	3,752,025	Worker	0.113	0.00088
R1373	475,200	3,752,025	Worker	0.119	0.00092
R1374	475,225	3,752,025	Worker	0.124	0.00095
R1375	475,250	3,752,025	Worker	0.130	0.00099
R1376	475,275	3,752,025	Worker	0.134	0.00102
R1377	475,300	3,752,025	Worker	0.136	0.00103
R1378	475,325	3,752,025	Worker	0.136	0.00104
R1379	475,975	3,752,025	Worker	0.101	0.00076
R1380	476,000	3,752,025	Worker	0.099	0.00075
R1381	476,075	3,752,025	Worker	0.092	0.00069
R1382	476,100	3,752,025	Worker	0.089	0.00066
R1383	476,125	3,752,025	Worker	0.085	0.00064
R1384	476,150	3,752,025	Worker	0.082	0.00062
R1385	476,175	3,752,025	Worker	0.079	0.00059
R1386	476,200	3,752,025	Worker	0.076	0.00057
R1387	476,225	3,752,025	Worker	0.073	0.00055
R1388	476,250	3,752,025	Worker	0.070	0.00052
R1389	476,275	3,752,025	Worker	0.067	0.00050
R1390	476,300	3,752,025	Worker	0.064	0.00048
R1391	476,325	3,752,025	Worker	0.062	0.00047
R1392	476,350	3,752,025	Worker	0.059	0.00045
R1393	476,375	3,752,025	Worker	0.057	0.00043
R1394	476,400	3,752,025	Worker	0.055	0.00042
R1395	476,425	3,752,025	Worker	0.053	0.00040

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1396	476,450	3,752,025	Worker	0.051	0.00039
R1397	476,475	3,752,025	Worker	0.049	0.00038
R1398	476,500	3,752,025	Worker	0.047	0.00036
R1399	476,525	3,752,025	Worker	0.046	0.00035
R1400	476,550	3,752,025	Worker	0.044	0.00034
R1401	476,575	3,752,025	Worker	0.043	0.00033
R1402	476,600	3,752,025	Worker	0.041	0.00032
R1403	476,625	3,752,025	Worker	0.040	0.00031
R1404	476,650	3,752,025	Worker	0.039	0.00030
R1405	476,675	3,752,025	Worker	0.038	0.00029
R1406	476,700	3,752,025	Worker	0.037	0.00029
R1407	476,725	3,752,025	Worker	0.036	0.00028
R1408	476,750	3,752,025	Worker	0.035	0.00027
R1409	476,775	3,752,025	Worker	0.034	0.00026
R1410	476,800	3,752,025	Worker	0.033	0.00026
R1411	476,825	3,752,025	Worker	0.032	0.00025
R1412	476,850	3,752,025	Worker	0.031	0.00024
R1413	476,875	3,752,025	Worker	0.031	0.00024
R1414	476,900	3,752,025	Worker	0.030	0.00023
R1415	476,925	3,752,025	Worker	0.029	0.00023
R1416	476,950	3,752,025	Worker	0.028	0.00022
R1417	476,975	3,752,025	Worker	0.028	0.00022
R1418	477,000	3,752,025	Worker	0.027	0.00021
R1419	477,025	3,752,025	Worker	0.027	0.00021
R1420	477,050	3,752,025	Worker	0.026	0.00020
R1421	477,075	3,752,025	Worker	0.025	0.00020
R1422	477,100	3,752,025	Worker	0.025	0.00020
R1423	477,125	3,752,025	Worker	0.024	0.00019
R1424	477,150	3,752,025	Worker	0.024	0.00019
R1425	477,175	3,752,025	Worker	0.023	0.00018
R1426	477,200	3,752,025	Worker	0.023	0.00018
R1427	477,225	3,752,025	Worker	0.022	0.00018
R1428	477,250	3,752,025	Worker	0.022	0.00017
R1429	477,275	3,752,025	Worker	0.022	0.00017
R1430	477,300	3,752,025	Worker	0.021	0.00017
R1431	477,325	3,752,025	Worker	0.021	0.00017
R1432	477,350	3,752,025	Worker	0.020	0.00016
R1433	477,375	3,752,025	Worker	0.020	0.00016
R1434	477,400	3,752,025	Worker	0.020	0.00016
R1435	477,425	3,752,025	Worker	0.020	0.00016
R1436	477,450	3,752,025	Worker	0.020	0.00016
R1437	477,500	3,752,025	Residential	0.367	0.00016
R1438	477,525	3,752,025	Residential	0.348	0.00015
R1439	477,550	3,752,025	Residential	0.335	0.00015
R1440	477,575	3,752,025	Residential	0.325	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1441	477,600	3,752,025	Residential	0.317	0.00014
R1442	477,625	3,752,025	Residential	0.310	0.00013
R1443	477,650	3,752,025	Residential	0.304	0.00013
R1444	477,675	3,752,025	Residential	0.298	0.00013
R1445	473,675	3,752,050	Worker	0.037	0.00034
R1446	473,700	3,752,050	Worker	0.041	0.00037
R1447	473,725	3,752,050	Worker	0.046	0.00041
R1448	473,750	3,752,050	Worker	0.051	0.00046
R1449	473,775	3,752,050	Worker	0.059	0.00053
R1450	473,800	3,752,050	Worker	0.068	0.00062
R1451	473,825	3,752,050	Worker	0.083	0.00075
R1452	473,850	3,752,050	Worker	0.106	0.00096
R1453	474,375	3,752,050	Worker	0.138	0.00125
R1454	474,400	3,752,050	Worker	0.123	0.00111
R1455	474,425	3,752,050	Worker	0.114	0.00102
R1456	474,450	3,752,050	Worker	0.108	0.00097
R1457	474,475	3,752,050	Worker	0.104	0.00093
R1458	474,500	3,752,050	Worker	0.101	0.00090
R1459	474,525	3,752,050	Worker	0.098	0.00087
R1460	474,550	3,752,050	Worker	0.096	0.00085
R1461	474,575	3,752,050	Worker	0.094	0.00084
R1462	474,600	3,752,050	Worker	0.093	0.00082
R1463	474,625	3,752,050	Worker	0.091	0.00081
R1464	474,650	3,752,050	Worker	0.091	0.00080
R1465	474,675	3,752,050	Worker	0.090	0.00079
R1466	474,700	3,752,050	Worker	0.089	0.00079
R1467	474,725	3,752,050	Worker	0.089	0.00078
R1468	474,750	3,752,050	Worker	0.089	0.00078
R1469	474,775	3,752,050	Worker	0.088	0.00077
R1470	474,800	3,752,050	Worker	0.089	0.00077
R1471	474,825	3,752,050	Worker	0.089	0.00077
R1472	474,850	3,752,050	Worker	0.089	0.00077
R1473	474,875	3,752,050	Worker	0.090	0.00077
R1474	474,900	3,752,050	Worker	0.091	0.00078
R1475	474,925	3,752,050	Worker	0.092	0.00078
R1476	474,950	3,752,050	Worker	0.093	0.00079
R1477	474,975	3,752,050	Worker	0.094	0.00080
R1478	475,000	3,752,050	Worker	0.096	0.00081
R1479	475,025	3,752,050	Worker	0.099	0.00082
R1480	475,050	3,752,050	Worker	0.101	0.00084
R1481	475,075	3,752,050	Worker	0.104	0.00085
R1482	475,100	3,752,050	Worker	0.108	0.00088
R1483	475,125	3,752,050	Worker	0.113	0.00091
R1484	475,150	3,752,050	Worker	0.118	0.00094
R1485	475,175	3,752,050	Worker	0.125	0.00098

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1486	475,200	3,752,050	Worker	0.133	0.00103
R1487	475,225	3,752,050	Worker	0.141	0.00108
R1488	475,250	3,752,050	Worker	0.151	0.00114
R1489	475,275	3,752,050	Worker	0.159	0.00119
R1490	475,300	3,752,050	Worker	0.165	0.00124
R1491	475,325	3,752,050	Worker	0.167	0.00126
R1492	475,975	3,752,050	Worker	0.125	0.00093
R1493	476,000	3,752,050	Worker	0.121	0.00090
R1494	476,075	3,752,050	Worker	0.107	0.00079
R1495	476,100	3,752,050	Worker	0.102	0.00076
R1496	476,125	3,752,050	Worker	0.097	0.00072
R1497	476,150	3,752,050	Worker	0.092	0.00069
R1498	476,175	3,752,050	Worker	0.088	0.00065
R1499	476,200	3,752,050	Worker	0.083	0.00062
R1500	476,225	3,752,050	Worker	0.079	0.00059
R1501	476,250	3,752,050	Worker	0.075	0.00057
R1502	476,275	3,752,050	Worker	0.072	0.00054
R1503	476,300	3,752,050	Worker	0.069	0.00052
R1504	476,325	3,752,050	Worker	0.066	0.00050
R1505	476,350	3,752,050	Worker	0.063	0.00048
R1506	476,375	3,752,050	Worker	0.060	0.00046
R1507	476,400	3,752,050	Worker	0.058	0.00044
R1508	476,425	3,752,050	Worker	0.055	0.00042
R1509	476,450	3,752,050	Worker	0.053	0.00041
R1510	476,475	3,752,050	Worker	0.051	0.00039
R1511	476,500	3,752,050	Worker	0.049	0.00038
R1512	476,525	3,752,050	Worker	0.048	0.00037
R1513	476,550	3,752,050	Worker	0.046	0.00035
R1514	476,575	3,752,050	Worker	0.044	0.00034
R1515	476,600	3,752,050	Worker	0.043	0.00033
R1516	476,625	3,752,050	Worker	0.041	0.00032
R1517	476,650	3,752,050	Worker	0.040	0.00031
R1518	476,675	3,752,050	Worker	0.039	0.00030
R1519	476,700	3,752,050	Worker	0.038	0.00029
R1520	476,725	3,752,050	Worker	0.037	0.00029
R1521	476,750	3,752,050	Worker	0.036	0.00028
R1522	476,775	3,752,050	Worker	0.035	0.00027
R1523	476,800	3,752,050	Worker	0.034	0.00026
R1524	476,825	3,752,050	Worker	0.033	0.00026
R1525	476,850	3,752,050	Worker	0.032	0.00025
R1526	476,875	3,752,050	Worker	0.031	0.00024
R1527	476,900	3,752,050	Worker	0.030	0.00024
R1528	476,925	3,752,050	Worker	0.030	0.00023
R1529	476,950	3,752,050	Worker	0.029	0.00023
R1530	476,975	3,752,050	Worker	0.028	0.00022

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1531	477,000	3,752,050	Worker	0.028	0.00022
R1532	477,025	3,752,050	Worker	0.027	0.00021
R1533	477,050	3,752,050	Worker	0.026	0.00021
R1534	477,075	3,752,050	Worker	0.026	0.00020
R1535	477,100	3,752,050	Worker	0.025	0.00020
R1536	477,125	3,752,050	Worker	0.025	0.00020
R1537	477,150	3,752,050	Worker	0.024	0.00019
R1538	477,175	3,752,050	Worker	0.024	0.00019
R1539	477,200	3,752,050	Worker	0.023	0.00018
R1540	477,225	3,752,050	Worker	0.023	0.00018
R1541	477,250	3,752,050	Worker	0.022	0.00018
R1542	477,275	3,752,050	Worker	0.022	0.00017
R1543	477,300	3,752,050	Worker	0.022	0.00017
R1544	477,325	3,752,050	Worker	0.021	0.00017
R1545	477,350	3,752,050	Worker	0.021	0.00017
R1546	477,375	3,752,050	Worker	0.020	0.00016
R1547	477,400	3,752,050	Worker	0.020	0.00016
R1548	477,425	3,752,050	Worker	0.020	0.00016
R1549	477,450	3,752,050	Worker	0.020	0.00016
R1550	477,500	3,752,050	Residential	0.372	0.00016
R1551	477,525	3,752,050	Residential	0.352	0.00015
R1552	477,550	3,752,050	Residential	0.339	0.00015
R1553	477,575	3,752,050	Residential	0.329	0.00014
R1554	477,600	3,752,050	Residential	0.321	0.00014
R1555	477,625	3,752,050	Residential	0.313	0.00014
R1556	477,650	3,752,050	Residential	0.306	0.00013
R1557	477,675	3,752,050	Residential	0.300	0.00013
R1558	473,675	3,752,075	Worker	0.036	0.00033
R1559	473,700	3,752,075	Worker	0.040	0.00036
R1560	473,725	3,752,075	Worker	0.044	0.00040
R1561	473,750	3,752,075	Worker	0.049	0.00044
R1562	473,775	3,752,075	Worker	0.056	0.00051
R1563	473,800	3,752,075	Worker	0.065	0.00059
R1564	473,825	3,752,075	Worker	0.078	0.00070
R1565	473,850	3,752,075	Worker	0.100	0.00091
R1566	474,375	3,752,075	Worker	0.175	0.00158
R1567	474,400	3,752,075	Worker	0.149	0.00135
R1568	474,425	3,752,075	Worker	0.136	0.00123
R1569	474,450	3,752,075	Worker	0.128	0.00115
R1570	474,475	3,752,075	Worker	0.122	0.00110
R1571	474,500	3,752,075	Worker	0.117	0.00105
R1572	474,525	3,752,075	Worker	0.113	0.00102
R1573	474,550	3,752,075	Worker	0.110	0.00099
R1574	474,575	3,752,075	Worker	0.108	0.00096
R1575	474,600	3,752,075	Worker	0.106	0.00094

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1576	474,625	3,752,075	Worker	0.104	0.00093
R1577	474,650	3,752,075	Worker	0.103	0.00091
R1578	474,675	3,752,075	Worker	0.102	0.00090
R1579	474,700	3,752,075	Worker	0.101	0.00089
R1580	474,725	3,752,075	Worker	0.100	0.00088
R1581	474,750	3,752,075	Worker	0.100	0.00088
R1582	474,775	3,752,075	Worker	0.099	0.00087
R1583	474,800	3,752,075	Worker	0.099	0.00087
R1584	474,825	3,752,075	Worker	0.100	0.00087
R1585	474,850	3,752,075	Worker	0.100	0.00087
R1586	474,875	3,752,075	Worker	0.100	0.00087
R1587	474,900	3,752,075	Worker	0.101	0.00088
R1588	474,925	3,752,075	Worker	0.102	0.00088
R1589	474,950	3,752,075	Worker	0.103	0.00089
R1590	474,975	3,752,075	Worker	0.105	0.00089
R1591	475,000	3,752,075	Worker	0.107	0.00090
R1592	475,025	3,752,075	Worker	0.109	0.00092
R1593	475,050	3,752,075	Worker	0.112	0.00093
R1594	475,075	3,752,075	Worker	0.115	0.00095
R1595	475,100	3,752,075	Worker	0.119	0.00098
R1596	475,125	3,752,075	Worker	0.124	0.00101
R1597	475,150	3,752,075	Worker	0.130	0.00104
R1598	475,175	3,752,075	Worker	0.138	0.00109
R1599	475,200	3,752,075	Worker	0.148	0.00115
R1600	475,225	3,752,075	Worker	0.160	0.00122
R1601	475,250	3,752,075	Worker	0.175	0.00131
R1602	475,275	3,752,075	Worker	0.191	0.00142
R1603	475,300	3,752,075	Worker	0.206	0.00151
R1604	475,325	3,752,075	Worker	0.215	0.00158
R1605	475,975	3,752,075	Worker	0.159	0.00116
R1606	476,000	3,752,075	Worker	0.150	0.00110
R1607	476,075	3,752,075	Worker	0.124	0.00091
R1608	476,100	3,752,075	Worker	0.116	0.00085
R1609	476,125	3,752,075	Worker	0.109	0.00080
R1610	476,150	3,752,075	Worker	0.102	0.00075
R1611	476,175	3,752,075	Worker	0.096	0.00071
R1612	476,200	3,752,075	Worker	0.090	0.00067
R1613	476,225	3,752,075	Worker	0.085	0.00064
R1614	476,250	3,752,075	Worker	0.081	0.00060
R1615	476,275	3,752,075	Worker	0.077	0.00057
R1616	476,300	3,752,075	Worker	0.073	0.00055
R1617	476,325	3,752,075	Worker	0.069	0.00052
R1618	476,350	3,752,075	Worker	0.066	0.00050
R1619	476,375	3,752,075	Worker	0.063	0.00048
R1620	476,400	3,752,075	Worker	0.060	0.00046

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1621	476,425	3,752,075	Worker	0.058	0.00044
R1622	476,450	3,752,075	Worker	0.055	0.00042
R1623	476,475	3,752,075	Worker	0.053	0.00041
R1624	476,500	3,752,075	Worker	0.051	0.00039
R1625	476,525	3,752,075	Worker	0.049	0.00038
R1626	476,550	3,752,075	Worker	0.047	0.00036
R1627	476,575	3,752,075	Worker	0.046	0.00035
R1628	476,600	3,752,075	Worker	0.044	0.00034
R1629	476,625	3,752,075	Worker	0.043	0.00033
R1630	476,650	3,752,075	Worker	0.041	0.00032
R1631	476,675	3,752,075	Worker	0.040	0.00031
R1632	476,700	3,752,075	Worker	0.039	0.00030
R1633	476,725	3,752,075	Worker	0.038	0.00029
R1634	476,750	3,752,075	Worker	0.037	0.00028
R1635	476,775	3,752,075	Worker	0.035	0.00028
R1636	476,800	3,752,075	Worker	0.035	0.00027
R1637	476,825	3,752,075	Worker	0.034	0.00026
R1638	476,850	3,752,075	Worker	0.033	0.00026
R1639	476,875	3,752,075	Worker	0.032	0.00025
R1640	476,900	3,752,075	Worker	0.031	0.00024
R1641	476,925	3,752,075	Worker	0.030	0.00024
R1642	476,950	3,752,075	Worker	0.030	0.00023
R1643	476,975	3,752,075	Worker	0.029	0.00023
R1644	477,000	3,752,075	Worker	0.028	0.00022
R1645	477,025	3,752,075	Worker	0.028	0.00022
R1646	477,050	3,752,075	Worker	0.027	0.00021
R1647	477,075	3,752,075	Worker	0.026	0.00021
R1648	477,100	3,752,075	Worker	0.026	0.00020
R1649	477,125	3,752,075	Worker	0.025	0.00020
R1650	477,150	3,752,075	Worker	0.025	0.00020
R1651	477,175	3,752,075	Worker	0.024	0.00019
R1652	477,200	3,752,075	Worker	0.024	0.00019
R1653	477,225	3,752,075	Worker	0.023	0.00019
R1654	477,250	3,752,075	Worker	0.023	0.00018
R1655	477,275	3,752,075	Worker	0.022	0.00018
R1656	477,300	3,752,075	Worker	0.022	0.00017
R1657	477,325	3,752,075	Worker	0.022	0.00017
R1658	477,350	3,752,075	Worker	0.021	0.00017
R1659	477,375	3,752,075	Worker	0.021	0.00017
R1660	477,400	3,752,075	Worker	0.021	0.00016
R1661	477,425	3,752,075	Worker	0.020	0.00016
R1662	477,450	3,752,075	Worker	0.021	0.00017
R1663	477,500	3,752,075	Residential	0.376	0.00016
R1664	477,525	3,752,075	Residential	0.356	0.00015
R1665	477,550	3,752,075	Residential	0.343	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1666	477,575	3,752,075	Residential	0.333	0.00014
R1667	477,600	3,752,075	Residential	0.324	0.00014
R1668	477,625	3,752,075	Residential	0.316	0.00014
R1669	477,650	3,752,075	Residential	0.309	0.00013
R1670	477,675	3,752,075	Residential	0.302	0.00013
R1671	473,675	3,752,100	Worker	0.035	0.00032
R1672	473,700	3,752,100	Worker	0.039	0.00035
R1673	473,725	3,752,100	Worker	0.043	0.00038
R1674	473,750	3,752,100	Worker	0.047	0.00043
R1675	473,775	3,752,100	Worker	0.053	0.00048
R1676	473,800	3,752,100	Worker	0.061	0.00055
R1677	473,825	3,752,100	Worker	0.071	0.00064
R1678	473,850	3,752,100	Worker	0.084	0.00076
R1679	474,400	3,752,100	Worker	0.199	0.00180
R1680	474,425	3,752,100	Worker	0.173	0.00157
R1681	474,450	3,752,100	Worker	0.159	0.00144
R1682	474,475	3,752,100	Worker	0.149	0.00135
R1683	474,500	3,752,100	Worker	0.141	0.00128
R1684	474,525	3,752,100	Worker	0.135	0.00122
R1685	474,550	3,752,100	Worker	0.131	0.00117
R1686	474,575	3,752,100	Worker	0.127	0.00114
R1687	474,600	3,752,100	Worker	0.124	0.00111
R1688	474,625	3,752,100	Worker	0.121	0.00109
R1689	474,650	3,752,100	Worker	0.119	0.00107
R1690	474,675	3,752,100	Worker	0.117	0.00105
R1691	474,700	3,752,100	Worker	0.116	0.00103
R1692	474,725	3,752,100	Worker	0.115	0.00102
R1693	474,750	3,752,100	Worker	0.114	0.00101
R1694	474,775	3,752,100	Worker	0.114	0.00101
R1695	474,800	3,752,100	Worker	0.114	0.00101
R1696	474,825	3,752,100	Worker	0.114	0.00100
R1697	474,850	3,752,100	Worker	0.114	0.00100
R1698	474,875	3,752,100	Worker	0.115	0.00101
R1699	474,900	3,752,100	Worker	0.116	0.00101
R1700	474,925	3,752,100	Worker	0.116	0.00101
R1701	474,950	3,752,100	Worker	0.118	0.00102
R1702	474,975	3,752,100	Worker	0.119	0.00103
R1703	475,000	3,752,100	Worker	0.121	0.00104
R1704	475,025	3,752,100	Worker	0.123	0.00105
R1705	475,050	3,752,100	Worker	0.126	0.00106
R1706	475,075	3,752,100	Worker	0.129	0.00108
R1707	475,100	3,752,100	Worker	0.133	0.00111
R1708	475,125	3,752,100	Worker	0.138	0.00113
R1709	475,150	3,752,100	Worker	0.145	0.00117
R1710	475,175	3,752,100	Worker	0.153	0.00123

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1711	475,200	3,752,100	Worker	0.165	0.00129
R1712	475,225	3,752,100	Worker	0.180	0.00139
R1713	475,250	3,752,100	Worker	0.201	0.00151
R1714	475,275	3,752,100	Worker	0.229	0.00168
R1715	475,300	3,752,100	Worker	0.264	0.00189
R1716	475,325	3,752,100	Worker	0.296	0.00209
R1717	475,975	3,752,100	Worker	0.204	0.00146
R1718	476,000	3,752,100	Worker	0.186	0.00133
R1719	476,075	3,752,100	Worker	0.141	0.00103
R1720	476,100	3,752,100	Worker	0.130	0.00095
R1721	476,125	3,752,100	Worker	0.120	0.00088
R1722	476,150	3,752,100	Worker	0.111	0.00082
R1723	476,175	3,752,100	Worker	0.103	0.00076
R1724	476,200	3,752,100	Worker	0.097	0.00072
R1725	476,225	3,752,100	Worker	0.091	0.00067
R1726	476,250	3,752,100	Worker	0.085	0.00064
R1727	476,275	3,752,100	Worker	0.080	0.00060
R1728	476,300	3,752,100	Worker	0.076	0.00057
R1729	476,325	3,752,100	Worker	0.072	0.00054
R1730	476,350	3,752,100	Worker	0.069	0.00052
R1731	476,375	3,752,100	Worker	0.065	0.00050
R1732	476,400	3,752,100	Worker	0.062	0.00047
R1733	476,425	3,752,100	Worker	0.060	0.00046
R1734	476,450	3,752,100	Worker	0.057	0.00044
R1735	476,475	3,752,100	Worker	0.055	0.00042
R1736	476,500	3,752,100	Worker	0.053	0.00040
R1737	476,525	3,752,100	Worker	0.051	0.00039
R1738	476,550	3,752,100	Worker	0.049	0.00038
R1739	476,575	3,752,100	Worker	0.047	0.00036
R1740	476,600	3,752,100	Worker	0.045	0.00035
R1741	476,625	3,752,100	Worker	0.044	0.00034
R1742	476,650	3,752,100	Worker	0.042	0.00033
R1743	476,675	3,752,100	Worker	0.041	0.00032
R1744	476,700	3,752,100	Worker	0.040	0.00031
R1745	476,725	3,752,100	Worker	0.038	0.00030
R1746	476,750	3,752,100	Worker	0.037	0.00029
R1747	476,775	3,752,100	Worker	0.036	0.00028
R1748	476,800	3,752,100	Worker	0.035	0.00028
R1749	476,825	3,752,100	Worker	0.034	0.00027
R1750	476,850	3,752,100	Worker	0.033	0.00026
R1751	476,875	3,752,100	Worker	0.033	0.00026
R1752	476,900	3,752,100	Worker	0.032	0.00025
R1753	476,925	3,752,100	Worker	0.031	0.00024
R1754	476,950	3,752,100	Worker	0.030	0.00024
R1755	476,975	3,752,100	Worker	0.029	0.00023

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1756	477,000	3,752,100	Worker	0.029	0.00023
R1757	477,025	3,752,100	Worker	0.028	0.00022
R1758	477,050	3,752,100	Worker	0.027	0.00022
R1759	477,075	3,752,100	Worker	0.027	0.00021
R1760	477,100	3,752,100	Worker	0.026	0.00021
R1761	477,125	3,752,100	Worker	0.026	0.00021
R1762	477,150	3,752,100	Worker	0.025	0.00020
R1763	477,175	3,752,100	Worker	0.025	0.00020
R1764	477,200	3,752,100	Worker	0.024	0.00019
R1765	477,225	3,752,100	Worker	0.024	0.00019
R1766	477,250	3,752,100	Worker	0.023	0.00019
R1767	477,275	3,752,100	Worker	0.023	0.00018
R1768	477,300	3,752,100	Worker	0.022	0.00018
R1769	477,325	3,752,100	Worker	0.022	0.00018
R1770	477,350	3,752,100	Worker	0.022	0.00017
R1771	477,375	3,752,100	Worker	0.021	0.00017
R1772	477,400	3,752,100	Worker	0.021	0.00017
R1773	477,425	3,752,100	Worker	0.021	0.00017
R1774	477,450	3,752,100	Worker	0.021	0.00017
R1775	477,500	3,752,100	Residential	0.382	0.00017
R1776	477,525	3,752,100	Residential	0.361	0.00016
R1777	477,550	3,752,100	Residential	0.347	0.00015
R1778	477,575	3,752,100	Residential	0.337	0.00015
R1779	477,600	3,752,100	Residential	0.327	0.00014
R1780	477,625	3,752,100	Residential	0.319	0.00014
R1781	477,650	3,752,100	Residential	0.312	0.00014
R1782	477,675	3,752,100	Residential	0.305	0.00013
R1783	473,700	3,752,125	Worker	0.037	0.00033
R1784	473,725	3,752,125	Worker	0.041	0.00037
R1785	473,750	3,752,125	Worker	0.045	0.00041
R1786	473,775	3,752,125	Worker	0.050	0.00045
R1787	473,800	3,752,125	Worker	0.057	0.00052
R1788	473,825	3,752,125	Worker	0.065	0.00059
R1789	473,850	3,752,125	Worker	0.075	0.00068
R1790	474,425	3,752,125	Worker	0.246	0.00223
R1791	474,450	3,752,125	Worker	0.213	0.00194
R1792	474,475	3,752,125	Worker	0.194	0.00176
R1793	474,500	3,752,125	Worker	0.180	0.00163
R1794	474,525	3,752,125	Worker	0.170	0.00154
R1795	474,550	3,752,125	Worker	0.162	0.00146
R1796	474,575	3,752,125	Worker	0.156	0.00140
R1797	474,600	3,752,125	Worker	0.151	0.00136
R1798	474,625	3,752,125	Worker	0.147	0.00132
R1799	474,650	3,752,125	Worker	0.143	0.00129
R1800	474,675	3,752,125	Worker	0.141	0.00126

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1801	474,700	3,752,125	Worker	0.139	0.00124
R1802	474,725	3,752,125	Worker	0.137	0.00122
R1803	474,750	3,752,125	Worker	0.136	0.00121
R1804	474,775	3,752,125	Worker	0.135	0.00121
R1805	474,800	3,752,125	Worker	0.135	0.00120
R1806	474,825	3,752,125	Worker	0.135	0.00120
R1807	474,850	3,752,125	Worker	0.135	0.00120
R1808	474,875	3,752,125	Worker	0.136	0.00120
R1809	474,900	3,752,125	Worker	0.136	0.00120
R1810	474,925	3,752,125	Worker	0.137	0.00120
R1811	474,950	3,752,125	Worker	0.138	0.00121
R1812	474,975	3,752,125	Worker	0.140	0.00122
R1813	475,000	3,752,125	Worker	0.141	0.00122
R1814	475,025	3,752,125	Worker	0.143	0.00124
R1815	475,050	3,752,125	Worker	0.146	0.00125
R1816	475,075	3,752,125	Worker	0.149	0.00127
R1817	475,100	3,752,125	Worker	0.152	0.00129
R1818	475,125	3,752,125	Worker	0.157	0.00131
R1819	475,150	3,752,125	Worker	0.163	0.00135
R1820	475,175	3,752,125	Worker	0.172	0.00140
R1821	475,200	3,752,125	Worker	0.184	0.00147
R1822	475,225	3,752,125	Worker	0.201	0.00157
R1823	475,250	3,752,125	Worker	0.226	0.00173
R1824	475,275	3,752,125	Worker	0.266	0.00196
R1825	475,300	3,752,125	Worker	0.331	0.00234
R1826	475,325	3,752,125	Worker	0.430	0.00292
R1827	475,975	3,752,125	Worker	0.258	0.00181
R1828	476,000	3,752,125	Worker	0.224	0.00158
R1829	476,075	3,752,125	Worker	0.156	0.00113
R1830	476,100	3,752,125	Worker	0.141	0.00102
R1831	476,125	3,752,125	Worker	0.129	0.00094
R1832	476,150	3,752,125	Worker	0.118	0.00087
R1833	476,175	3,752,125	Worker	0.109	0.00080
R1834	476,200	3,752,125	Worker	0.101	0.00075
R1835	476,225	3,752,125	Worker	0.095	0.00070
R1836	476,250	3,752,125	Worker	0.089	0.00066
R1837	476,275	3,752,125	Worker	0.083	0.00062
R1838	476,300	3,752,125	Worker	0.079	0.00059
R1839	476,325	3,752,125	Worker	0.074	0.00056
R1840	476,350	3,752,125	Worker	0.071	0.00054
R1841	476,375	3,752,125	Worker	0.067	0.00051
R1842	476,400	3,752,125	Worker	0.064	0.00049
R1843	476,425	3,752,125	Worker	0.061	0.00047
R1844	476,450	3,752,125	Worker	0.059	0.00045
R1845	476,475	3,752,125	Worker	0.056	0.00043

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1846	476,500	3,752,125	Worker	0.054	0.00042
R1847	476,525	3,752,125	Worker	0.052	0.00040
R1848	476,550	3,752,125	Worker	0.050	0.00039
R1849	476,575	3,752,125	Worker	0.048	0.00037
R1850	476,600	3,752,125	Worker	0.046	0.00036
R1851	476,625	3,752,125	Worker	0.045	0.00035
R1852	476,650	3,752,125	Worker	0.043	0.00034
R1853	476,675	3,752,125	Worker	0.042	0.00033
R1854	476,700	3,752,125	Worker	0.040	0.00032
R1855	476,725	3,752,125	Worker	0.039	0.00031
R1856	476,750	3,752,125	Worker	0.038	0.00030
R1857	476,775	3,752,125	Worker	0.037	0.00029
R1858	476,800	3,752,125	Worker	0.036	0.00028
R1859	476,825	3,752,125	Worker	0.035	0.00028
R1860	476,850	3,752,125	Worker	0.034	0.00027
R1861	476,875	3,752,125	Worker	0.033	0.00026
R1862	476,900	3,752,125	Worker	0.032	0.00026
R1863	476,925	3,752,125	Worker	0.032	0.00025
R1864	476,950	3,752,125	Worker	0.031	0.00024
R1865	476,975	3,752,125	Worker	0.030	0.00024
R1866	477,000	3,752,125	Worker	0.029	0.00023
R1867	477,025	3,752,125	Worker	0.029	0.00023
R1868	477,050	3,752,125	Worker	0.028	0.00022
R1869	477,075	3,752,125	Worker	0.028	0.00022
R1870	477,100	3,752,125	Worker	0.027	0.00022
R1871	477,125	3,752,125	Worker	0.026	0.00021
R1872	477,150	3,752,125	Worker	0.026	0.00021
R1873	477,175	3,752,125	Worker	0.025	0.00020
R1874	477,200	3,752,125	Worker	0.025	0.00020
R1875	477,225	3,752,125	Worker	0.024	0.00020
R1876	477,250	3,752,125	Worker	0.024	0.00019
R1877	477,275	3,752,125	Worker	0.023	0.00019
R1878	477,300	3,752,125	Worker	0.023	0.00019
R1879	477,325	3,752,125	Worker	0.023	0.00018
R1880	477,350	3,752,125	Worker	0.022	0.00018
R1881	477,375	3,752,125	Worker	0.022	0.00018
R1882	477,400	3,752,125	Worker	0.021	0.00017
R1883	477,425	3,752,125	Worker	0.021	0.00017
R1884	477,450	3,752,125	Worker	0.021	0.00017
R1885	477,500	3,752,125	Residential	0.389	0.00017
R1886	477,525	3,752,125	Residential	0.367	0.00016
R1887	477,550	3,752,125	Residential	0.353	0.00015
R1888	477,575	3,752,125	Residential	0.341	0.00015
R1889	477,600	3,752,125	Residential	0.331	0.00014
R1890	477,625	3,752,125	Residential	0.322	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1891	477,650	3,752,125	Residential	0.314	0.00014
R1892	477,675	3,752,125	Residential	0.306	0.00013
R1893	473,700	3,752,150	Worker	0.035	0.00032
R1894	473,725	3,752,150	Worker	0.039	0.00035
R1895	473,750	3,752,150	Worker	0.043	0.00039
R1896	473,775	3,752,150	Worker	0.048	0.00043
R1897	473,800	3,752,150	Worker	0.054	0.00049
R1898	473,825	3,752,150	Worker	0.061	0.00055
R1899	473,850	3,752,150	Worker	0.070	0.00063
R1900	474,450	3,752,150	Worker	0.335	0.00305
R1901	474,475	3,752,150	Worker	0.288	0.00262
R1902	474,500	3,752,150	Worker	0.257	0.00234
R1903	474,525	3,752,150	Worker	0.236	0.00214
R1904	474,550	3,752,150	Worker	0.219	0.00199
R1905	474,575	3,752,150	Worker	0.206	0.00186
R1906	474,600	3,752,150	Worker	0.195	0.00177
R1907	474,625	3,752,150	Worker	0.188	0.00170
R1908	474,650	3,752,150	Worker	0.182	0.00164
R1909	474,675	3,752,150	Worker	0.178	0.00160
R1910	474,700	3,752,150	Worker	0.174	0.00157
R1911	474,725	3,752,150	Worker	0.172	0.00155
R1912	474,750	3,752,150	Worker	0.171	0.00153
R1913	474,775	3,752,150	Worker	0.170	0.00153
R1914	474,800	3,752,150	Worker	0.170	0.00152
R1915	474,825	3,752,150	Worker	0.170	0.00152
R1916	474,850	3,752,150	Worker	0.170	0.00151
R1917	474,875	3,752,150	Worker	0.170	0.00151
R1918	474,900	3,752,150	Worker	0.170	0.00151
R1919	474,925	3,752,150	Worker	0.171	0.00151
R1920	474,950	3,752,150	Worker	0.171	0.00151
R1921	474,975	3,752,150	Worker	0.172	0.00152
R1922	475,000	3,752,150	Worker	0.174	0.00153
R1923	475,025	3,752,150	Worker	0.175	0.00153
R1924	475,050	3,752,150	Worker	0.177	0.00154
R1925	475,075	3,752,150	Worker	0.180	0.00156
R1926	475,100	3,752,150	Worker	0.183	0.00158
R1927	475,125	3,752,150	Worker	0.187	0.00160
R1928	475,150	3,752,150	Worker	0.193	0.00163
R1929	475,175	3,752,150	Worker	0.201	0.00168
R1930	475,200	3,752,150	Worker	0.212	0.00174
R1931	475,225	3,752,150	Worker	0.228	0.00183
R1932	475,250	3,752,150	Worker	0.253	0.00198
R1933	475,275	3,752,150	Worker	0.296	0.00224
R1934	475,300	3,752,150	Worker	0.380	0.00273
R1935	475,325	3,752,150	Worker	0.577	0.00386

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1936	476,075	3,752,150	Worker	0.166	0.00119
R1937	476,100	3,752,150	Worker	0.148	0.00107
R1938	476,125	3,752,150	Worker	0.134	0.00098
R1939	476,150	3,752,150	Worker	0.122	0.00090
R1940	476,175	3,752,150	Worker	0.112	0.00083
R1941	476,200	3,752,150	Worker	0.104	0.00077
R1942	476,225	3,752,150	Worker	0.097	0.00072
R1943	476,250	3,752,150	Worker	0.091	0.00068
R1944	476,275	3,752,150	Worker	0.085	0.00064
R1945	476,300	3,752,150	Worker	0.080	0.00061
R1946	476,325	3,752,150	Worker	0.076	0.00058
R1947	476,350	3,752,150	Worker	0.072	0.00055
R1948	476,375	3,752,150	Worker	0.069	0.00053
R1949	476,400	3,752,150	Worker	0.066	0.00050
R1950	476,425	3,752,150	Worker	0.063	0.00048
R1951	476,450	3,752,150	Worker	0.060	0.00046
R1952	476,475	3,752,150	Worker	0.058	0.00045
R1953	476,500	3,752,150	Worker	0.055	0.00043
R1954	476,525	3,752,150	Worker	0.053	0.00042
R1955	476,550	3,752,150	Worker	0.051	0.00040
R1956	476,575	3,752,150	Worker	0.050	0.00039
R1957	476,600	3,752,150	Worker	0.048	0.00037
R1958	476,625	3,752,150	Worker	0.046	0.00036
R1959	476,650	3,752,150	Worker	0.044	0.00035
R1960	476,675	3,752,150	Worker	0.043	0.00034
R1961	476,700	3,752,150	Worker	0.042	0.00033
R1962	476,725	3,752,150	Worker	0.040	0.00032
R1963	476,750	3,752,150	Worker	0.039	0.00031
R1964	476,775	3,752,150	Worker	0.038	0.00030
R1965	476,800	3,752,150	Worker	0.037	0.00029
R1966	476,825	3,752,150	Worker	0.036	0.00029
R1967	476,850	3,752,150	Worker	0.035	0.00028
R1968	476,875	3,752,150	Worker	0.034	0.00027
R1969	476,900	3,752,150	Worker	0.033	0.00027
R1970	476,925	3,752,150	Worker	0.033	0.00026
R1971	476,950	3,752,150	Worker	0.032	0.00025
R1972	476,975	3,752,150	Worker	0.031	0.00025
R1973	477,000	3,752,150	Worker	0.030	0.00024
R1974	477,025	3,752,150	Worker	0.030	0.00024
R1975	477,050	3,752,150	Worker	0.029	0.00023
R1976	477,075	3,752,150	Worker	0.028	0.00023
R1977	477,100	3,752,150	Worker	0.028	0.00022
R1978	477,125	3,752,150	Worker	0.027	0.00022
R1979	477,150	3,752,150	Worker	0.027	0.00022
R1980	477,175	3,752,150	Worker	0.026	0.00021

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R1981	477,200	3,752,150	Worker	0.026	0.00021
R1982	477,225	3,752,150	Worker	0.025	0.00021
R1983	477,250	3,752,150	Worker	0.025	0.00020
R1984	477,275	3,752,150	Worker	0.024	0.00020
R1985	477,300	3,752,150	Worker	0.024	0.00019
R1986	477,325	3,752,150	Worker	0.024	0.00019
R1987	477,350	3,752,150	Worker	0.023	0.00019
R1988	477,375	3,752,150	Worker	0.023	0.00018
R1989	477,400	3,752,150	Worker	0.022	0.00018
R1990	477,425	3,752,150	Worker	0.022	0.00018
R1991	477,450	3,752,150	Worker	0.022	0.00018
R1992	477,500	3,752,150	Residential	0.401	0.00018
R1993	477,525	3,752,150	Residential	0.377	0.00016
R1994	477,550	3,752,150	Residential	0.360	0.00016
R1995	477,575	3,752,150	Residential	0.347	0.00015
R1996	477,600	3,752,150	Residential	0.335	0.00015
R1997	477,625	3,752,150	Residential	0.325	0.00014
R1998	477,650	3,752,150	Residential	0.315	0.00014
R1999	477,675	3,752,150	Residential	0.307	0.00013
R2000	473,700	3,752,175	Worker	0.034	0.00030
R2001	473,725	3,752,175	Worker	0.037	0.00033
R2002	473,750	3,752,175	Worker	0.041	0.00037
R2003	473,775	3,752,175	Worker	0.046	0.00041
R2004	473,800	3,752,175	Worker	0.051	0.00046
R2005	473,825	3,752,175	Worker	0.058	0.00053
R2006	473,850	3,752,175	Worker	0.067	0.00061
R2007	474,075	3,752,175	Worker	0.193	0.00176
R2008	474,100	3,752,175	Worker	0.164	0.00149
R2009	474,125	3,752,175	Worker	0.152	0.00138
R2010	474,150	3,752,175	Worker	0.147	0.00134
R2011	474,175	3,752,175	Worker	0.148	0.00135
R2012	474,200	3,752,175	Worker	0.155	0.00140
R2013	474,225	3,752,175	Worker	0.165	0.00150
R2014	474,250	3,752,175	Worker	0.179	0.00163
R2015	474,275	3,752,175	Worker	0.200	0.00182
R2016	474,300	3,752,175	Worker	0.230	0.00210
R2017	474,325	3,752,175	Worker	0.268	0.00244
R2018	474,350	3,752,175	Worker	0.322	0.00294
R2019	474,525	3,752,175	Worker	0.410	0.00374
R2020	474,550	3,752,175	Worker	0.356	0.00324
R2021	474,575	3,752,175	Worker	0.317	0.00288
R2022	474,600	3,752,175	Worker	0.289	0.00262
R2023	474,625	3,752,175	Worker	0.270	0.00245
R2024	474,650	3,752,175	Worker	0.257	0.00233
R2025	474,675	3,752,175	Worker	0.248	0.00225

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2026	474,700	3,752,175	Worker	0.243	0.00220
R2027	474,725	3,752,175	Worker	0.240	0.00217
R2028	474,750	3,752,175	Worker	0.238	0.00215
R2029	474,775	3,752,175	Worker	0.237	0.00214
R2030	474,800	3,752,175	Worker	0.236	0.00213
R2031	474,825	3,752,175	Worker	0.235	0.00212
R2032	474,850	3,752,175	Worker	0.235	0.00211
R2033	474,875	3,752,175	Worker	0.234	0.00210
R2034	474,900	3,752,175	Worker	0.234	0.00210
R2035	474,925	3,752,175	Worker	0.234	0.00210
R2036	474,950	3,752,175	Worker	0.234	0.00209
R2037	474,975	3,752,175	Worker	0.235	0.00209
R2038	475,000	3,752,175	Worker	0.235	0.00209
R2039	475,025	3,752,175	Worker	0.236	0.00209
R2040	475,050	3,752,175	Worker	0.237	0.00210
R2041	475,075	3,752,175	Worker	0.239	0.00210
R2042	475,100	3,752,175	Worker	0.241	0.00211
R2043	475,125	3,752,175	Worker	0.244	0.00213
R2044	475,150	3,752,175	Worker	0.248	0.00215
R2045	475,175	3,752,175	Worker	0.254	0.00218
R2046	475,200	3,752,175	Worker	0.263	0.00223
R2047	475,225	3,752,175	Worker	0.275	0.00230
R2048	475,250	3,752,175	Worker	0.295	0.00241
R2049	475,275	3,752,175	Worker	0.328	0.00261
R2050	475,300	3,752,175	Worker	0.392	0.00299
R2051	475,325	3,752,175	Worker	0.543	0.00388
R2052	476,075	3,752,175	Worker	0.168	0.00121
R2053	476,100	3,752,175	Worker	0.150	0.00109
R2054	476,125	3,752,175	Worker	0.136	0.00100
R2055	476,150	3,752,175	Worker	0.124	0.00092
R2056	476,175	3,752,175	Worker	0.114	0.00085
R2057	476,200	3,752,175	Worker	0.106	0.00079
R2058	476,225	3,752,175	Worker	0.099	0.00074
R2059	476,250	3,752,175	Worker	0.092	0.00070
R2060	476,275	3,752,175	Worker	0.087	0.00066
R2061	476,300	3,752,175	Worker	0.082	0.00063
R2062	476,325	3,752,175	Worker	0.078	0.00060
R2063	476,350	3,752,175	Worker	0.074	0.00057
R2064	476,375	3,752,175	Worker	0.071	0.00055
R2065	476,400	3,752,175	Worker	0.068	0.00053
R2066	476,425	3,752,175	Worker	0.065	0.00051
R2067	476,450	3,752,175	Worker	0.062	0.00049
R2068	476,475	3,752,175	Worker	0.060	0.00047
R2069	476,500	3,752,175	Worker	0.058	0.00045
R2070	476,525	3,752,175	Worker	0.056	0.00044

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2071	476,550	3,752,175	Worker	0.054	0.00043
R2072	476,575	3,752,175	Worker	0.052	0.00041
R2073	476,600	3,752,175	Worker	0.050	0.00040
R2074	476,625	3,752,175	Worker	0.049	0.00039
R2075	476,650	3,752,175	Worker	0.047	0.00037
R2076	476,675	3,752,175	Worker	0.045	0.00036
R2077	476,700	3,752,175	Worker	0.044	0.00035
R2078	476,725	3,752,175	Worker	0.042	0.00034
R2079	476,750	3,752,175	Worker	0.041	0.00033
R2080	476,775	3,752,175	Worker	0.040	0.00032
R2081	476,800	3,752,175	Worker	0.039	0.00031
R2082	476,825	3,752,175	Worker	0.038	0.00030
R2083	476,850	3,752,175	Worker	0.037	0.00030
R2084	476,875	3,752,175	Worker	0.036	0.00029
R2085	476,900	3,752,175	Worker	0.035	0.00028
R2086	476,925	3,752,175	Worker	0.034	0.00028
R2087	476,950	3,752,175	Worker	0.033	0.00027
R2088	476,975	3,752,175	Worker	0.033	0.00026
R2089	477,000	3,752,175	Worker	0.032	0.00026
R2090	477,025	3,752,175	Worker	0.031	0.00025
R2091	477,050	3,752,175	Worker	0.031	0.00025
R2092	477,075	3,752,175	Worker	0.030	0.00025
R2093	477,100	3,752,175	Worker	0.030	0.00024
R2094	477,125	3,752,175	Worker	0.029	0.00024
R2095	477,150	3,752,175	Worker	0.029	0.00023
R2096	477,175	3,752,175	Worker	0.028	0.00023
R2097	477,200	3,752,175	Worker	0.028	0.00023
R2098	477,225	3,752,175	Worker	0.027	0.00022
R2099	477,250	3,752,175	Worker	0.027	0.00022
R2100	477,275	3,752,175	Worker	0.026	0.00022
R2101	477,300	3,752,175	Worker	0.026	0.00021
R2102	477,325	3,752,175	Worker	0.026	0.00021
R2103	477,350	3,752,175	Worker	0.025	0.00021
R2104	477,375	3,752,175	Worker	0.025	0.00020
R2105	477,400	3,752,175	Worker	0.024	0.00020
R2106	477,425	3,752,175	Worker	0.024	0.00020
R2107	477,450	3,752,175	Worker	0.024	0.00019
R2108	477,500	3,752,175	Residential	0.423	0.00019
R2109	477,525	3,752,175	Residential	0.392	0.00017
R2110	477,550	3,752,175	Residential	0.370	0.00016
R2111	477,575	3,752,175	Residential	0.353	0.00015
R2112	477,600	3,752,175	Residential	0.339	0.00015
R2113	477,625	3,752,175	Residential	0.326	0.00014
R2114	477,650	3,752,175	Residential	0.316	0.00014
R2115	477,675	3,752,175	Residential	0.307	0.00013

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2116	473,700	3,752,200	Worker	0.032	0.00029
R2117	473,725	3,752,200	Worker	0.035	0.00032
R2118	473,750	3,752,200	Worker	0.039	0.00035
R2119	473,775	3,752,200	Worker	0.043	0.00039
R2120	473,800	3,752,200	Worker	0.049	0.00044
R2121	473,825	3,752,200	Worker	0.056	0.00050
R2122	474,025	3,752,200	Worker	0.178	0.00162
R2123	474,050	3,752,200	Worker	0.141	0.00129
R2124	474,075	3,752,200	Worker	0.122	0.00111
R2125	474,100	3,752,200	Worker	0.112	0.00102
R2126	474,125	3,752,200	Worker	0.107	0.00097
R2127	474,150	3,752,200	Worker	0.105	0.00095
R2128	474,175	3,752,200	Worker	0.106	0.00096
R2129	474,200	3,752,200	Worker	0.108	0.00098
R2130	474,225	3,752,200	Worker	0.112	0.00101
R2131	474,250	3,752,200	Worker	0.117	0.00106
R2132	474,275	3,752,200	Worker	0.125	0.00113
R2133	474,300	3,752,200	Worker	0.134	0.00121
R2134	474,325	3,752,200	Worker	0.145	0.00131
R2135	474,350	3,752,200	Worker	0.158	0.00143
R2136	474,375	3,752,200	Worker	0.175	0.00159
R2137	474,400	3,752,200	Worker	0.195	0.00177
R2138	474,425	3,752,200	Worker	0.222	0.00202
R2139	474,450	3,752,200	Worker	0.257	0.00234
R2140	474,475	3,752,200	Worker	0.308	0.00281
R2141	474,650	3,752,200	Worker	0.452	0.00412
R2142	474,675	3,752,200	Worker	0.436	0.00397
R2143	474,700	3,752,200	Worker	0.431	0.00392
R2144	474,725	3,752,200	Worker	0.427	0.00389
R2145	474,750	3,752,200	Worker	0.423	0.00385
R2146	474,775	3,752,200	Worker	0.420	0.00382
R2147	474,800	3,752,200	Worker	0.416	0.00378
R2148	474,825	3,752,200	Worker	0.414	0.00376
R2149	474,850	3,752,200	Worker	0.411	0.00373
R2150	474,875	3,752,200	Worker	0.409	0.00371
R2151	474,900	3,752,200	Worker	0.405	0.00367
R2152	474,925	3,752,200	Worker	0.402	0.00364
R2153	474,950	3,752,200	Worker	0.399	0.00361
R2154	474,975	3,752,200	Worker	0.396	0.00358
R2155	475,000	3,752,200	Worker	0.394	0.00356
R2156	475,025	3,752,200	Worker	0.393	0.00354
R2157	475,050	3,752,200	Worker	0.392	0.00352
R2158	475,075	3,752,200	Worker	0.388	0.00348
R2159	475,100	3,752,200	Worker	0.387	0.00346
R2160	475,125	3,752,200	Worker	0.387	0.00345

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2161	475,150	3,752,200	Worker	0.388	0.00344
R2162	475,175	3,752,200	Worker	0.391	0.00345
R2163	475,200	3,752,200	Worker	0.395	0.00346
R2164	475,225	3,752,200	Worker	0.401	0.00349
R2165	475,250	3,752,200	Worker	0.412	0.00354
R2166	475,275	3,752,200	Worker	0.430	0.00364
R2167	475,300	3,752,200	Worker	0.460	0.00381
R2168	475,325	3,752,200	Worker	0.513	0.00414
R2169	476,075	3,752,200	Worker	0.166	0.00121
R2170	476,100	3,752,200	Worker	0.149	0.00111
R2171	476,125	3,752,200	Worker	0.136	0.00102
R2172	476,150	3,752,200	Worker	0.125	0.00094
R2173	476,175	3,752,200	Worker	0.116	0.00088
R2174	476,200	3,752,200	Worker	0.109	0.00083
R2175	476,225	3,752,200	Worker	0.102	0.00078
R2176	476,250	3,752,200	Worker	0.096	0.00074
R2177	476,275	3,752,200	Worker	0.091	0.00071
R2178	476,300	3,752,200	Worker	0.087	0.00068
R2179	476,325	3,752,200	Worker	0.083	0.00065
R2180	476,350	3,752,200	Worker	0.079	0.00062
R2181	476,375	3,752,200	Worker	0.076	0.00060
R2182	476,400	3,752,200	Worker	0.073	0.00058
R2183	476,425	3,752,200	Worker	0.071	0.00056
R2184	476,450	3,752,200	Worker	0.068	0.00054
R2185	476,475	3,752,200	Worker	0.066	0.00053
R2186	476,500	3,752,200	Worker	0.064	0.00051
R2187	476,525	3,752,200	Worker	0.062	0.00050
R2188	476,550	3,752,200	Worker	0.060	0.00048
R2189	476,575	3,752,200	Worker	0.058	0.00047
R2190	476,600	3,752,200	Worker	0.057	0.00046
R2191	476,625	3,752,200	Worker	0.055	0.00045
R2192	476,650	3,752,200	Worker	0.053	0.00043
R2193	476,675	3,752,200	Worker	0.051	0.00041
R2194	476,700	3,752,200	Worker	0.049	0.00040
R2195	476,725	3,752,200	Worker	0.047	0.00038
R2196	476,750	3,752,200	Worker	0.045	0.00037
R2197	476,775	3,752,200	Worker	0.044	0.00036
R2198	476,800	3,752,200	Worker	0.043	0.00035
R2199	476,825	3,752,200	Worker	0.042	0.00034
R2200	476,850	3,752,200	Worker	0.041	0.00034
R2201	476,875	3,752,200	Worker	0.040	0.00033
R2202	476,900	3,752,200	Worker	0.039	0.00032
R2203	476,925	3,752,200	Worker	0.039	0.00032
R2204	476,950	3,752,200	Worker	0.038	0.00031
R2205	476,975	3,752,200	Worker	0.037	0.00031

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2206	477,000	3,752,200	Worker	0.036	0.00030
R2207	477,025	3,752,200	Worker	0.036	0.00030
R2208	477,050	3,752,200	Worker	0.035	0.00029
R2209	477,075	3,752,200	Worker	0.035	0.00029
R2210	477,100	3,752,200	Worker	0.034	0.00028
R2211	477,125	3,752,200	Worker	0.034	0.00028
R2212	477,150	3,752,200	Worker	0.033	0.00028
R2213	477,175	3,752,200	Worker	0.033	0.00027
R2214	477,200	3,752,200	Worker	0.032	0.00027
R2215	477,225	3,752,200	Worker	0.032	0.00027
R2216	477,250	3,752,200	Worker	0.032	0.00026
R2217	477,275	3,752,200	Worker	0.031	0.00026
R2218	477,300	3,752,200	Worker	0.031	0.00026
R2219	477,325	3,752,200	Worker	0.030	0.00026
R2220	477,350	3,752,200	Worker	0.030	0.00025
R2221	477,375	3,752,200	Worker	0.030	0.00025
R2222	477,400	3,752,200	Worker	0.030	0.00025
R2223	477,425	3,752,200	Worker	0.029	0.00025
R2224	477,450	3,752,200	Worker	0.028	0.00024
R2225	477,500	3,752,200	Residential	0.465	0.00020
R2226	477,525	3,752,200	Residential	0.412	0.00018
R2227	477,550	3,752,200	Residential	0.379	0.00017
R2228	477,575	3,752,200	Residential	0.356	0.00016
R2229	477,600	3,752,200	Residential	0.339	0.00015
R2230	477,625	3,752,200	Residential	0.326	0.00014
R2231	477,650	3,752,200	Residential	0.314	0.00014
R2232	477,675	3,752,200	Residential	0.304	0.00013
R2233	473,700	3,752,225	Worker	0.031	0.00027
R2234	473,725	3,752,225	Worker	0.033	0.00030
R2235	473,750	3,752,225	Worker	0.037	0.00033
R2236	473,775	3,752,225	Worker	0.041	0.00037
R2237	473,800	3,752,225	Worker	0.046	0.00042
R2238	473,825	3,752,225	Worker	0.053	0.00048
R2239	474,000	3,752,225	Worker	0.151	0.00137
R2240	474,025	3,752,225	Worker	0.117	0.00106
R2241	474,050	3,752,225	Worker	0.100	0.00091
R2242	474,075	3,752,225	Worker	0.091	0.00082
R2243	474,100	3,752,225	Worker	0.086	0.00078
R2244	474,125	3,752,225	Worker	0.083	0.00075
R2245	474,150	3,752,225	Worker	0.082	0.00074
R2246	474,175	3,752,225	Worker	0.082	0.00074
R2247	474,200	3,752,225	Worker	0.083	0.00075
R2248	474,225	3,752,225	Worker	0.085	0.00077
R2249	474,250	3,752,225	Worker	0.088	0.00079
R2250	474,275	3,752,225	Worker	0.091	0.00082

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2251	474,300	3,752,225	Worker	0.096	0.00086
R2252	474,325	3,752,225	Worker	0.101	0.00091
R2253	474,350	3,752,225	Worker	0.107	0.00096
R2254	474,375	3,752,225	Worker	0.114	0.00103
R2255	474,400	3,752,225	Worker	0.122	0.00110
R2256	474,425	3,752,225	Worker	0.131	0.00119
R2257	474,450	3,752,225	Worker	0.143	0.00129
R2258	474,475	3,752,225	Worker	0.156	0.00141
R2259	474,500	3,752,225	Worker	0.172	0.00156
R2260	474,525	3,752,225	Worker	0.192	0.00174
R2261	474,550	3,752,225	Worker	0.218	0.00198
R2262	474,575	3,752,225	Worker	0.251	0.00228
R2263	474,600	3,752,225	Worker	0.295	0.00268
R2264	477,500	3,752,225	Residential	0.498	0.00022
R2265	477,525	3,752,225	Residential	0.419	0.00018
R2266	477,550	3,752,225	Residential	0.379	0.00017
R2267	477,575	3,752,225	Residential	0.354	0.00015
R2268	477,600	3,752,225	Residential	0.336	0.00015
R2269	477,625	3,752,225	Residential	0.322	0.00014
R2270	477,650	3,752,225	Residential	0.310	0.00013
R2271	477,675	3,752,225	Residential	0.300	0.00013
R2272	473,700	3,752,250	Worker	0.029	0.00026
R2273	473,725	3,752,250	Worker	0.031	0.00028
R2274	473,750	3,752,250	Worker	0.035	0.00031
R2275	473,775	3,752,250	Worker	0.039	0.00035
R2276	473,800	3,752,250	Worker	0.044	0.00039
R2277	473,825	3,752,250	Worker	0.050	0.00045
R2278	473,975	3,752,250	Worker	0.129	0.00117
R2279	474,000	3,752,250	Worker	0.100	0.00091
R2280	474,025	3,752,250	Worker	0.086	0.00078
R2281	474,050	3,752,250	Worker	0.077	0.00070
R2282	474,075	3,752,250	Worker	0.072	0.00065
R2283	474,100	3,752,250	Worker	0.069	0.00062
R2284	474,125	3,752,250	Worker	0.068	0.00061
R2285	474,150	3,752,250	Worker	0.067	0.00060
R2286	474,175	3,752,250	Worker	0.067	0.00060
R2287	474,200	3,752,250	Worker	0.068	0.00061
R2288	474,225	3,752,250	Worker	0.069	0.00062
R2289	474,250	3,752,250	Worker	0.070	0.00063
R2290	474,275	3,752,250	Worker	0.072	0.00065
R2291	474,300	3,752,250	Worker	0.075	0.00067
R2292	474,325	3,752,250	Worker	0.078	0.00070
R2293	474,350	3,752,250	Worker	0.081	0.00073
R2294	474,375	3,752,250	Worker	0.085	0.00076
R2295	474,400	3,752,250	Worker	0.089	0.00080

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2296	474,425	3,752,250	Worker	0.094	0.00085
R2297	474,450	3,752,250	Worker	0.099	0.00089
R2298	474,475	3,752,250	Worker	0.105	0.00095
R2299	474,500	3,752,250	Worker	0.112	0.00101
R2300	474,525	3,752,250	Worker	0.120	0.00108
R2301	474,550	3,752,250	Worker	0.129	0.00116
R2302	474,575	3,752,250	Worker	0.139	0.00126
R2303	474,600	3,752,250	Worker	0.151	0.00136
R2304	474,625	3,752,250	Worker	0.164	0.00148
R2305	474,650	3,752,250	Worker	0.176	0.00159
R2306	474,675	3,752,250	Worker	0.186	0.00168
R2307	474,700	3,752,250	Worker	0.195	0.00176
R2308	474,725	3,752,250	Worker	0.202	0.00182
R2309	474,750	3,752,250	Worker	0.207	0.00187
R2310	474,775	3,752,250	Worker	0.211	0.00191
R2311	474,800	3,752,250	Worker	0.215	0.00194
R2312	474,825	3,752,250	Worker	0.219	0.00197
R2313	474,850	3,752,250	Worker	0.222	0.00200
R2314	474,875	3,752,250	Worker	0.225	0.00203
R2315	474,900	3,752,250	Worker	0.228	0.00205
R2316	474,925	3,752,250	Worker	0.232	0.00208
R2317	474,950	3,752,250	Worker	0.235	0.00211
R2318	474,975	3,752,250	Worker	0.238	0.00214
R2319	475,000	3,752,250	Worker	0.242	0.00216
R2320	475,025	3,752,250	Worker	0.246	0.00220
R2321	475,050	3,752,250	Worker	0.250	0.00223
R2322	475,075	3,752,250	Worker	0.254	0.00226
R2323	475,100	3,752,250	Worker	0.259	0.00230
R2324	475,125	3,752,250	Worker	0.264	0.00234
R2325	475,150	3,752,250	Worker	0.270	0.00238
R2326	475,175	3,752,250	Worker	0.276	0.00243
R2327	475,200	3,752,250	Worker	0.283	0.00248
R2328	475,225	3,752,250	Worker	0.291	0.00253
R2329	475,250	3,752,250	Worker	0.300	0.00260
R2330	475,275	3,752,250	Worker	0.309	0.00266
R2331	475,300	3,752,250	Worker	0.318	0.00272
R2332	475,325	3,752,250	Worker	0.322	0.00274
R2333	475,350	3,752,250	Worker	0.316	0.00268
R2334	475,375	3,752,250	Worker	0.299	0.00253
R2335	475,400	3,752,250	Worker	0.285	0.00241
R2336	475,425	3,752,250	Worker	0.275	0.00232
R2337	475,450	3,752,250	Worker	0.269	0.00227
R2338	475,475	3,752,250	Worker	0.265	0.00223
R2339	475,500	3,752,250	Worker	0.263	0.00220
R2340	475,525	3,752,250	Worker	0.261	0.00219

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2341	475,550	3,752,250	Worker	0.260	0.00217
R2342	475,575	3,752,250	Worker	0.259	0.00216
R2343	475,600	3,752,250	Worker	0.259	0.00215
R2344	475,625	3,752,250	Worker	0.259	0.00215
R2345	475,650	3,752,250	Worker	0.259	0.00215
R2346	475,675	3,752,250	Worker	0.261	0.00215
R2347	475,700	3,752,250	Worker	0.264	0.00216
R2348	475,725	3,752,250	Worker	0.268	0.00218
R2349	475,750	3,752,250	Worker	0.275	0.00220
R2350	475,775	3,752,250	Worker	0.284	0.00224
R2351	475,800	3,752,250	Worker	0.296	0.00229
R2352	475,825	3,752,250	Worker	0.305	0.00232
R2353	475,875	3,752,250	Worker	0.264	0.00200
R2354	475,900	3,752,250	Worker	0.233	0.00175
R2355	475,925	3,752,250	Worker	0.214	0.00159
R2356	475,950	3,752,250	Worker	0.197	0.00145
R2357	475,975	3,752,250	Worker	0.179	0.00132
R2358	476,000	3,752,250	Worker	0.163	0.00121
R2359	476,025	3,752,250	Worker	0.149	0.00111
R2360	476,050	3,752,250	Worker	0.137	0.00102
R2361	476,075	3,752,250	Worker	0.126	0.00095
R2362	476,100	3,752,250	Worker	0.117	0.00088
R2363	476,125	3,752,250	Worker	0.109	0.00083
R2364	476,150	3,752,250	Worker	0.102	0.00078
R2365	476,175	3,752,250	Worker	0.096	0.00074
R2366	476,200	3,752,250	Worker	0.091	0.00070
R2367	476,225	3,752,250	Worker	0.086	0.00067
R2368	476,250	3,752,250	Worker	0.082	0.00064
R2369	476,275	3,752,250	Worker	0.078	0.00061
R2370	476,300	3,752,250	Worker	0.075	0.00058
R2371	476,325	3,752,250	Worker	0.072	0.00056
R2372	476,350	3,752,250	Worker	0.069	0.00054
R2373	476,375	3,752,250	Worker	0.066	0.00052
R2374	476,400	3,752,250	Worker	0.064	0.00051
R2375	476,425	3,752,250	Worker	0.062	0.00049
R2376	476,450	3,752,250	Worker	0.060	0.00047
R2377	476,475	3,752,250	Worker	0.058	0.00046
R2378	476,500	3,752,250	Worker	0.056	0.00045
R2379	476,525	3,752,250	Worker	0.054	0.00044
R2380	476,550	3,752,250	Worker	0.053	0.00042
R2381	476,575	3,752,250	Worker	0.052	0.00042
R2382	476,600	3,752,250	Worker	0.050	0.00041
R2383	476,625	3,752,250	Worker	0.050	0.00040
R2384	476,650	3,752,250	Worker	0.050	0.00041
R2385	476,700	3,752,250	Worker	0.045	0.00037

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2386	476,725	3,752,250	Worker	0.043	0.00035
R2387	476,750	3,752,250	Worker	0.041	0.00033
R2388	476,775	3,752,250	Worker	0.039	0.00032
R2389	476,800	3,752,250	Worker	0.038	0.00031
R2390	476,825	3,752,250	Worker	0.037	0.00030
R2391	476,850	3,752,250	Worker	0.036	0.00029
R2392	476,875	3,752,250	Worker	0.035	0.00029
R2393	476,900	3,752,250	Worker	0.034	0.00028
R2394	476,925	3,752,250	Worker	0.033	0.00027
R2395	476,950	3,752,250	Worker	0.033	0.00027
R2396	476,975	3,752,250	Worker	0.032	0.00026
R2397	477,000	3,752,250	Worker	0.031	0.00026
R2398	477,025	3,752,250	Worker	0.031	0.00025
R2399	477,050	3,752,250	Worker	0.030	0.00025
R2400	477,075	3,752,250	Worker	0.030	0.00024
R2401	477,100	3,752,250	Worker	0.029	0.00024
R2402	477,125	3,752,250	Worker	0.028	0.00023
R2403	477,150	3,752,250	Worker	0.028	0.00023
R2404	477,175	3,752,250	Worker	0.028	0.00023
R2405	477,200	3,752,250	Worker	0.027	0.00022
R2406	477,225	3,752,250	Worker	0.027	0.00022
R2407	477,250	3,752,250	Worker	0.026	0.00022
R2408	477,275	3,752,250	Worker	0.026	0.00021
R2409	477,300	3,752,250	Worker	0.026	0.00021
R2410	477,325	3,752,250	Worker	0.025	0.00021
R2411	477,350	3,752,250	Worker	0.025	0.00021
R2412	477,375	3,752,250	Worker	0.025	0.00020
R2413	477,400	3,752,250	Worker	0.024	0.00020
R2414	477,425	3,752,250	Worker	0.024	0.00020
R2415	477,450	3,752,250	Worker	0.025	0.00021
R2416	477,500	3,752,250	Residential	0.451	0.00020
R2417	477,525	3,752,250	Residential	0.399	0.00017
R2418	477,550	3,752,250	Residential	0.367	0.00016
R2419	477,575	3,752,250	Residential	0.345	0.00015
R2420	477,600	3,752,250	Residential	0.329	0.00014
R2421	477,625	3,752,250	Residential	0.315	0.00014
R2422	477,650	3,752,250	Residential	0.304	0.00013
R2423	477,675	3,752,250	Residential	0.295	0.00013
R2424	473,675	3,752,275	Worker	0.025	0.00022
R2425	473,700	3,752,275	Worker	0.027	0.00024
R2426	473,725	3,752,275	Worker	0.029	0.00026
R2427	473,750	3,752,275	Worker	0.032	0.00029
R2428	473,775	3,752,275	Worker	0.036	0.00032
R2429	473,800	3,752,275	Worker	0.041	0.00037
R2430	473,950	3,752,275	Worker	0.114	0.00104

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2431	473,975	3,752,275	Worker	0.087	0.00079
R2432	474,000	3,752,275	Worker	0.074	0.00067
R2433	474,025	3,752,275	Worker	0.066	0.00060
R2434	474,050	3,752,275	Worker	0.062	0.00056
R2435	474,075	3,752,275	Worker	0.059	0.00053
R2436	474,100	3,752,275	Worker	0.057	0.00051
R2437	474,125	3,752,275	Worker	0.056	0.00051
R2438	474,150	3,752,275	Worker	0.056	0.00050
R2439	474,175	3,752,275	Worker	0.056	0.00050
R2440	474,200	3,752,275	Worker	0.057	0.00051
R2441	474,225	3,752,275	Worker	0.057	0.00051
R2442	474,250	3,752,275	Worker	0.059	0.00052
R2443	474,275	3,752,275	Worker	0.060	0.00054
R2444	474,300	3,752,275	Worker	0.062	0.00055
R2445	474,325	3,752,275	Worker	0.063	0.00057
R2446	474,350	3,752,275	Worker	0.066	0.00059
R2447	474,375	3,752,275	Worker	0.068	0.00061
R2448	474,400	3,752,275	Worker	0.070	0.00063
R2449	474,425	3,752,275	Worker	0.073	0.00066
R2450	474,450	3,752,275	Worker	0.076	0.00068
R2451	474,475	3,752,275	Worker	0.080	0.00071
R2452	474,500	3,752,275	Worker	0.083	0.00075
R2453	474,525	3,752,275	Worker	0.087	0.00078
R2454	474,550	3,752,275	Worker	0.092	0.00082
R2455	474,575	3,752,275	Worker	0.096	0.00086
R2456	474,600	3,752,275	Worker	0.101	0.00091
R2457	474,625	3,752,275	Worker	0.106	0.00095
R2458	474,650	3,752,275	Worker	0.111	0.00099
R2459	474,675	3,752,275	Worker	0.115	0.00103
R2460	474,700	3,752,275	Worker	0.119	0.00107
R2461	474,725	3,752,275	Worker	0.123	0.00110
R2462	474,750	3,752,275	Worker	0.127	0.00113
R2463	474,775	3,752,275	Worker	0.130	0.00116
R2464	474,800	3,752,275	Worker	0.132	0.00118
R2465	474,825	3,752,275	Worker	0.135	0.00120
R2466	474,850	3,752,275	Worker	0.137	0.00122
R2467	474,875	3,752,275	Worker	0.139	0.00124
R2468	474,900	3,752,275	Worker	0.141	0.00126
R2469	474,925	3,752,275	Worker	0.143	0.00128
R2470	474,950	3,752,275	Worker	0.146	0.00129
R2471	474,975	3,752,275	Worker	0.148	0.00131
R2472	475,000	3,752,275	Worker	0.150	0.00133
R2473	475,025	3,752,275	Worker	0.152	0.00134
R2474	475,050	3,752,275	Worker	0.155	0.00136
R2475	475,075	3,752,275	Worker	0.158	0.00138

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2476	475,100	3,752,275	Worker	0.161	0.00140
R2477	475,125	3,752,275	Worker	0.164	0.00143
R2478	475,150	3,752,275	Worker	0.167	0.00145
R2479	475,175	3,752,275	Worker	0.171	0.00148
R2480	475,200	3,752,275	Worker	0.175	0.00150
R2481	475,225	3,752,275	Worker	0.179	0.00153
R2482	475,250	3,752,275	Worker	0.184	0.00156
R2483	475,275	3,752,275	Worker	0.188	0.00159
R2484	475,300	3,752,275	Worker	0.192	0.00161
R2485	475,325	3,752,275	Worker	0.193	0.00161
R2486	475,350	3,752,275	Worker	0.191	0.00159
R2487	475,375	3,752,275	Worker	0.187	0.00156
R2488	475,400	3,752,275	Worker	0.183	0.00153
R2489	475,425	3,752,275	Worker	0.180	0.00150
R2490	475,450	3,752,275	Worker	0.177	0.00148
R2491	475,475	3,752,275	Worker	0.176	0.00146
R2492	475,500	3,752,275	Worker	0.174	0.00145
R2493	475,525	3,752,275	Worker	0.174	0.00144
R2494	475,550	3,752,275	Worker	0.173	0.00143
R2495	475,575	3,752,275	Worker	0.173	0.00142
R2496	475,600	3,752,275	Worker	0.173	0.00142
R2497	475,625	3,752,275	Worker	0.173	0.00141
R2498	475,650	3,752,275	Worker	0.174	0.00141
R2499	475,675	3,752,275	Worker	0.175	0.00141
R2500	475,700	3,752,275	Worker	0.177	0.00141
R2501	475,725	3,752,275	Worker	0.179	0.00142
R2502	475,750	3,752,275	Worker	0.182	0.00143
R2503	475,775	3,752,275	Worker	0.185	0.00144
R2504	475,800	3,752,275	Worker	0.188	0.00144
R2505	475,825	3,752,275	Worker	0.187	0.00143
R2506	475,875	3,752,275	Worker	0.170	0.00131
R2507	475,900	3,752,275	Worker	0.153	0.00117
R2508	475,925	3,752,275	Worker	0.142	0.00108
R2509	475,950	3,752,275	Worker	0.134	0.00102
R2510	475,975	3,752,275	Worker	0.127	0.00096
R2511	476,000	3,752,275	Worker	0.120	0.00091
R2512	476,025	3,752,275	Worker	0.113	0.00086
R2513	476,050	3,752,275	Worker	0.107	0.00081
R2514	476,075	3,752,275	Worker	0.101	0.00076
R2515	476,100	3,752,275	Worker	0.095	0.00072
R2516	476,125	3,752,275	Worker	0.090	0.00068
R2517	476,150	3,752,275	Worker	0.085	0.00065
R2518	476,175	3,752,275	Worker	0.080	0.00061
R2519	476,200	3,752,275	Worker	0.076	0.00059
R2520	476,225	3,752,275	Worker	0.073	0.00056

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2521	476,250	3,752,275	Worker	0.069	0.00053
R2522	476,275	3,752,275	Worker	0.066	0.00051
R2523	476,300	3,752,275	Worker	0.063	0.00049
R2524	476,325	3,752,275	Worker	0.061	0.00047
R2525	476,350	3,752,275	Worker	0.059	0.00046
R2526	476,375	3,752,275	Worker	0.056	0.00044
R2527	476,400	3,752,275	Worker	0.054	0.00043
R2528	476,425	3,752,275	Worker	0.053	0.00041
R2529	476,450	3,752,275	Worker	0.051	0.00040
R2530	476,475	3,752,275	Worker	0.049	0.00039
R2531	476,500	3,752,275	Worker	0.048	0.00038
R2532	476,525	3,752,275	Worker	0.046	0.00037
R2533	476,550	3,752,275	Worker	0.045	0.00036
R2534	476,575	3,752,275	Worker	0.044	0.00035
R2535	476,600	3,752,275	Worker	0.043	0.00035
R2536	476,625	3,752,275	Worker	0.043	0.00034
R2537	476,650	3,752,275	Worker	0.044	0.00035
R2538	476,700	3,752,275	Worker	0.040	0.00032
R2539	476,725	3,752,275	Worker	0.038	0.00030
R2540	476,750	3,752,275	Worker	0.036	0.00029
R2541	476,775	3,752,275	Worker	0.035	0.00028
R2542	476,800	3,752,275	Worker	0.034	0.00027
R2543	476,825	3,752,275	Worker	0.033	0.00026
R2544	476,850	3,752,275	Worker	0.032	0.00026
R2545	476,875	3,752,275	Worker	0.031	0.00025
R2546	476,900	3,752,275	Worker	0.030	0.00024
R2547	476,925	3,752,275	Worker	0.029	0.00024
R2548	476,950	3,752,275	Worker	0.029	0.00023
R2549	476,975	3,752,275	Worker	0.028	0.00023
R2550	477,000	3,752,275	Worker	0.027	0.00022
R2551	477,025	3,752,275	Worker	0.027	0.00022
R2552	477,050	3,752,275	Worker	0.026	0.00021
R2553	477,075	3,752,275	Worker	0.026	0.00021
R2554	477,100	3,752,275	Worker	0.025	0.00021
R2555	477,125	3,752,275	Worker	0.025	0.00020
R2556	477,150	3,752,275	Worker	0.024	0.00020
R2557	477,175	3,752,275	Worker	0.024	0.00020
R2558	477,200	3,752,275	Worker	0.024	0.00019
R2559	477,225	3,752,275	Worker	0.023	0.00019
R2560	477,250	3,752,275	Worker	0.023	0.00019
R2561	477,275	3,752,275	Worker	0.023	0.00018
R2562	477,300	3,752,275	Worker	0.022	0.00018
R2563	477,325	3,752,275	Worker	0.022	0.00018
R2564	477,350	3,752,275	Worker	0.022	0.00018
R2565	477,375	3,752,275	Worker	0.021	0.00018

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2566	477,400	3,752,275	Worker	0.021	0.00018
R2567	477,425	3,752,275	Worker	0.021	0.00018
R2568	477,450	3,752,275	Worker	0.022	0.00018
R2569	477,500	3,752,275	Residential	0.419	0.00018
R2570	477,525	3,752,275	Residential	0.375	0.00016
R2571	477,550	3,752,275	Residential	0.350	0.00015
R2572	477,575	3,752,275	Residential	0.332	0.00014
R2573	477,600	3,752,275	Residential	0.318	0.00014
R2574	477,625	3,752,275	Residential	0.306	0.00013
R2575	477,650	3,752,275	Residential	0.296	0.00013
R2576	477,675	3,752,275	Residential	0.288	0.00013
R2577	473,675	3,752,300	Worker	0.024	0.00021
R2578	473,700	3,752,300	Worker	0.025	0.00023
R2579	473,725	3,752,300	Worker	0.027	0.00024
R2580	473,750	3,752,300	Worker	0.030	0.00027
R2581	473,775	3,752,300	Worker	0.033	0.00030
R2582	473,800	3,752,300	Worker	0.038	0.00034
R2583	473,925	3,752,300	Worker	0.102	0.00093
R2584	473,950	3,752,300	Worker	0.076	0.00069
R2585	473,975	3,752,300	Worker	0.064	0.00057
R2586	474,000	3,752,300	Worker	0.057	0.00051
R2587	474,025	3,752,300	Worker	0.053	0.00048
R2588	474,050	3,752,300	Worker	0.051	0.00045
R2589	474,075	3,752,300	Worker	0.049	0.00044
R2590	474,100	3,752,300	Worker	0.048	0.00043
R2591	474,125	3,752,300	Worker	0.048	0.00043
R2592	474,150	3,752,300	Worker	0.048	0.00043
R2593	474,175	3,752,300	Worker	0.048	0.00043
R2594	474,200	3,752,300	Worker	0.048	0.00043
R2595	474,225	3,752,300	Worker	0.049	0.00044
R2596	474,250	3,752,300	Worker	0.050	0.00045
R2597	474,275	3,752,300	Worker	0.051	0.00045
R2598	474,300	3,752,300	Worker	0.052	0.00046
R2599	474,325	3,752,300	Worker	0.053	0.00048
R2600	474,350	3,752,300	Worker	0.055	0.00049
R2601	474,375	3,752,300	Worker	0.056	0.00050
R2602	474,400	3,752,300	Worker	0.058	0.00052
R2603	474,425	3,752,300	Worker	0.060	0.00054
R2604	474,450	3,752,300	Worker	0.062	0.00055
R2605	474,475	3,752,300	Worker	0.064	0.00057
R2606	474,500	3,752,300	Worker	0.066	0.00059
R2607	474,525	3,752,300	Worker	0.069	0.00061
R2608	474,550	3,752,300	Worker	0.071	0.00064
R2609	474,575	3,752,300	Worker	0.074	0.00066
R2610	474,600	3,752,300	Worker	0.077	0.00068

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2611	474,625	3,752,300	Worker	0.079	0.00070
R2612	474,650	3,752,300	Worker	0.082	0.00073
R2613	474,675	3,752,300	Worker	0.084	0.00075
R2614	474,700	3,752,300	Worker	0.086	0.00077
R2615	474,725	3,752,300	Worker	0.089	0.00079
R2616	474,750	3,752,300	Worker	0.091	0.00081
R2617	474,775	3,752,300	Worker	0.093	0.00083
R2618	474,800	3,752,300	Worker	0.095	0.00084
R2619	474,825	3,752,300	Worker	0.097	0.00086
R2620	474,850	3,752,300	Worker	0.099	0.00087
R2621	474,875	3,752,300	Worker	0.100	0.00089
R2622	474,900	3,752,300	Worker	0.102	0.00090
R2623	474,925	3,752,300	Worker	0.104	0.00091
R2624	474,950	3,752,300	Worker	0.106	0.00093
R2625	474,975	3,752,300	Worker	0.107	0.00094
R2626	475,000	3,752,300	Worker	0.109	0.00095
R2627	475,025	3,752,300	Worker	0.111	0.00097
R2628	475,050	3,752,300	Worker	0.113	0.00098
R2629	475,075	3,752,300	Worker	0.115	0.00099
R2630	475,100	3,752,300	Worker	0.117	0.00101
R2631	475,125	3,752,300	Worker	0.119	0.00103
R2632	475,150	3,752,300	Worker	0.122	0.00104
R2633	475,175	3,752,300	Worker	0.124	0.00106
R2634	475,200	3,752,300	Worker	0.127	0.00108
R2635	475,225	3,752,300	Worker	0.130	0.00110
R2636	475,250	3,752,300	Worker	0.133	0.00111
R2637	475,275	3,752,300	Worker	0.135	0.00113
R2638	475,300	3,752,300	Worker	0.137	0.00114
R2639	475,325	3,752,300	Worker	0.137	0.00114
R2640	475,350	3,752,300	Worker	0.136	0.00113
R2641	475,375	3,752,300	Worker	0.135	0.00112
R2642	475,400	3,752,300	Worker	0.134	0.00111
R2643	475,425	3,752,300	Worker	0.133	0.00110
R2644	475,450	3,752,300	Worker	0.132	0.00109
R2645	475,475	3,752,300	Worker	0.131	0.00108
R2646	475,500	3,752,300	Worker	0.131	0.00108
R2647	475,525	3,752,300	Worker	0.130	0.00107
R2648	475,550	3,752,300	Worker	0.130	0.00107
R2649	475,575	3,752,300	Worker	0.130	0.00106
R2650	475,600	3,752,300	Worker	0.130	0.00106
R2651	475,625	3,752,300	Worker	0.131	0.00106
R2652	475,650	3,752,300	Worker	0.131	0.00105
R2653	475,675	3,752,300	Worker	0.132	0.00105
R2654	475,700	3,752,300	Worker	0.132	0.00105
R2655	475,725	3,752,300	Worker	0.133	0.00105

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2656	475,750	3,752,300	Worker	0.134	0.00105
R2657	475,775	3,752,300	Worker	0.135	0.00105
R2658	475,800	3,752,300	Worker	0.135	0.00104
R2659	475,825	3,752,300	Worker	0.133	0.00103
R2660	475,875	3,752,300	Worker	0.126	0.00098
R2661	475,900	3,752,300	Worker	0.114	0.00089
R2662	475,925	3,752,300	Worker	0.106	0.00082
R2663	475,950	3,752,300	Worker	0.100	0.00078
R2664	475,975	3,752,300	Worker	0.096	0.00074
R2665	476,000	3,752,300	Worker	0.092	0.00071
R2666	476,025	3,752,300	Worker	0.089	0.00068
R2667	476,050	3,752,300	Worker	0.085	0.00065
R2668	476,075	3,752,300	Worker	0.081	0.00062
R2669	476,100	3,752,300	Worker	0.078	0.00060
R2670	476,125	3,752,300	Worker	0.074	0.00057
R2671	476,150	3,752,300	Worker	0.071	0.00055
R2672	476,175	3,752,300	Worker	0.068	0.00053
R2673	476,200	3,752,300	Worker	0.065	0.00050
R2674	476,225	3,752,300	Worker	0.063	0.00048
R2675	476,250	3,752,300	Worker	0.060	0.00047
R2676	476,275	3,752,300	Worker	0.058	0.00045
R2677	476,300	3,752,300	Worker	0.056	0.00043
R2678	476,325	3,752,300	Worker	0.054	0.00042
R2679	476,350	3,752,300	Worker	0.052	0.00040
R2680	476,375	3,752,300	Worker	0.050	0.00039
R2681	476,400	3,752,300	Worker	0.048	0.00038
R2682	476,425	3,752,300	Worker	0.047	0.00037
R2683	476,450	3,752,300	Worker	0.045	0.00036
R2684	476,475	3,752,300	Worker	0.044	0.00035
R2685	476,500	3,752,300	Worker	0.043	0.00034
R2686	476,525	3,752,300	Worker	0.042	0.00033
R2687	476,550	3,752,300	Worker	0.041	0.00032
R2688	476,575	3,752,300	Worker	0.040	0.00032
R2689	476,600	3,752,300	Worker	0.039	0.00031
R2690	476,625	3,752,300	Worker	0.039	0.00031
R2691	476,650	3,752,300	Worker	0.040	0.00032
R2692	476,700	3,752,300	Worker	0.037	0.00030
R2693	476,725	3,752,300	Worker	0.035	0.00028
R2694	476,750	3,752,300	Worker	0.033	0.00027
R2695	476,775	3,752,300	Worker	0.032	0.00026
R2696	476,800	3,752,300	Worker	0.031	0.00025
R2697	476,825	3,752,300	Worker	0.030	0.00024
R2698	476,850	3,752,300	Worker	0.029	0.00023
R2699	476,875	3,752,300	Worker	0.028	0.00023
R2700	476,900	3,752,300	Worker	0.028	0.00022

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2701	476,925	3,752,300	Worker	0.027	0.00022
R2702	476,950	3,752,300	Worker	0.026	0.00021
R2703	476,975	3,752,300	Worker	0.026	0.00021
R2704	477,000	3,752,300	Worker	0.025	0.00020
R2705	477,025	3,752,300	Worker	0.025	0.00020
R2706	477,050	3,752,300	Worker	0.024	0.00020
R2707	477,075	3,752,300	Worker	0.024	0.00019
R2708	477,100	3,752,300	Worker	0.023	0.00019
R2709	477,125	3,752,300	Worker	0.023	0.00018
R2710	477,150	3,752,300	Worker	0.022	0.00018
R2711	477,175	3,752,300	Worker	0.022	0.00018
R2712	477,200	3,752,300	Worker	0.022	0.00018
R2713	477,225	3,752,300	Worker	0.021	0.00017
R2714	477,250	3,752,300	Worker	0.021	0.00017
R2715	477,275	3,752,300	Worker	0.021	0.00017
R2716	477,300	3,752,300	Worker	0.020	0.00017
R2717	477,325	3,752,300	Worker	0.020	0.00016
R2718	477,350	3,752,300	Worker	0.020	0.00016
R2719	477,375	3,752,300	Worker	0.020	0.00016
R2720	477,400	3,752,300	Worker	0.020	0.00016
R2721	477,425	3,752,300	Worker	0.020	0.00016
R2722	477,450	3,752,300	Worker	0.021	0.00017
R2723	477,500	3,752,300	Residential	0.398	0.00017
R2724	477,525	3,752,300	Residential	0.357	0.00016
R2725	477,550	3,752,300	Residential	0.334	0.00015
R2726	477,575	3,752,300	Residential	0.318	0.00014
R2727	477,600	3,752,300	Residential	0.306	0.00013
R2728	477,625	3,752,300	Residential	0.296	0.00013
R2729	477,650	3,752,300	Residential	0.287	0.00012
R2730	477,675	3,752,300	Residential	0.279	0.00012
R2731	473,675	3,752,325	Worker	0.022	0.00020
R2732	473,700	3,752,325	Worker	0.024	0.00021
R2733	473,725	3,752,325	Worker	0.025	0.00023
R2734	473,750	3,752,325	Worker	0.027	0.00024
R2735	473,775	3,752,325	Worker	0.030	0.00027
R2736	473,900	3,752,325	Worker	0.078	0.00071
R2737	473,925	3,752,325	Worker	0.061	0.00055
R2738	473,950	3,752,325	Worker	0.053	0.00047
R2739	473,975	3,752,325	Worker	0.048	0.00043
R2740	474,000	3,752,325	Worker	0.045	0.00040
R2741	474,025	3,752,325	Worker	0.043	0.00039
R2742	474,050	3,752,325	Worker	0.042	0.00038
R2743	474,075	3,752,325	Worker	0.041	0.00037
R2744	474,100	3,752,325	Worker	0.041	0.00037
R2745	474,125	3,752,325	Worker	0.041	0.00037

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2746	474,150	3,752,325	Worker	0.041	0.00037
R2747	474,175	3,752,325	Worker	0.041	0.00037
R2748	474,200	3,752,325	Worker	0.042	0.00037
R2749	474,225	3,752,325	Worker	0.043	0.00038
R2750	474,250	3,752,325	Worker	0.043	0.00038
R2751	474,275	3,752,325	Worker	0.044	0.00039
R2752	474,300	3,752,325	Worker	0.045	0.00040
R2753	474,325	3,752,325	Worker	0.046	0.00041
R2754	474,350	3,752,325	Worker	0.047	0.00042
R2755	474,375	3,752,325	Worker	0.048	0.00043
R2756	474,400	3,752,325	Worker	0.049	0.00044
R2757	474,425	3,752,325	Worker	0.051	0.00045
R2758	474,450	3,752,325	Worker	0.052	0.00046
R2759	474,475	3,752,325	Worker	0.054	0.00048
R2760	474,500	3,752,325	Worker	0.055	0.00049
R2761	474,525	3,752,325	Worker	0.057	0.00050
R2762	474,550	3,752,325	Worker	0.058	0.00052
R2763	474,575	3,752,325	Worker	0.060	0.00053
R2764	474,600	3,752,325	Worker	0.062	0.00055
R2765	474,625	3,752,325	Worker	0.063	0.00056
R2766	474,650	3,752,325	Worker	0.065	0.00057
R2767	474,675	3,752,325	Worker	0.066	0.00059
R2768	474,700	3,752,325	Worker	0.068	0.00060
R2769	474,725	3,752,325	Worker	0.069	0.00061
R2770	474,750	3,752,325	Worker	0.071	0.00063
R2771	474,775	3,752,325	Worker	0.073	0.00064
R2772	474,800	3,752,325	Worker	0.074	0.00065
R2773	474,825	3,752,325	Worker	0.076	0.00066
R2774	474,850	3,752,325	Worker	0.077	0.00068
R2775	474,875	3,752,325	Worker	0.078	0.00069
R2776	474,900	3,752,325	Worker	0.080	0.00070
R2777	474,925	3,752,325	Worker	0.081	0.00071
R2778	474,950	3,752,325	Worker	0.083	0.00072
R2779	474,975	3,752,325	Worker	0.084	0.00073
R2780	475,000	3,752,325	Worker	0.086	0.00074
R2781	475,025	3,752,325	Worker	0.087	0.00075
R2782	475,050	3,752,325	Worker	0.089	0.00076
R2783	475,075	3,752,325	Worker	0.090	0.00077
R2784	475,100	3,752,325	Worker	0.092	0.00079
R2785	475,125	3,752,325	Worker	0.094	0.00080
R2786	475,150	3,752,325	Worker	0.096	0.00081
R2787	475,175	3,752,325	Worker	0.098	0.00082
R2788	475,200	3,752,325	Worker	0.100	0.00084
R2789	475,225	3,752,325	Worker	0.102	0.00085
R2790	475,250	3,752,325	Worker	0.103	0.00086

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2791	475,275	3,752,325	Worker	0.105	0.00087
R2792	475,300	3,752,325	Worker	0.105	0.00087
R2793	475,325	3,752,325	Worker	0.106	0.00087
R2794	475,350	3,752,325	Worker	0.105	0.00087
R2795	475,375	3,752,325	Worker	0.105	0.00086
R2796	475,400	3,752,325	Worker	0.104	0.00086
R2797	475,425	3,752,325	Worker	0.104	0.00086
R2798	475,450	3,752,325	Worker	0.104	0.00085
R2799	475,475	3,752,325	Worker	0.103	0.00085
R2800	475,500	3,752,325	Worker	0.103	0.00085
R2801	475,525	3,752,325	Worker	0.103	0.00084
R2802	475,550	3,752,325	Worker	0.103	0.00084
R2803	475,575	3,752,325	Worker	0.103	0.00084
R2804	475,600	3,752,325	Worker	0.103	0.00084
R2805	475,625	3,752,325	Worker	0.103	0.00083
R2806	475,650	3,752,325	Worker	0.104	0.00083
R2807	475,675	3,752,325	Worker	0.104	0.00083
R2808	475,700	3,752,325	Worker	0.104	0.00083
R2809	475,725	3,752,325	Worker	0.105	0.00082
R2810	475,750	3,752,325	Worker	0.105	0.00082
R2811	475,775	3,752,325	Worker	0.104	0.00081
R2812	475,800	3,752,325	Worker	0.104	0.00080
R2813	475,825	3,752,325	Worker	0.103	0.00080
R2814	475,875	3,752,325	Worker	0.100	0.00079
R2815	475,900	3,752,325	Worker	0.090	0.00071
R2816	475,925	3,752,325	Worker	0.084	0.00066
R2817	475,950	3,752,325	Worker	0.080	0.00063
R2818	475,975	3,752,325	Worker	0.077	0.00060
R2819	476,000	3,752,325	Worker	0.074	0.00058
R2820	476,025	3,752,325	Worker	0.071	0.00056
R2821	476,050	3,752,325	Worker	0.069	0.00054
R2822	476,075	3,752,325	Worker	0.067	0.00052
R2823	476,100	3,752,325	Worker	0.065	0.00050
R2824	476,125	3,752,325	Worker	0.062	0.00048
R2825	476,150	3,752,325	Worker	0.060	0.00047
R2826	476,175	3,752,325	Worker	0.058	0.00045
R2827	476,200	3,752,325	Worker	0.056	0.00044
R2828	476,225	3,752,325	Worker	0.054	0.00042
R2829	476,250	3,752,325	Worker	0.053	0.00041
R2830	476,275	3,752,325	Worker	0.051	0.00040
R2831	476,300	3,752,325	Worker	0.049	0.00038
R2832	476,325	3,752,325	Worker	0.048	0.00037
R2833	476,350	3,752,325	Worker	0.046	0.00036
R2834	476,375	3,752,325	Worker	0.045	0.00035
R2835	476,400	3,752,325	Worker	0.043	0.00034

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2836	476,425	3,752,325	Worker	0.042	0.00033
R2837	476,450	3,752,325	Worker	0.041	0.00032
R2838	476,475	3,752,325	Worker	0.040	0.00031
R2839	476,500	3,752,325	Worker	0.039	0.00031
R2840	476,525	3,752,325	Worker	0.038	0.00030
R2841	476,550	3,752,325	Worker	0.037	0.00029
R2842	476,575	3,752,325	Worker	0.036	0.00029
R2843	476,600	3,752,325	Worker	0.036	0.00029
R2844	476,625	3,752,325	Worker	0.036	0.00029
R2845	476,650	3,752,325	Worker	0.037	0.00030
R2846	476,700	3,752,325	Worker	0.034	0.00027
R2847	476,725	3,752,325	Worker	0.032	0.00026
R2848	476,750	3,752,325	Worker	0.031	0.00025
R2849	476,775	3,752,325	Worker	0.030	0.00024
R2850	476,800	3,752,325	Worker	0.029	0.00023
R2851	476,825	3,752,325	Worker	0.028	0.00022
R2852	476,850	3,752,325	Worker	0.027	0.00022
R2853	476,875	3,752,325	Worker	0.027	0.00021
R2854	476,900	3,752,325	Worker	0.026	0.00021
R2855	476,925	3,752,325	Worker	0.025	0.00020
R2856	476,950	3,752,325	Worker	0.025	0.00020
R2857	476,975	3,752,325	Worker	0.024	0.00019
R2858	477,000	3,752,325	Worker	0.024	0.00019
R2859	477,025	3,752,325	Worker	0.023	0.00019
R2860	477,050	3,752,325	Worker	0.023	0.00018
R2861	477,075	3,752,325	Worker	0.022	0.00018
R2862	477,100	3,752,325	Worker	0.022	0.00018
R2863	477,125	3,752,325	Worker	0.021	0.00017
R2864	477,150	3,752,325	Worker	0.021	0.00017
R2865	477,175	3,752,325	Worker	0.021	0.00017
R2866	477,200	3,752,325	Worker	0.020	0.00016
R2867	477,225	3,752,325	Worker	0.020	0.00016
R2868	477,250	3,752,325	Worker	0.020	0.00016
R2869	477,275	3,752,325	Worker	0.019	0.00016
R2870	477,300	3,752,325	Worker	0.019	0.00016
R2871	477,325	3,752,325	Worker	0.019	0.00015
R2872	477,350	3,752,325	Worker	0.019	0.00015
R2873	477,375	3,752,325	Worker	0.019	0.00015
R2874	477,400	3,752,325	Worker	0.019	0.00015
R2875	477,425	3,752,325	Worker	0.019	0.00016
R2876	477,450	3,752,325	Worker	0.020	0.00017
R2877	477,500	3,752,325	Residential	0.381	0.00017
R2878	477,525	3,752,325	Residential	0.342	0.00015
R2879	477,550	3,752,325	Residential	0.321	0.00014
R2880	477,575	3,752,325	Residential	0.306	0.00013

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2881	477,600	3,752,325	Residential	0.295	0.00013
R2882	477,625	3,752,325	Residential	0.285	0.00012
R2883	477,650	3,752,325	Residential	0.277	0.00012
R2884	477,675	3,752,325	Residential	0.270	0.00012
R2885	473,675	3,752,350	Worker	0.021	0.00018
R2886	473,700	3,752,350	Worker	0.022	0.00019
R2887	473,725	3,752,350	Worker	0.023	0.00021
R2888	473,750	3,752,350	Worker	0.025	0.00022
R2889	473,775	3,752,350	Worker	0.027	0.00024
R2890	473,875	3,752,350	Worker	0.040	0.00036
R2891	473,900	3,752,350	Worker	0.040	0.00036
R2892	473,925	3,752,350	Worker	0.039	0.00035
R2893	473,950	3,752,350	Worker	0.038	0.00034
R2894	473,975	3,752,350	Worker	0.037	0.00033
R2895	474,000	3,752,350	Worker	0.036	0.00032
R2896	474,025	3,752,350	Worker	0.036	0.00032
R2897	474,050	3,752,350	Worker	0.036	0.00032
R2898	474,075	3,752,350	Worker	0.035	0.00032
R2899	474,100	3,752,350	Worker	0.036	0.00032
R2900	474,125	3,752,350	Worker	0.036	0.00032
R2901	474,150	3,752,350	Worker	0.036	0.00032
R2902	474,175	3,752,350	Worker	0.036	0.00032
R2903	474,275	3,752,350	Worker	0.039	0.00034
R2904	474,300	3,752,350	Worker	0.039	0.00035
R2905	474,325	3,752,350	Worker	0.040	0.00036
R2906	474,350	3,752,350	Worker	0.041	0.00036
R2907	474,375	3,752,350	Worker	0.042	0.00037
R2908	474,400	3,752,350	Worker	0.043	0.00038
R2909	474,425	3,752,350	Worker	0.044	0.00039
R2910	474,450	3,752,350	Worker	0.045	0.00040
R2911	474,475	3,752,350	Worker	0.046	0.00041
R2912	474,500	3,752,350	Worker	0.047	0.00042
R2913	474,525	3,752,350	Worker	0.048	0.00043
R2914	474,550	3,752,350	Worker	0.049	0.00044
R2915	474,575	3,752,350	Worker	0.051	0.00045
R2916	474,600	3,752,350	Worker	0.052	0.00045
R2917	474,625	3,752,350	Worker	0.053	0.00046
R2918	474,650	3,752,350	Worker	0.054	0.00047
R2919	474,675	3,752,350	Worker	0.055	0.00048
R2920	474,700	3,752,350	Worker	0.056	0.00049
R2921	474,725	3,752,350	Worker	0.057	0.00050
R2922	474,750	3,752,350	Worker	0.058	0.00051
R2923	474,775	3,752,350	Worker	0.059	0.00052
R2924	474,800	3,752,350	Worker	0.061	0.00053
R2925	474,825	3,752,350	Worker	0.062	0.00054

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2926	474,850	3,752,350	Worker	0.063	0.00055
R2927	474,875	3,752,350	Worker	0.064	0.00056
R2928	474,900	3,752,350	Worker	0.065	0.00057
R2929	474,925	3,752,350	Worker	0.066	0.00058
R2930	474,950	3,752,350	Worker	0.068	0.00058
R2931	474,975	3,752,350	Worker	0.069	0.00059
R2932	475,000	3,752,350	Worker	0.070	0.00060
R2933	475,025	3,752,350	Worker	0.071	0.00061
R2934	475,050	3,752,350	Worker	0.073	0.00062
R2935	475,075	3,752,350	Worker	0.074	0.00063
R2936	475,100	3,752,350	Worker	0.075	0.00064
R2937	475,125	3,752,350	Worker	0.077	0.00065
R2938	475,150	3,752,350	Worker	0.078	0.00066
R2939	475,175	3,752,350	Worker	0.080	0.00067
R2940	475,200	3,752,350	Worker	0.081	0.00068
R2941	475,225	3,752,350	Worker	0.083	0.00069
R2942	475,250	3,752,350	Worker	0.084	0.00069
R2943	475,275	3,752,350	Worker	0.085	0.00070
R2944	475,300	3,752,350	Worker	0.085	0.00070
R2945	475,325	3,752,350	Worker	0.085	0.00070
R2946	475,350	3,752,350	Worker	0.085	0.00070
R2947	475,375	3,752,350	Worker	0.085	0.00070
R2948	475,400	3,752,350	Worker	0.085	0.00070
R2949	475,425	3,752,350	Worker	0.085	0.00070
R2950	475,450	3,752,350	Worker	0.085	0.00069
R2951	475,475	3,752,350	Worker	0.085	0.00069
R2952	475,500	3,752,350	Worker	0.085	0.00069
R2953	475,525	3,752,350	Worker	0.084	0.00069
R2954	475,550	3,752,350	Worker	0.084	0.00069
R2955	475,575	3,752,350	Worker	0.085	0.00068
R2956	475,600	3,752,350	Worker	0.085	0.00068
R2957	475,625	3,752,350	Worker	0.085	0.00068
R2958	475,650	3,752,350	Worker	0.085	0.00068
R2959	475,675	3,752,350	Worker	0.085	0.00068
R2960	475,700	3,752,350	Worker	0.085	0.00067
R2961	475,725	3,752,350	Worker	0.085	0.00067
R2962	475,750	3,752,350	Worker	0.085	0.00066
R2963	475,775	3,752,350	Worker	0.084	0.00066
R2964	475,800	3,752,350	Worker	0.083	0.00065
R2965	475,825	3,752,350	Worker	0.083	0.00065
R2966	475,875	3,752,350	Worker	0.083	0.00067
R2967	475,900	3,752,350	Worker	0.075	0.00060
R2968	475,925	3,752,350	Worker	0.070	0.00055
R2969	475,950	3,752,350	Worker	0.066	0.00052
R2970	475,975	3,752,350	Worker	0.063	0.00050

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R2971	476,000	3,752,350	Worker	0.061	0.00048
R2972	476,025	3,752,350	Worker	0.059	0.00047
R2973	476,050	3,752,350	Worker	0.057	0.00045
R2974	476,075	3,752,350	Worker	0.056	0.00044
R2975	476,100	3,752,350	Worker	0.054	0.00043
R2976	476,125	3,752,350	Worker	0.053	0.00041
R2977	476,150	3,752,350	Worker	0.051	0.00040
R2978	476,175	3,752,350	Worker	0.050	0.00039
R2979	476,200	3,752,350	Worker	0.049	0.00038
R2980	476,225	3,752,350	Worker	0.047	0.00037
R2981	476,250	3,752,350	Worker	0.046	0.00036
R2982	476,275	3,752,350	Worker	0.045	0.00035
R2983	476,300	3,752,350	Worker	0.043	0.00034
R2984	476,325	3,752,350	Worker	0.042	0.00033
R2985	476,350	3,752,350	Worker	0.041	0.00032
R2986	476,375	3,752,350	Worker	0.040	0.00031
R2987	476,400	3,752,350	Worker	0.039	0.00031
R2988	476,425	3,752,350	Worker	0.038	0.00030
R2989	476,450	3,752,350	Worker	0.037	0.00029
R2990	476,475	3,752,350	Worker	0.036	0.00029
R2991	476,500	3,752,350	Worker	0.035	0.00028
R2992	476,525	3,752,350	Worker	0.035	0.00027
R2993	476,550	3,752,350	Worker	0.034	0.00027
R2994	476,575	3,752,350	Worker	0.033	0.00027
R2995	476,600	3,752,350	Worker	0.033	0.00026
R2996	476,625	3,752,350	Worker	0.033	0.00027
R2997	476,650	3,752,350	Worker	0.035	0.00028
R2998	476,700	3,752,350	Worker	0.032	0.00026
R2999	476,725	3,752,350	Worker	0.030	0.00024
R3000	476,750	3,752,350	Worker	0.029	0.00023
R3001	476,775	3,752,350	Worker	0.028	0.00022
R3002	476,800	3,752,350	Worker	0.027	0.00022
R3003	476,825	3,752,350	Worker	0.026	0.00021
R3004	476,850	3,752,350	Worker	0.025	0.00020
R3005	476,875	3,752,350	Worker	0.025	0.00020
R3006	476,900	3,752,350	Worker	0.024	0.00019
R3007	476,925	3,752,350	Worker	0.024	0.00019
R3008	476,950	3,752,350	Worker	0.023	0.00019
R3009	476,975	3,752,350	Worker	0.023	0.00018
R3010	477,000	3,752,350	Worker	0.022	0.00018
R3011	477,025	3,752,350	Worker	0.022	0.00017
R3012	477,050	3,752,350	Worker	0.021	0.00017
R3013	477,075	3,752,350	Worker	0.021	0.00017
R3014	477,100	3,752,350	Worker	0.021	0.00017
R3015	477,125	3,752,350	Worker	0.020	0.00016

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3016	477,150	3,752,350	Worker	0.020	0.00016
R3017	477,175	3,752,350	Worker	0.020	0.00016
R3018	477,200	3,752,350	Worker	0.019	0.00015
R3019	477,225	3,752,350	Worker	0.019	0.00015
R3020	477,250	3,752,350	Worker	0.019	0.00015
R3021	477,275	3,752,350	Worker	0.018	0.00015
R3022	477,300	3,752,350	Worker	0.018	0.00015
R3023	477,325	3,752,350	Worker	0.018	0.00015
R3024	477,350	3,752,350	Worker	0.018	0.00014
R3025	477,375	3,752,350	Worker	0.018	0.00014
R3026	477,400	3,752,350	Worker	0.018	0.00015
R3027	477,425	3,752,350	Worker	0.018	0.00015
R3028	477,450	3,752,350	Worker	0.019	0.00016
R3029	477,500	3,752,350	Residential	0.368	0.00016
R3030	477,525	3,752,350	Residential	0.330	0.00014
R3031	477,550	3,752,350	Residential	0.309	0.00013
R3032	477,575	3,752,350	Residential	0.295	0.00013
R3033	477,600	3,752,350	Residential	0.284	0.00012
R3034	477,625	3,752,350	Residential	0.275	0.00012
R3035	477,650	3,752,350	Residential	0.268	0.00012
R3036	477,675	3,752,350	Residential	0.261	0.00011
R3037	473,675	3,752,375	Worker	0.019	0.00017
R3038	473,700	3,752,375	Worker	0.021	0.00018
R3039	473,725	3,752,375	Worker	0.022	0.00019
R3040	473,750	3,752,375	Worker	0.023	0.00020
R3041	473,850	3,752,375	Worker	0.029	0.00026
R3042	473,875	3,752,375	Worker	0.030	0.00027
R3043	473,900	3,752,375	Worker	0.030	0.00027
R3044	473,925	3,752,375	Worker	0.030	0.00027
R3045	473,950	3,752,375	Worker	0.030	0.00027
R3046	473,975	3,752,375	Worker	0.030	0.00027
R3047	474,000	3,752,375	Worker	0.030	0.00027
R3048	474,025	3,752,375	Worker	0.031	0.00027
R3049	474,050	3,752,375	Worker	0.031	0.00027
R3050	474,075	3,752,375	Worker	0.031	0.00027
R3051	474,100	3,752,375	Worker	0.031	0.00028
R3052	474,400	3,752,375	Worker	0.038	0.00033
R3053	474,425	3,752,375	Worker	0.039	0.00034
R3054	474,450	3,752,375	Worker	0.039	0.00035
R3055	474,475	3,752,375	Worker	0.040	0.00035
R3056	474,500	3,752,375	Worker	0.041	0.00036
R3057	474,525	3,752,375	Worker	0.042	0.00037
R3058	474,550	3,752,375	Worker	0.043	0.00038
R3059	474,575	3,752,375	Worker	0.044	0.00038
R3060	474,600	3,752,375	Worker	0.044	0.00039

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3061	474,625	3,752,375	Worker	0.045	0.00040
R3062	474,650	3,752,375	Worker	0.046	0.00040
R3063	474,675	3,752,375	Worker	0.047	0.00041
R3064	474,700	3,752,375	Worker	0.048	0.00042
R3065	474,725	3,752,375	Worker	0.049	0.00042
R3066	474,750	3,752,375	Worker	0.050	0.00043
R3067	474,775	3,752,375	Worker	0.050	0.00044
R3068	474,800	3,752,375	Worker	0.051	0.00045
R3069	474,825	3,752,375	Worker	0.052	0.00045
R3070	474,850	3,752,375	Worker	0.053	0.00046
R3071	474,875	3,752,375	Worker	0.054	0.00047
R3072	474,900	3,752,375	Worker	0.055	0.00047
R3073	474,925	3,752,375	Worker	0.056	0.00048
R3074	474,950	3,752,375	Worker	0.057	0.00049
R3075	474,975	3,752,375	Worker	0.058	0.00050
R3076	475,000	3,752,375	Worker	0.059	0.00050
R3077	475,025	3,752,375	Worker	0.060	0.00051
R3078	475,050	3,752,375	Worker	0.061	0.00052
R3079	475,075	3,752,375	Worker	0.063	0.00053
R3080	475,100	3,752,375	Worker	0.064	0.00054
R3081	475,125	3,752,375	Worker	0.065	0.00054
R3082	475,150	3,752,375	Worker	0.066	0.00055
R3083	475,175	3,752,375	Worker	0.067	0.00056
R3084	475,200	3,752,375	Worker	0.068	0.00057
R3085	475,225	3,752,375	Worker	0.069	0.00057
R3086	475,250	3,752,375	Worker	0.070	0.00058
R3087	475,275	3,752,375	Worker	0.071	0.00058
R3088	475,300	3,752,375	Worker	0.071	0.00058
R3089	475,325	3,752,375	Worker	0.071	0.00058
R3090	475,350	3,752,375	Worker	0.071	0.00058
R3091	475,375	3,752,375	Worker	0.071	0.00058
R3092	475,400	3,752,375	Worker	0.071	0.00058
R3093	475,425	3,752,375	Worker	0.071	0.00058
R3094	475,450	3,752,375	Worker	0.071	0.00058
R3095	475,475	3,752,375	Worker	0.071	0.00058
R3096	475,500	3,752,375	Worker	0.071	0.00058
R3097	475,525	3,752,375	Worker	0.071	0.00058
R3098	475,550	3,752,375	Worker	0.071	0.00057
R3099	475,575	3,752,375	Worker	0.071	0.00057
R3100	475,600	3,752,375	Worker	0.071	0.00057
R3101	475,625	3,752,375	Worker	0.071	0.00057
R3102	475,650	3,752,375	Worker	0.071	0.00057
R3103	475,675	3,752,375	Worker	0.071	0.00056
R3104	475,700	3,752,375	Worker	0.071	0.00056
R3105	475,725	3,752,375	Worker	0.070	0.00056

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3106	475,750	3,752,375	Worker	0.070	0.00055
R3107	475,775	3,752,375	Worker	0.070	0.00055
R3108	475,800	3,752,375	Worker	0.069	0.00055
R3109	475,825	3,752,375	Worker	0.070	0.00055
R3110	475,875	3,752,375	Worker	0.071	0.00058
R3111	475,900	3,752,375	Worker	0.064	0.00051
R3112	475,925	3,752,375	Worker	0.059	0.00047
R3113	475,950	3,752,375	Worker	0.056	0.00045
R3114	475,975	3,752,375	Worker	0.054	0.00043
R3115	476,000	3,752,375	Worker	0.052	0.00041
R3116	476,025	3,752,375	Worker	0.050	0.00040
R3117	476,050	3,752,375	Worker	0.049	0.00039
R3118	476,075	3,752,375	Worker	0.048	0.00038
R3119	476,100	3,752,375	Worker	0.046	0.00037
R3120	476,125	3,752,375	Worker	0.045	0.00036
R3121	476,150	3,752,375	Worker	0.044	0.00035
R3122	476,175	3,752,375	Worker	0.043	0.00034
R3123	476,200	3,752,375	Worker	0.042	0.00033
R3124	476,225	3,752,375	Worker	0.041	0.00033
R3125	476,250	3,752,375	Worker	0.040	0.00032
R3126	476,275	3,752,375	Worker	0.039	0.00031
R3127	476,300	3,752,375	Worker	0.038	0.00030
R3128	476,325	3,752,375	Worker	0.037	0.00030
R3129	476,350	3,752,375	Worker	0.037	0.00029
R3130	476,375	3,752,375	Worker	0.036	0.00028
R3131	476,400	3,752,375	Worker	0.035	0.00028
R3132	476,425	3,752,375	Worker	0.034	0.00027
R3133	476,450	3,752,375	Worker	0.033	0.00027
R3134	476,475	3,752,375	Worker	0.033	0.00026
R3135	476,500	3,752,375	Worker	0.032	0.00026
R3136	476,525	3,752,375	Worker	0.032	0.00025
R3137	476,550	3,752,375	Worker	0.031	0.00025
R3138	476,575	3,752,375	Worker	0.031	0.00024
R3139	476,600	3,752,375	Worker	0.031	0.00024
R3140	476,625	3,752,375	Worker	0.031	0.00025
R3141	476,650	3,752,375	Worker	0.032	0.00026
R3142	476,700	3,752,375	Worker	0.030	0.00024
R3143	476,725	3,752,375	Worker	0.028	0.00022
R3144	476,750	3,752,375	Worker	0.027	0.00022
R3145	476,775	3,752,375	Worker	0.026	0.00021
R3146	476,800	3,752,375	Worker	0.025	0.00020
R3147	476,825	3,752,375	Worker	0.024	0.00020
R3148	476,850	3,752,375	Worker	0.024	0.00019
R3149	476,875	3,752,375	Worker	0.023	0.00019
R3150	476,900	3,752,375	Worker	0.023	0.00018

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3151	476,925	3,752,375	Worker	0.022	0.00018
R3152	476,950	3,752,375	Worker	0.022	0.00017
R3153	476,975	3,752,375	Worker	0.021	0.00017
R3154	477,000	3,752,375	Worker	0.021	0.00017
R3155	477,025	3,752,375	Worker	0.021	0.00016
R3156	477,050	3,752,375	Worker	0.020	0.00016
R3157	477,075	3,752,375	Worker	0.020	0.00016
R3158	477,100	3,752,375	Worker	0.019	0.00016
R3159	477,125	3,752,375	Worker	0.019	0.00015
R3160	477,150	3,752,375	Worker	0.019	0.00015
R3161	477,175	3,752,375	Worker	0.018	0.00015
R3162	477,200	3,752,375	Worker	0.018	0.00015
R3163	477,225	3,752,375	Worker	0.018	0.00014
R3164	477,250	3,752,375	Worker	0.018	0.00014
R3165	477,275	3,752,375	Worker	0.017	0.00014
R3166	477,300	3,752,375	Worker	0.017	0.00014
R3167	477,325	3,752,375	Worker	0.017	0.00014
R3168	477,350	3,752,375	Worker	0.017	0.00014
R3169	477,375	3,752,375	Worker	0.017	0.00014
R3170	477,400	3,752,375	Worker	0.017	0.00014
R3171	477,425	3,752,375	Worker	0.017	0.00014
R3172	477,450	3,752,375	Worker	0.019	0.00015
R3173	477,500	3,752,375	Residential	0.355	0.00016
R3174	477,525	3,752,375	Residential	0.318	0.00014
R3175	477,550	3,752,375	Residential	0.297	0.00013
R3176	477,575	3,752,375	Residential	0.284	0.00012
R3177	477,600	3,752,375	Residential	0.274	0.00012
R3178	477,625	3,752,375	Residential	0.265	0.00012
R3179	477,650	3,752,375	Residential	0.258	0.00011
R3180	477,675	3,752,375	Residential	0.252	0.00011
R3181	473,700	3,752,400	Worker	0.019	0.00017
R3182	473,725	3,752,400	Worker	0.020	0.00018
R3183	473,825	3,752,400	Worker	0.024	0.00021
R3184	473,850	3,752,400	Worker	0.025	0.00022
R3185	473,875	3,752,400	Worker	0.025	0.00023
R3186	473,900	3,752,400	Worker	0.026	0.00023
R3187	473,925	3,752,400	Worker	0.026	0.00023
R3188	473,950	3,752,400	Worker	0.026	0.00023
R3189	473,975	3,752,400	Worker	0.026	0.00023
R3190	474,000	3,752,400	Worker	0.026	0.00023
R3191	474,025	3,752,400	Worker	0.027	0.00024
R3192	474,050	3,752,400	Worker	0.027	0.00024
R3193	474,075	3,752,400	Worker	0.027	0.00024
R3194	474,525	3,752,400	Worker	0.037	0.00032
R3195	474,550	3,752,400	Worker	0.038	0.00033

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3196	474,575	3,752,400	Worker	0.038	0.00033
R3197	474,600	3,752,400	Worker	0.039	0.00034
R3198	474,625	3,752,400	Worker	0.040	0.00035
R3199	474,650	3,752,400	Worker	0.040	0.00035
R3200	474,675	3,752,400	Worker	0.041	0.00036
R3201	474,700	3,752,400	Worker	0.042	0.00036
R3202	474,725	3,752,400	Worker	0.042	0.00037
R3203	474,750	3,752,400	Worker	0.043	0.00037
R3204	474,775	3,752,400	Worker	0.044	0.00038
R3205	474,800	3,752,400	Worker	0.045	0.00038
R3206	474,825	3,752,400	Worker	0.045	0.00039
R3207	474,850	3,752,400	Worker	0.046	0.00040
R3208	474,875	3,752,400	Worker	0.047	0.00040
R3209	474,900	3,752,400	Worker	0.048	0.00041
R3210	474,925	3,752,400	Worker	0.048	0.00041
R3211	474,950	3,752,400	Worker	0.049	0.00042
R3212	474,975	3,752,400	Worker	0.050	0.00043
R3213	475,000	3,752,400	Worker	0.051	0.00043
R3214	475,025	3,752,400	Worker	0.052	0.00044
R3215	475,050	3,752,400	Worker	0.053	0.00045
R3216	475,075	3,752,400	Worker	0.054	0.00045
R3217	475,100	3,752,400	Worker	0.055	0.00046
R3218	475,125	3,752,400	Worker	0.056	0.00046
R3219	475,150	3,752,400	Worker	0.057	0.00047
R3220	475,175	3,752,400	Worker	0.058	0.00048
R3221	475,200	3,752,400	Worker	0.058	0.00048
R3222	475,225	3,752,400	Worker	0.059	0.00049
R3223	475,250	3,752,400	Worker	0.060	0.00049
R3224	475,275	3,752,400	Worker	0.060	0.00049
R3225	475,300	3,752,400	Worker	0.060	0.00049
R3226	475,325	3,752,400	Worker	0.061	0.00050
R3227	475,350	3,752,400	Worker	0.061	0.00050
R3228	475,375	3,752,400	Worker	0.061	0.00049
R3229	475,400	3,752,400	Worker	0.061	0.00049
R3230	475,425	3,752,400	Worker	0.061	0.00049
R3231	475,450	3,752,400	Worker	0.061	0.00049
R3232	475,475	3,752,400	Worker	0.061	0.00049
R3233	475,500	3,752,400	Worker	0.060	0.00049
R3234	475,525	3,752,400	Worker	0.060	0.00049
R3235	475,550	3,752,400	Worker	0.060	0.00049
R3236	475,575	3,752,400	Worker	0.060	0.00049
R3237	475,600	3,752,400	Worker	0.060	0.00048
R3238	475,625	3,752,400	Worker	0.060	0.00048
R3239	475,650	3,752,400	Worker	0.060	0.00048
R3240	475,675	3,752,400	Worker	0.060	0.00048

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3241	475,700	3,752,400	Worker	0.060	0.00047
R3242	475,725	3,752,400	Worker	0.060	0.00047
R3243	475,750	3,752,400	Worker	0.059	0.00047
R3244	475,775	3,752,400	Worker	0.059	0.00047
R3245	475,800	3,752,400	Worker	0.059	0.00047
R3246	475,825	3,752,400	Worker	0.060	0.00048
R3247	475,875	3,752,400	Worker	0.062	0.00051
R3248	475,900	3,752,400	Worker	0.055	0.00045
R3249	475,925	3,752,400	Worker	0.051	0.00041
R3250	475,950	3,752,400	Worker	0.049	0.00039
R3251	475,975	3,752,400	Worker	0.047	0.00037
R3252	476,000	3,752,400	Worker	0.045	0.00036
R3253	476,025	3,752,400	Worker	0.044	0.00035
R3254	476,050	3,752,400	Worker	0.042	0.00034
R3255	476,075	3,752,400	Worker	0.041	0.00033
R3256	476,100	3,752,400	Worker	0.040	0.00032
R3257	476,125	3,752,400	Worker	0.039	0.00031
R3258	476,150	3,752,400	Worker	0.038	0.00031
R3259	476,175	3,752,400	Worker	0.038	0.00030
R3260	476,200	3,752,400	Worker	0.037	0.00029
R3261	476,225	3,752,400	Worker	0.036	0.00029
R3262	476,250	3,752,400	Worker	0.035	0.00028
R3263	476,275	3,752,400	Worker	0.035	0.00028
R3264	476,300	3,752,400	Worker	0.034	0.00027
R3265	476,325	3,752,400	Worker	0.033	0.00026
R3266	476,350	3,752,400	Worker	0.033	0.00026
R3267	476,375	3,752,400	Worker	0.032	0.00025
R3268	476,400	3,752,400	Worker	0.031	0.00025
R3269	476,425	3,752,400	Worker	0.031	0.00025
R3270	476,450	3,752,400	Worker	0.030	0.00024
R3271	476,475	3,752,400	Worker	0.030	0.00024
R3272	476,500	3,752,400	Worker	0.029	0.00023
R3273	476,525	3,752,400	Worker	0.029	0.00023
R3274	476,550	3,752,400	Worker	0.028	0.00023
R3275	476,575	3,752,400	Worker	0.028	0.00023
R3276	476,600	3,752,400	Worker	0.028	0.00023
R3277	476,625	3,752,400	Worker	0.029	0.00023
R3278	476,650	3,752,400	Worker	0.030	0.00025
R3279	476,700	3,752,400	Worker	0.028	0.00022
R3280	476,725	3,752,400	Worker	0.026	0.00021
R3281	476,750	3,752,400	Worker	0.025	0.00020
R3282	476,775	3,752,400	Worker	0.024	0.00019
R3283	476,800	3,752,400	Worker	0.023	0.00019
R3284	476,825	3,752,400	Worker	0.023	0.00018
R3285	476,850	3,752,400	Worker	0.022	0.00018

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3286	476,875	3,752,400	Worker	0.022	0.00017
R3287	476,900	3,752,400	Worker	0.021	0.00017
R3288	476,925	3,752,400	Worker	0.021	0.00017
R3289	476,950	3,752,400	Worker	0.020	0.00016
R3290	476,975	3,752,400	Worker	0.020	0.00016
R3291	477,000	3,752,400	Worker	0.020	0.00016
R3292	477,025	3,752,400	Worker	0.019	0.00016
R3293	477,050	3,752,400	Worker	0.019	0.00015
R3294	477,075	3,752,400	Worker	0.019	0.00015
R3295	477,100	3,752,400	Worker	0.018	0.00015
R3296	477,125	3,752,400	Worker	0.018	0.00014
R3297	477,150	3,752,400	Worker	0.018	0.00014
R3298	477,175	3,752,400	Worker	0.017	0.00014
R3299	477,200	3,752,400	Worker	0.017	0.00014
R3300	477,225	3,752,400	Worker	0.017	0.00014
R3301	477,250	3,752,400	Worker	0.017	0.00014
R3302	477,275	3,752,400	Worker	0.017	0.00013
R3303	477,300	3,752,400	Worker	0.016	0.00013
R3304	477,325	3,752,400	Worker	0.016	0.00013
R3305	477,350	3,752,400	Worker	0.016	0.00013
R3306	477,375	3,752,400	Worker	0.016	0.00013
R3307	477,400	3,752,400	Worker	0.016	0.00013
R3308	477,425	3,752,400	Worker	0.017	0.00014
R3309	477,450	3,752,400	Worker	0.018	0.00015
R3310	477,500	3,752,400	Residential	0.344	0.00015
R3311	477,525	3,752,400	Residential	0.307	0.00013
R3312	477,550	3,752,400	Residential	0.287	0.00013
R3313	477,575	3,752,400	Residential	0.274	0.00012
R3314	477,600	3,752,400	Residential	0.264	0.00011
R3315	477,625	3,752,400	Residential	0.256	0.00011
R3316	477,650	3,752,400	Residential	0.249	0.00011
R3317	477,675	3,752,400	Residential	0.243	0.00011
R3318	473,700	3,752,425	Worker	0.018	0.00016
R3319	473,800	3,752,425	Worker	0.021	0.00019
R3320	473,825	3,752,425	Worker	0.022	0.00019
R3321	473,850	3,752,425	Worker	0.022	0.00020
R3322	473,875	3,752,425	Worker	0.023	0.00020
R3323	473,900	3,752,425	Worker	0.023	0.00020
R3324	473,925	3,752,425	Worker	0.023	0.00020
R3325	473,950	3,752,425	Worker	0.023	0.00020
R3326	473,975	3,752,425	Worker	0.023	0.00021
R3327	474,000	3,752,425	Worker	0.024	0.00021
R3328	474,025	3,752,425	Worker	0.024	0.00021
R3329	474,050	3,752,425	Worker	0.024	0.00021
R3330	474,750	3,752,425	Worker	0.038	0.00033

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3331	474,775	3,752,425	Worker	0.039	0.00033
R3332	474,800	3,752,425	Worker	0.039	0.00034
R3333	474,825	3,752,425	Worker	0.040	0.00034
R3334	474,850	3,752,425	Worker	0.041	0.00035
R3335	474,875	3,752,425	Worker	0.041	0.00035
R3336	474,900	3,752,425	Worker	0.042	0.00036
R3337	474,925	3,752,425	Worker	0.043	0.00036
R3338	474,950	3,752,425	Worker	0.043	0.00037
R3339	474,975	3,752,425	Worker	0.044	0.00037
R3340	475,000	3,752,425	Worker	0.045	0.00038
R3341	475,025	3,752,425	Worker	0.046	0.00038
R3342	475,050	3,752,425	Worker	0.046	0.00039
R3343	475,075	3,752,425	Worker	0.047	0.00039
R3344	475,100	3,752,425	Worker	0.048	0.00040
R3345	475,125	3,752,425	Worker	0.049	0.00040
R3346	475,150	3,752,425	Worker	0.049	0.00041
R3347	475,175	3,752,425	Worker	0.050	0.00041
R3348	475,200	3,752,425	Worker	0.051	0.00042
R3349	475,225	3,752,425	Worker	0.051	0.00042
R3350	475,250	3,752,425	Worker	0.052	0.00042
R3351	475,275	3,752,425	Worker	0.052	0.00042
R3352	475,300	3,752,425	Worker	0.052	0.00043
R3353	475,325	3,752,425	Worker	0.052	0.00043
R3354	475,350	3,752,425	Worker	0.052	0.00043
R3355	475,375	3,752,425	Worker	0.052	0.00043
R3356	475,400	3,752,425	Worker	0.052	0.00043
R3357	475,425	3,752,425	Worker	0.052	0.00043
R3358	475,450	3,752,425	Worker	0.052	0.00042
R3359	475,475	3,752,425	Worker	0.052	0.00042
R3360	475,500	3,752,425	Worker	0.052	0.00042
R3361	475,525	3,752,425	Worker	0.052	0.00042
R3362	475,550	3,752,425	Worker	0.052	0.00042
R3363	475,575	3,752,425	Worker	0.052	0.00042
R3364	475,600	3,752,425	Worker	0.052	0.00042
R3365	475,625	3,752,425	Worker	0.052	0.00042
R3366	475,650	3,752,425	Worker	0.052	0.00041
R3367	475,675	3,752,425	Worker	0.052	0.00041
R3368	475,700	3,752,425	Worker	0.051	0.00041
R3369	475,725	3,752,425	Worker	0.051	0.00041
R3370	475,750	3,752,425	Worker	0.051	0.00040
R3371	475,775	3,752,425	Worker	0.051	0.00040
R3372	475,800	3,752,425	Worker	0.051	0.00041
R3373	475,825	3,752,425	Worker	0.052	0.00042
R3374	475,875	3,752,425	Worker	0.055	0.00045
R3375	475,900	3,752,425	Worker	0.049	0.00040

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3376	475,925	3,752,425	Worker	0.045	0.00036
R3377	475,950	3,752,425	Worker	0.043	0.00034
R3378	475,975	3,752,425	Worker	0.041	0.00033
R3379	476,000	3,752,425	Worker	0.040	0.00032
R3380	476,025	3,752,425	Worker	0.038	0.00031
R3381	476,050	3,752,425	Worker	0.037	0.00030
R3382	476,075	3,752,425	Worker	0.036	0.00029
R3383	476,100	3,752,425	Worker	0.035	0.00028
R3384	476,125	3,752,425	Worker	0.034	0.00028
R3385	476,150	3,752,425	Worker	0.034	0.00027
R3386	476,175	3,752,425	Worker	0.033	0.00026
R3387	476,200	3,752,425	Worker	0.032	0.00026
R3388	476,225	3,752,425	Worker	0.032	0.00025
R3389	476,250	3,752,425	Worker	0.031	0.00025
R3390	476,275	3,752,425	Worker	0.031	0.00025
R3391	476,300	3,752,425	Worker	0.030	0.00024
R3392	476,325	3,752,425	Worker	0.030	0.00024
R3393	476,350	3,752,425	Worker	0.029	0.00023
R3394	476,375	3,752,425	Worker	0.029	0.00023
R3395	476,400	3,752,425	Worker	0.028	0.00023
R3396	476,425	3,752,425	Worker	0.028	0.00022
R3397	476,450	3,752,425	Worker	0.027	0.00022
R3398	476,475	3,752,425	Worker	0.027	0.00022
R3399	476,500	3,752,425	Worker	0.027	0.00021
R3400	476,525	3,752,425	Worker	0.026	0.00021
R3401	476,550	3,752,425	Worker	0.026	0.00021
R3402	476,575	3,752,425	Worker	0.026	0.00021
R3403	476,600	3,752,425	Worker	0.026	0.00021
R3404	476,625	3,752,425	Worker	0.026	0.00021
R3405	476,650	3,752,425	Worker	0.028	0.00023
R3406	476,700	3,752,425	Worker	0.026	0.00021
R3407	476,725	3,752,425	Worker	0.024	0.00020
R3408	476,750	3,752,425	Worker	0.023	0.00019
R3409	476,775	3,752,425	Worker	0.023	0.00018
R3410	476,800	3,752,425	Worker	0.022	0.00018
R3411	476,825	3,752,425	Worker	0.021	0.00017
R3412	476,850	3,752,425	Worker	0.021	0.00017
R3413	476,875	3,752,425	Worker	0.020	0.00016
R3414	476,900	3,752,425	Worker	0.020	0.00016
R3415	476,925	3,752,425	Worker	0.020	0.00016
R3416	476,950	3,752,425	Worker	0.019	0.00015
R3417	476,975	3,752,425	Worker	0.019	0.00015
R3418	477,000	3,752,425	Worker	0.019	0.00015
R3419	477,025	3,752,425	Worker	0.018	0.00015
R3420	477,125	3,752,425	Worker	0.017	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3421	477,150	3,752,425	Worker	0.017	0.00013
R3422	477,175	3,752,425	Worker	0.017	0.00013
R3423	477,200	3,752,425	Worker	0.016	0.00013
R3424	477,225	3,752,425	Worker	0.016	0.00013
R3425	477,250	3,752,425	Worker	0.016	0.00013
R3426	477,275	3,752,425	Worker	0.016	0.00013
R3427	477,300	3,752,425	Worker	0.016	0.00013
R3428	477,325	3,752,425	Worker	0.015	0.00013
R3429	477,350	3,752,425	Worker	0.015	0.00013
R3430	477,375	3,752,425	Worker	0.015	0.00013
R3431	477,400	3,752,425	Worker	0.016	0.00013
R3432	477,425	3,752,425	Worker	0.016	0.00013
R3433	477,450	3,752,425	Worker	0.017	0.00014
R3434	477,500	3,752,425	Residential	0.332	0.00015
R3435	477,525	3,752,425	Residential	0.296	0.00013
R3436	477,550	3,752,425	Residential	0.276	0.00012
R3437	477,575	3,752,425	Residential	0.263	0.00011
R3438	477,600	3,752,425	Residential	0.254	0.00011
R3439	477,625	3,752,425	Residential	0.246	0.00011
R3440	477,650	3,752,425	Residential	0.240	0.00010
R3441	477,675	3,752,425	Residential	0.234	0.00010
R3442	473,775	3,752,450	Worker	0.019	0.00016
R3443	473,800	3,752,450	Worker	0.019	0.00017
R3444	473,825	3,752,450	Worker	0.020	0.00017
R3445	473,850	3,752,450	Worker	0.020	0.00018
R3446	473,875	3,752,450	Worker	0.020	0.00018
R3447	473,900	3,752,450	Worker	0.021	0.00018
R3448	473,925	3,752,450	Worker	0.021	0.00018
R3449	473,950	3,752,450	Worker	0.021	0.00019
R3450	473,975	3,752,450	Worker	0.021	0.00019
R3451	474,000	3,752,450	Worker	0.022	0.00019
R3452	474,025	3,752,450	Worker	0.022	0.00019
R3453	475,575	3,752,450	Worker	0.046	0.00036
R3454	475,600	3,752,450	Worker	0.045	0.00036
R3455	475,625	3,752,450	Worker	0.045	0.00036
R3456	475,650	3,752,450	Worker	0.045	0.00036
R3457	475,675	3,752,450	Worker	0.045	0.00036
R3458	475,700	3,752,450	Worker	0.045	0.00035
R3459	475,725	3,752,450	Worker	0.044	0.00035
R3460	475,750	3,752,450	Worker	0.044	0.00035
R3461	475,775	3,752,450	Worker	0.044	0.00035
R3462	475,800	3,752,450	Worker	0.045	0.00036
R3463	475,825	3,752,450	Worker	0.046	0.00037
R3464	475,875	3,752,450	Worker	0.050	0.00041
R3465	475,900	3,752,450	Worker	0.044	0.00036

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3466	475,925	3,752,450	Worker	0.040	0.00033
R3467	475,950	3,752,450	Worker	0.038	0.00031
R3468	475,975	3,752,450	Worker	0.036	0.00029
R3469	476,000	3,752,450	Worker	0.035	0.00028
R3470	476,025	3,752,450	Worker	0.034	0.00027
R3471	476,050	3,752,450	Worker	0.033	0.00027
R3472	476,075	3,752,450	Worker	0.032	0.00026
R3473	476,100	3,752,450	Worker	0.031	0.00025
R3474	476,125	3,752,450	Worker	0.031	0.00025
R3475	476,150	3,752,450	Worker	0.030	0.00024
R3476	476,175	3,752,450	Worker	0.029	0.00024
R3477	476,200	3,752,450	Worker	0.029	0.00023
R3478	476,325	3,752,450	Worker	0.027	0.00021
R3479	476,350	3,752,450	Worker	0.026	0.00021
R3480	476,375	3,752,450	Worker	0.026	0.00021
R3481	476,400	3,752,450	Worker	0.025	0.00020
R3482	476,425	3,752,450	Worker	0.025	0.00020
R3483	476,450	3,752,450	Worker	0.025	0.00020
R3484	476,475	3,752,450	Worker	0.025	0.00020
R3485	476,500	3,752,450	Worker	0.024	0.00019
R3486	476,525	3,752,450	Worker	0.024	0.00019
R3487	476,550	3,752,450	Worker	0.024	0.00019
R3488	476,575	3,752,450	Worker	0.024	0.00019
R3489	476,600	3,752,450	Worker	0.024	0.00019
R3490	476,625	3,752,450	Worker	0.024	0.00020
R3491	476,650	3,752,450	Worker	0.026	0.00022
R3492	476,700	3,752,450	Worker	0.024	0.00020
R3493	476,725	3,752,450	Worker	0.023	0.00018
R3494	476,750	3,752,450	Worker	0.022	0.00018
R3495	476,775	3,752,450	Worker	0.021	0.00017
R3496	476,800	3,752,450	Worker	0.020	0.00016
R3497	476,825	3,752,450	Worker	0.020	0.00016
R3498	476,850	3,752,450	Worker	0.019	0.00016
R3499	476,875	3,752,450	Worker	0.019	0.00015
R3500	476,900	3,752,450	Worker	0.019	0.00015
R3501	476,925	3,752,450	Worker	0.018	0.00015
R3502	476,950	3,752,450	Worker	0.018	0.00014
R3503	477,175	3,752,450	Worker	0.016	0.00013
R3504	477,200	3,752,450	Worker	0.015	0.00012
R3505	477,225	3,752,450	Worker	0.015	0.00012
R3506	477,250	3,752,450	Worker	0.015	0.00012
R3507	477,275	3,752,450	Worker	0.015	0.00012
R3508	477,300	3,752,450	Worker	0.015	0.00012
R3509	477,325	3,752,450	Worker	0.015	0.00012
R3510	477,350	3,752,450	Worker	0.015	0.00012

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3511	477,375	3,752,450	Worker	0.015	0.00012
R3512	477,400	3,752,450	Worker	0.015	0.00012
R3513	477,425	3,752,450	Worker	0.015	0.00013
R3514	477,450	3,752,450	Worker	0.017	0.00014
R3515	477,500	3,752,450	Residential	0.320	0.00014
R3516	477,525	3,752,450	Residential	0.285	0.00012
R3517	477,550	3,752,450	Residential	0.266	0.00012
R3518	477,575	3,752,450	Residential	0.253	0.00011
R3519	477,600	3,752,450	Residential	0.244	0.00011
R3520	477,625	3,752,450	Residential	0.237	0.00010
R3521	477,650	3,752,450	Residential	0.230	0.00010
R3522	477,675	3,752,450	Residential	0.225	0.00010
R3523	473,750	3,752,475	Worker	0.017	0.00015
R3524	473,775	3,752,475	Worker	0.017	0.00015
R3525	473,800	3,752,475	Worker	0.018	0.00016
R3526	473,825	3,752,475	Worker	0.018	0.00016
R3527	473,850	3,752,475	Worker	0.019	0.00016
R3528	473,875	3,752,475	Worker	0.019	0.00017
R3529	473,900	3,752,475	Worker	0.019	0.00017
R3530	473,925	3,752,475	Worker	0.019	0.00017
R3531	473,950	3,752,475	Worker	0.019	0.00017
R3532	473,975	3,752,475	Worker	0.020	0.00017
R3533	474,000	3,752,475	Worker	0.020	0.00017
R3534	475,600	3,752,475	Worker	0.040	0.00032
R3535	475,625	3,752,475	Worker	0.040	0.00032
R3536	475,650	3,752,475	Worker	0.040	0.00032
R3537	475,675	3,752,475	Worker	0.039	0.00031
R3538	475,700	3,752,475	Worker	0.039	0.00031
R3539	475,725	3,752,475	Worker	0.039	0.00031
R3540	475,750	3,752,475	Worker	0.039	0.00031
R3541	475,775	3,752,475	Worker	0.039	0.00031
R3542	475,800	3,752,475	Worker	0.039	0.00032
R3543	475,825	3,752,475	Worker	0.041	0.00034
R3544	475,875	3,752,475	Worker	0.045	0.00038
R3545	475,900	3,752,475	Worker	0.039	0.00032
R3546	475,925	3,752,475	Worker	0.036	0.00029
R3547	475,950	3,752,475	Worker	0.034	0.00028
R3548	475,975	3,752,475	Worker	0.033	0.00026
R3549	476,000	3,752,475	Worker	0.031	0.00025
R3550	476,025	3,752,475	Worker	0.030	0.00024
R3551	476,050	3,752,475	Worker	0.029	0.00024
R3552	476,075	3,752,475	Worker	0.029	0.00023
R3553	476,100	3,752,475	Worker	0.028	0.00023
R3554	476,125	3,752,475	Worker	0.027	0.00022
R3555	476,150	3,752,475	Worker	0.027	0.00022

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3556	476,375	3,752,475	Worker	0.023	0.00019
R3557	476,400	3,752,475	Worker	0.023	0.00018
R3558	476,425	3,752,475	Worker	0.023	0.00018
R3559	476,450	3,752,475	Worker	0.022	0.00018
R3560	476,475	3,752,475	Worker	0.022	0.00018
R3561	476,500	3,752,475	Worker	0.022	0.00018
R3562	476,525	3,752,475	Worker	0.022	0.00018
R3563	476,550	3,752,475	Worker	0.022	0.00018
R3564	476,575	3,752,475	Worker	0.022	0.00018
R3565	476,600	3,752,475	Worker	0.022	0.00018
R3566	476,625	3,752,475	Worker	0.023	0.00019
R3567	476,650	3,752,475	Worker	0.025	0.00020
R3568	476,675	3,752,475	Worker	0.025	0.00021
R3569	476,700	3,752,475	Worker	0.022	0.00018
R3570	476,725	3,752,475	Worker	0.021	0.00017
R3571	476,750	3,752,475	Worker	0.020	0.00016
R3572	476,775	3,752,475	Worker	0.020	0.00016
R3573	476,800	3,752,475	Worker	0.019	0.00015
R3574	476,825	3,752,475	Worker	0.019	0.00015
R3575	476,850	3,752,475	Worker	0.018	0.00015
R3576	476,875	3,752,475	Worker	0.018	0.00014
R3577	476,900	3,752,475	Worker	0.017	0.00014
R3578	476,925	3,752,475	Worker	0.017	0.00014
R3579	477,225	3,752,475	Worker	0.014	0.00012
R3580	477,250	3,752,475	Worker	0.014	0.00012
R3581	477,275	3,752,475	Worker	0.014	0.00011
R3582	477,300	3,752,475	Worker	0.014	0.00011
R3583	477,325	3,752,475	Worker	0.014	0.00011
R3584	477,350	3,752,475	Worker	0.014	0.00011
R3585	477,375	3,752,475	Worker	0.014	0.00011
R3586	477,400	3,752,475	Worker	0.014	0.00012
R3587	477,425	3,752,475	Worker	0.015	0.00012
R3588	477,450	3,752,475	Worker	0.016	0.00013
R3589	477,500	3,752,475	Residential	0.308	0.00014
R3590	477,525	3,752,475	Residential	0.274	0.00012
R3591	477,550	3,752,475	Residential	0.255	0.00011
R3592	477,575	3,752,475	Residential	0.243	0.00011
R3593	477,600	3,752,475	Residential	0.234	0.00010
R3594	477,625	3,752,475	Residential	0.227	0.00010
R3595	477,650	3,752,475	Residential	0.221	0.00010
R3596	477,675	3,752,475	Residential	0.216	0.00009
R3597	473,775	3,752,500	Worker	0.016	0.00014
R3598	473,800	3,752,500	Worker	0.017	0.00015
R3599	473,825	3,752,500	Worker	0.017	0.00015
R3600	473,850	3,752,500	Worker	0.017	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3601	473,875	3,752,500	Worker	0.017	0.00015
R3602	473,900	3,752,500	Worker	0.018	0.00015
R3603	473,925	3,752,500	Worker	0.018	0.00016
R3604	473,950	3,752,500	Worker	0.018	0.00016
R3605	473,975	3,752,500	Worker	0.018	0.00016
R3606	475,625	3,752,500	Worker	0.035	0.00028
R3607	475,650	3,752,500	Worker	0.035	0.00028
R3608	475,675	3,752,500	Worker	0.035	0.00028
R3609	475,700	3,752,500	Worker	0.035	0.00028
R3610	475,725	3,752,500	Worker	0.034	0.00027
R3611	475,750	3,752,500	Worker	0.034	0.00028
R3612	475,775	3,752,500	Worker	0.035	0.00028
R3613	475,800	3,752,500	Worker	0.035	0.00029
R3614	475,825	3,752,500	Worker	0.037	0.00030
R3615	475,875	3,752,500	Worker	0.042	0.00035
R3616	475,900	3,752,500	Worker	0.036	0.00029
R3617	475,925	3,752,500	Worker	0.033	0.00027
R3618	475,950	3,752,500	Worker	0.031	0.00025
R3619	475,975	3,752,500	Worker	0.029	0.00024
R3620	476,000	3,752,500	Worker	0.028	0.00023
R3621	476,025	3,752,500	Worker	0.027	0.00022
R3622	476,050	3,752,500	Worker	0.027	0.00021
R3623	476,075	3,752,500	Worker	0.026	0.00021
R3624	476,100	3,752,500	Worker	0.025	0.00020
R3625	476,425	3,752,500	Worker	0.021	0.00017
R3626	476,450	3,752,500	Worker	0.020	0.00016
R3627	476,475	3,752,500	Worker	0.020	0.00016
R3628	476,500	3,752,500	Worker	0.020	0.00016
R3629	476,525	3,752,500	Worker	0.020	0.00016
R3630	476,550	3,752,500	Worker	0.020	0.00016
R3631	476,575	3,752,500	Worker	0.020	0.00016
R3632	476,600	3,752,500	Worker	0.020	0.00017
R3633	476,625	3,752,500	Worker	0.021	0.00017
R3634	476,650	3,752,500	Worker	0.023	0.00019
R3635	476,675	3,752,500	Worker	0.023	0.00020
R3636	476,700	3,752,500	Worker	0.021	0.00017
R3637	476,725	3,752,500	Worker	0.020	0.00016
R3638	476,750	3,752,500	Worker	0.019	0.00015
R3639	476,775	3,752,500	Worker	0.018	0.00015
R3640	476,800	3,752,500	Worker	0.018	0.00014
R3641	476,825	3,752,500	Worker	0.017	0.00014
R3642	476,850	3,752,500	Worker	0.017	0.00014
R3643	476,875	3,752,500	Worker	0.017	0.00013
R3644	476,900	3,752,500	Worker	0.016	0.00013
R3645	477,250	3,752,500	Worker	0.013	0.00011

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3646	477,275	3,752,500	Worker	0.013	0.00011
R3647	477,300	3,752,500	Worker	0.013	0.00011
R3648	477,325	3,752,500	Worker	0.013	0.00011
R3649	477,350	3,752,500	Worker	0.013	0.00011
R3650	477,375	3,752,500	Worker	0.013	0.00011
R3651	477,400	3,752,500	Worker	0.014	0.00011
R3652	477,425	3,752,500	Worker	0.014	0.00012
R3653	477,450	3,752,500	Worker	0.015	0.00013
R3654	477,500	3,752,500	Residential	0.296	0.00013
R3655	477,525	3,752,500	Residential	0.263	0.00012
R3656	477,550	3,752,500	Residential	0.245	0.00011
R3657	477,575	3,752,500	Residential	0.233	0.00010
R3658	477,600	3,752,500	Residential	0.224	0.00010
R3659	477,625	3,752,500	Residential	0.217	0.00009
R3660	477,650	3,752,500	Residential	0.212	0.00009
R3661	477,675	3,752,500	Residential	0.207	0.00009
R3662	473,825	3,752,525	Worker	0.016	0.00014
R3663	473,850	3,752,525	Worker	0.016	0.00014
R3664	473,875	3,752,525	Worker	0.016	0.00014
R3665	473,900	3,752,525	Worker	0.017	0.00014
R3666	475,650	3,752,525	Worker	0.031	0.00025
R3667	475,675	3,752,525	Worker	0.031	0.00025
R3668	475,700	3,752,525	Worker	0.031	0.00025
R3669	475,725	3,752,525	Worker	0.031	0.00024
R3670	475,750	3,752,525	Worker	0.031	0.00025
R3671	475,775	3,752,525	Worker	0.031	0.00025
R3672	475,800	3,752,525	Worker	0.032	0.00026
R3673	475,825	3,752,525	Worker	0.034	0.00028
R3674	475,875	3,752,525	Worker	0.039	0.00032
R3675	475,900	3,752,525	Worker	0.033	0.00027
R3676	475,925	3,752,525	Worker	0.030	0.00024
R3677	475,950	3,752,525	Worker	0.028	0.00023
R3678	475,975	3,752,525	Worker	0.027	0.00022
R3679	476,000	3,752,525	Worker	0.026	0.00021
R3680	476,025	3,752,525	Worker	0.025	0.00020
R3681	476,050	3,752,525	Worker	0.024	0.00019
R3682	476,075	3,752,525	Worker	0.023	0.00019
R3683	476,425	3,752,525	Worker	0.019	0.00015
R3684	476,450	3,752,525	Worker	0.019	0.00015
R3685	476,475	3,752,525	Worker	0.018	0.00015
R3686	476,500	3,752,525	Worker	0.018	0.00015
R3687	476,525	3,752,525	Worker	0.018	0.00015
R3688	476,550	3,752,525	Worker	0.018	0.00015
R3689	476,575	3,752,525	Worker	0.018	0.00015
R3690	476,600	3,752,525	Worker	0.019	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3691	476,625	3,752,525	Worker	0.019	0.00016
R3692	476,650	3,752,525	Worker	0.022	0.00018
R3693	476,675	3,752,525	Worker	0.022	0.00018
R3694	476,700	3,752,525	Worker	0.019	0.00016
R3695	476,725	3,752,525	Worker	0.018	0.00015
R3696	476,750	3,752,525	Worker	0.017	0.00014
R3697	476,775	3,752,525	Worker	0.017	0.00014
R3698	476,800	3,752,525	Worker	0.016	0.00013
R3699	476,825	3,752,525	Worker	0.016	0.00013
R3700	476,850	3,752,525	Worker	0.016	0.00013
R3701	476,875	3,752,525	Worker	0.015	0.00012
R3702	477,250	3,752,525	Worker	0.013	0.00010
R3703	477,275	3,752,525	Worker	0.013	0.00010
R3704	477,300	3,752,525	Worker	0.013	0.00010
R3705	477,325	3,752,525	Worker	0.012	0.00010
R3706	477,350	3,752,525	Worker	0.013	0.00010
R3707	477,375	3,752,525	Worker	0.013	0.00010
R3708	477,400	3,752,525	Worker	0.013	0.00011
R3709	477,425	3,752,525	Worker	0.013	0.00011
R3710	477,450	3,752,525	Worker	0.015	0.00012
R3711	477,500	3,752,525	Residential	0.284	0.00013
R3712	477,525	3,752,525	Residential	0.252	0.00011
R3713	477,550	3,752,525	Residential	0.234	0.00010
R3714	477,575	3,752,525	Residential	0.222	0.00010
R3715	477,600	3,752,525	Residential	0.214	0.00009
R3716	477,625	3,752,525	Residential	0.207	0.00009
R3717	477,650	3,752,525	Residential	0.202	0.00009
R3718	477,675	3,752,525	Residential	0.197	0.00009
R3719	475,650	3,752,550	Worker	0.028	0.00022
R3720	475,675	3,752,550	Worker	0.028	0.00022
R3721	475,700	3,752,550	Worker	0.028	0.00022
R3722	475,725	3,752,550	Worker	0.027	0.00022
R3723	475,750	3,752,550	Worker	0.027	0.00022
R3724	475,775	3,752,550	Worker	0.028	0.00022
R3725	475,800	3,752,550	Worker	0.028	0.00023
R3726	475,825	3,752,550	Worker	0.031	0.00025
R3727	475,875	3,752,550	Worker	0.036	0.00030
R3728	475,900	3,752,550	Worker	0.030	0.00025
R3729	475,925	3,752,550	Worker	0.027	0.00022
R3730	475,950	3,752,550	Worker	0.025	0.00021
R3731	475,975	3,752,550	Worker	0.024	0.00020
R3732	476,000	3,752,550	Worker	0.023	0.00019
R3733	476,025	3,752,550	Worker	0.022	0.00018
R3734	476,050	3,752,550	Worker	0.022	0.00018
R3735	476,075	3,752,550	Worker	0.021	0.00017

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3736	476,450	3,752,550	Worker	0.017	0.00014
R3737	476,475	3,752,550	Worker	0.017	0.00014
R3738	476,500	3,752,550	Worker	0.017	0.00014
R3739	476,525	3,752,550	Worker	0.017	0.00014
R3740	476,550	3,752,550	Worker	0.017	0.00014
R3741	476,575	3,752,550	Worker	0.017	0.00014
R3742	476,600	3,752,550	Worker	0.017	0.00014
R3743	476,625	3,752,550	Worker	0.018	0.00015
R3744	476,650	3,752,550	Worker	0.020	0.00017
R3745	476,675	3,752,550	Worker	0.020	0.00017
R3746	476,700	3,752,550	Worker	0.018	0.00015
R3747	476,725	3,752,550	Worker	0.017	0.00014
R3748	476,750	3,752,550	Worker	0.016	0.00013
R3749	476,775	3,752,550	Worker	0.016	0.00013
R3750	476,800	3,752,550	Worker	0.015	0.00012
R3751	476,825	3,752,550	Worker	0.015	0.00012
R3752	476,850	3,752,550	Worker	0.015	0.00012
R3753	476,875	3,752,550	Worker	0.014	0.00012
R3754	477,275	3,752,550	Worker	0.012	0.00010
R3755	477,300	3,752,550	Worker	0.012	0.00010
R3756	477,325	3,752,550	Worker	0.012	0.00010
R3757	477,350	3,752,550	Worker	0.012	0.00010
R3758	477,375	3,752,550	Worker	0.012	0.00010
R3759	477,400	3,752,550	Worker	0.012	0.00010
R3760	477,425	3,752,550	Worker	0.013	0.00010
R3761	477,450	3,752,550	Worker	0.014	0.00012
R3762	477,500	3,752,550	Residential	0.272	0.00012
R3763	477,525	3,752,550	Residential	0.239	0.00011
R3764	477,550	3,752,550	Residential	0.222	0.00010
R3765	477,575	3,752,550	Residential	0.210	0.00009
R3766	477,600	3,752,550	Residential	0.202	0.00009
R3767	477,625	3,752,550	Residential	0.196	0.00009
R3768	477,650	3,752,550	Residential	0.191	0.00008
R3769	477,675	3,752,550	Residential	0.187	0.00008
R3770	475,675	3,752,575	Worker	0.025	0.00020
R3771	475,700	3,752,575	Worker	0.025	0.00020
R3772	475,725	3,752,575	Worker	0.025	0.00020
R3773	475,750	3,752,575	Worker	0.025	0.00020
R3774	475,775	3,752,575	Worker	0.025	0.00020
R3775	475,800	3,752,575	Worker	0.025	0.00021
R3776	475,825	3,752,575	Worker	0.027	0.00022
R3777	475,875	3,752,575	Worker	0.033	0.00028
R3778	475,900	3,752,575	Worker	0.027	0.00023
R3779	475,925	3,752,575	Worker	0.024	0.00020
R3780	475,950	3,752,575	Worker	0.023	0.00019

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3781	475,975	3,752,575	Worker	0.022	0.00018
R3782	476,000	3,752,575	Worker	0.021	0.00017
R3783	476,025	3,752,575	Worker	0.020	0.00016
R3784	476,050	3,752,575	Worker	0.020	0.00016
R3785	476,450	3,752,575	Worker	0.016	0.00013
R3786	476,475	3,752,575	Worker	0.015	0.00013
R3787	476,500	3,752,575	Worker	0.015	0.00012
R3788	476,525	3,752,575	Worker	0.015	0.00012
R3789	476,550	3,752,575	Worker	0.015	0.00012
R3790	476,575	3,752,575	Worker	0.015	0.00013
R3791	476,600	3,752,575	Worker	0.016	0.00013
R3792	476,625	3,752,575	Worker	0.016	0.00014
R3793	476,650	3,752,575	Worker	0.019	0.00016
R3794	476,675	3,752,575	Worker	0.019	0.00016
R3795	476,700	3,752,575	Worker	0.017	0.00014
R3796	476,725	3,752,575	Worker	0.015	0.00013
R3797	476,750	3,752,575	Worker	0.015	0.00012
R3798	476,775	3,752,575	Worker	0.014	0.00012
R3799	476,800	3,752,575	Worker	0.014	0.00011
R3800	476,825	3,752,575	Worker	0.014	0.00011
R3801	476,850	3,752,575	Worker	0.013	0.00011
R3802	477,275	3,752,575	Worker	0.011	0.00009
R3803	477,300	3,752,575	Worker	0.011	0.00009
R3804	477,325	3,752,575	Worker	0.011	0.00009
R3805	477,350	3,752,575	Worker	0.011	0.00009
R3806	477,375	3,752,575	Worker	0.011	0.00009
R3807	477,400	3,752,575	Worker	0.011	0.00009
R3808	477,425	3,752,575	Worker	0.012	0.00010
R3809	477,450	3,752,575	Worker	0.013	0.00011
R3810	477,500	3,752,575	Residential	0.255	0.00011
R3811	477,525	3,752,575	Residential	0.222	0.00010
R3812	477,550	3,752,575	Residential	0.206	0.00009
R3813	477,575	3,752,575	Residential	0.197	0.00009
R3814	477,600	3,752,575	Residential	0.190	0.00008
R3815	477,625	3,752,575	Residential	0.185	0.00008
R3816	477,650	3,752,575	Residential	0.181	0.00008
R3817	477,675	3,752,575	Residential	0.178	0.00008
R3818	475,675	3,752,600	Worker	0.023	0.00018
R3819	475,700	3,752,600	Worker	0.022	0.00018
R3820	475,725	3,752,600	Worker	0.022	0.00018
R3821	475,750	3,752,600	Worker	0.022	0.00018
R3822	475,775	3,752,600	Worker	0.022	0.00018
R3823	475,800	3,752,600	Worker	0.022	0.00018
R3824	475,825	3,752,600	Worker	0.023	0.00019
R3825	475,875	3,752,600	Worker	0.028	0.00023

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3826	475,900	3,752,600	Worker	0.023	0.00019
R3827	475,925	3,752,600	Worker	0.021	0.00017
R3828	475,950	3,752,600	Worker	0.020	0.00016
R3829	475,975	3,752,600	Worker	0.019	0.00016
R3830	476,000	3,752,600	Worker	0.019	0.00015
R3831	476,025	3,752,600	Worker	0.018	0.00015
R3832	476,050	3,752,600	Worker	0.018	0.00014
R3833	476,475	3,752,600	Worker	0.014	0.00012
R3834	476,500	3,752,600	Worker	0.014	0.00011
R3835	476,525	3,752,600	Worker	0.014	0.00011
R3836	476,550	3,752,600	Worker	0.014	0.00011
R3837	476,575	3,752,600	Worker	0.014	0.00011
R3838	476,600	3,752,600	Worker	0.014	0.00012
R3839	476,625	3,752,600	Worker	0.015	0.00012
R3840	476,675	3,752,600	Worker	0.017	0.00014
R3841	476,700	3,752,600	Worker	0.015	0.00012
R3842	476,725	3,752,600	Worker	0.014	0.00011
R3843	476,750	3,752,600	Worker	0.013	0.00011
R3844	476,775	3,752,600	Worker	0.013	0.00011
R3845	476,800	3,752,600	Worker	0.013	0.00010
R3846	476,825	3,752,600	Worker	0.013	0.00010
R3847	476,850	3,752,600	Worker	0.012	0.00010
R3848	477,275	3,752,600	Worker	0.010	0.00009
R3849	477,300	3,752,600	Worker	0.010	0.00008
R3850	477,325	3,752,600	Worker	0.010	0.00008
R3851	477,350	3,752,600	Worker	0.010	0.00008
R3852	477,375	3,752,600	Worker	0.010	0.00008
R3853	477,400	3,752,600	Worker	0.010	0.00009
R3854	477,425	3,752,600	Worker	0.011	0.00009
R3855	477,450	3,752,600	Worker	0.011	0.00009
R3856	477,500	3,752,600	Residential	0.213	0.00009
R3857	477,525	3,752,600	Residential	0.197	0.00009
R3858	477,550	3,752,600	Residential	0.188	0.00008
R3859	477,575	3,752,600	Residential	0.182	0.00008
R3860	477,600	3,752,600	Residential	0.177	0.00008
R3861	477,625	3,752,600	Residential	0.174	0.00008
R3862	477,650	3,752,600	Residential	0.171	0.00007
R3863	477,675	3,752,600	Residential	0.168	0.00007
R3864	475,675	3,752,625	Worker	0.021	0.00016
R3865	475,700	3,752,625	Worker	0.020	0.00016
R3866	475,725	3,752,625	Worker	0.020	0.00016
R3867	475,750	3,752,625	Worker	0.020	0.00016
R3868	475,775	3,752,625	Worker	0.020	0.00016
R3869	475,800	3,752,625	Worker	0.020	0.00016
R3870	475,825	3,752,625	Worker	0.020	0.00016

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3871	475,850	3,752,625	Worker	0.020	0.00016
R3872	475,875	3,752,625	Worker	0.019	0.00015
R3873	475,900	3,752,625	Worker	0.019	0.00015
R3874	475,925	3,752,625	Worker	0.018	0.00015
R3875	475,950	3,752,625	Worker	0.018	0.00014
R3876	475,975	3,752,625	Worker	0.017	0.00014
R3877	476,000	3,752,625	Worker	0.017	0.00014
R3878	476,025	3,752,625	Worker	0.017	0.00013
R3879	476,050	3,752,625	Worker	0.016	0.00013
R3880	476,475	3,752,625	Worker	0.013	0.00011
R3881	476,500	3,752,625	Worker	0.013	0.00010
R3882	476,525	3,752,625	Worker	0.013	0.00010
R3883	476,550	3,752,625	Worker	0.013	0.00010
R3884	476,575	3,752,625	Worker	0.013	0.00010
R3885	476,600	3,752,625	Worker	0.013	0.00010
R3886	476,625	3,752,625	Worker	0.013	0.00011
R3887	476,650	3,752,625	Worker	0.013	0.00011
R3888	476,675	3,752,625	Worker	0.013	0.00010
R3889	476,700	3,752,625	Worker	0.013	0.00010
R3890	476,725	3,752,625	Worker	0.012	0.00010
R3891	476,750	3,752,625	Worker	0.012	0.00010
R3892	476,775	3,752,625	Worker	0.012	0.00010
R3893	476,800	3,752,625	Worker	0.012	0.00010
R3894	476,825	3,752,625	Worker	0.012	0.00009
R3895	476,850	3,752,625	Worker	0.012	0.00009
R3896	477,275	3,752,625	Worker	0.010	0.00008
R3897	477,300	3,752,625	Worker	0.010	0.00008
R3898	477,325	3,752,625	Worker	0.010	0.00008
R3899	477,350	3,752,625	Worker	0.010	0.00008
R3900	477,375	3,752,625	Worker	0.010	0.00008
R3901	477,400	3,752,625	Worker	0.010	0.00008
R3902	477,425	3,752,625	Worker	0.010	0.00008
R3903	477,450	3,752,625	Worker	0.010	0.00008
R3904	477,475	3,752,625	Worker	0.010	0.00008
R3905	477,500	3,752,625	Residential	0.176	0.00008
R3906	477,525	3,752,625	Residential	0.173	0.00008
R3907	477,550	3,752,625	Residential	0.171	0.00007
R3908	477,575	3,752,625	Residential	0.168	0.00007
R3909	477,600	3,752,625	Residential	0.165	0.00007
R3910	477,625	3,752,625	Residential	0.163	0.00007
R3911	477,650	3,752,625	Residential	0.161	0.00007
R3912	477,675	3,752,625	Residential	0.158	0.00007
R3913	475,675	3,752,650	Worker	0.019	0.00015
R3914	475,700	3,752,650	Worker	0.019	0.00015
R3915	475,725	3,752,650	Worker	0.018	0.00015

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3916	475,750	3,752,650	Worker	0.018	0.00014
R3917	475,775	3,752,650	Worker	0.018	0.00014
R3918	475,800	3,752,650	Worker	0.018	0.00014
R3919	475,825	3,752,650	Worker	0.017	0.00014
R3920	475,850	3,752,650	Worker	0.017	0.00014
R3921	475,875	3,752,650	Worker	0.017	0.00013
R3922	475,900	3,752,650	Worker	0.016	0.00013
R3923	475,925	3,752,650	Worker	0.016	0.00013
R3924	475,950	3,752,650	Worker	0.016	0.00013
R3925	475,975	3,752,650	Worker	0.016	0.00013
R3926	476,000	3,752,650	Worker	0.015	0.00012
R3927	476,025	3,752,650	Worker	0.015	0.00012
R3928	476,050	3,752,650	Worker	0.015	0.00012
R3929	476,475	3,752,650	Worker	0.012	0.00010
R3930	476,500	3,752,650	Worker	0.012	0.00010
R3931	476,525	3,752,650	Worker	0.012	0.00010
R3932	476,550	3,752,650	Worker	0.012	0.00010
R3933	476,575	3,752,650	Worker	0.012	0.00010
R3934	476,600	3,752,650	Worker	0.012	0.00010
R3935	476,625	3,752,650	Worker	0.012	0.00010
R3936	476,650	3,752,650	Worker	0.012	0.00009
R3937	476,675	3,752,650	Worker	0.011	0.00009
R3938	476,700	3,752,650	Worker	0.011	0.00009
R3939	476,725	3,752,650	Worker	0.011	0.00009
R3940	476,750	3,752,650	Worker	0.011	0.00009
R3941	476,775	3,752,650	Worker	0.011	0.00009
R3942	476,800	3,752,650	Worker	0.011	0.00009
R3943	476,825	3,752,650	Worker	0.011	0.00009
R3944	476,850	3,752,650	Worker	0.011	0.00009
R3945	477,300	3,752,650	Worker	0.009	0.00007
R3946	477,325	3,752,650	Worker	0.009	0.00007
R3947	477,350	3,752,650	Worker	0.009	0.00007
R3948	477,375	3,752,650	Worker	0.009	0.00007
R3949	477,400	3,752,650	Worker	0.009	0.00007
R3950	477,425	3,752,650	Worker	0.009	0.00007
R3951	477,450	3,752,650	Worker	0.009	0.00007
R3952	477,475	3,752,650	Worker	0.009	0.00007
R3953	477,500	3,752,650	Residential	0.162	0.00007
R3954	477,525	3,752,650	Residential	0.160	0.00007
R3955	477,550	3,752,650	Residential	0.158	0.00007
R3956	477,575	3,752,650	Residential	0.156	0.00007
R3957	477,600	3,752,650	Residential	0.155	0.00007
R3958	477,625	3,752,650	Residential	0.153	0.00007
R3959	477,650	3,752,650	Residential	0.151	0.00007
R3960	475,675	3,752,675	Worker	0.017	0.00014

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R3961	475,700	3,752,675	Worker	0.017	0.00014
R3962	475,725	3,752,675	Worker	0.017	0.00013
R3963	475,750	3,752,675	Worker	0.017	0.00013
R3964	475,775	3,752,675	Worker	0.016	0.00013
R3965	475,800	3,752,675	Worker	0.016	0.00013
R3966	475,825	3,752,675	Worker	0.016	0.00013
R3967	475,850	3,752,675	Worker	0.016	0.00012
R3968	475,875	3,752,675	Worker	0.015	0.00012
R3969	475,900	3,752,675	Worker	0.015	0.00012
R3970	475,925	3,752,675	Worker	0.015	0.00012
R3971	475,950	3,752,675	Worker	0.014	0.00012
R3972	475,975	3,752,675	Worker	0.014	0.00011
R3973	476,000	3,752,675	Worker	0.014	0.00011
R3974	476,025	3,752,675	Worker	0.014	0.00011
R3975	476,475	3,752,675	Worker	0.011	0.00009
R3976	476,500	3,752,675	Worker	0.011	0.00009
R3977	476,525	3,752,675	Worker	0.011	0.00009
R3978	476,550	3,752,675	Worker	0.011	0.00009
R3979	476,575	3,752,675	Worker	0.011	0.00009
R3980	476,600	3,752,675	Worker	0.011	0.00009
R3981	476,625	3,752,675	Worker	0.011	0.00009
R3982	476,650	3,752,675	Worker	0.011	0.00009
R3983	476,675	3,752,675	Worker	0.010	0.00009
R3984	476,700	3,752,675	Worker	0.010	0.00008
R3985	476,725	3,752,675	Worker	0.010	0.00008
R3986	476,750	3,752,675	Worker	0.010	0.00008
R3987	476,775	3,752,675	Worker	0.010	0.00008
R3988	476,800	3,752,675	Worker	0.010	0.00008
R3989	476,825	3,752,675	Worker	0.010	0.00008
R3990	476,850	3,752,675	Worker	0.010	0.00008
R3991	477,300	3,752,675	Worker	0.009	0.00007
R3992	477,325	3,752,675	Worker	0.009	0.00007
R3993	477,350	3,752,675	Worker	0.009	0.00007
R3994	477,375	3,752,675	Worker	0.008	0.00007
R3995	477,400	3,752,675	Worker	0.008	0.00007
R3996	477,425	3,752,675	Worker	0.008	0.00007
R3997	477,450	3,752,675	Worker	0.008	0.00007
R3998	477,475	3,752,675	Worker	0.008	0.00007
R3999	477,500	3,752,675	Residential	0.151	0.00007
R4000	477,525	3,752,675	Residential	0.150	0.00007
R4001	477,550	3,752,675	Residential	0.148	0.00006
R4002	477,575	3,752,675	Residential	0.147	0.00006
R4003	477,600	3,752,675	Residential	0.145	0.00006
R4004	477,625	3,752,675	Residential	0.144	0.00006
R4005	477,650	3,752,675	Residential	0.143	0.00006

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R4006	475,700	3,752,700	Worker	0.016	0.00012
R4007	475,725	3,752,700	Worker	0.015	0.00012
R4008	475,750	3,752,700	Worker	0.015	0.00012
R4009	475,775	3,752,700	Worker	0.015	0.00012
R4010	475,800	3,752,700	Worker	0.015	0.00012
R4011	475,825	3,752,700	Worker	0.014	0.00012
R4012	475,850	3,752,700	Worker	0.014	0.00011
R4013	475,875	3,752,700	Worker	0.014	0.00011
R4014	475,900	3,752,700	Worker	0.014	0.00011
R4015	475,925	3,752,700	Worker	0.014	0.00011
R4016	475,950	3,752,700	Worker	0.013	0.00011
R4017	475,975	3,752,700	Worker	0.013	0.00011
R4018	476,000	3,752,700	Worker	0.013	0.00010
R4019	476,025	3,752,700	Worker	0.013	0.00010
R4020	476,500	3,752,700	Worker	0.010	0.00008
R4021	476,525	3,752,700	Worker	0.010	0.00008
R4022	476,550	3,752,700	Worker	0.010	0.00008
R4023	476,575	3,752,700	Worker	0.010	0.00008
R4024	476,600	3,752,700	Worker	0.010	0.00008
R4025	476,625	3,752,700	Worker	0.010	0.00008
R4026	476,650	3,752,700	Worker	0.010	0.00008
R4027	476,675	3,752,700	Worker	0.010	0.00008
R4028	476,700	3,752,700	Worker	0.010	0.00008
R4029	476,725	3,752,700	Worker	0.010	0.00008
R4030	476,750	3,752,700	Worker	0.009	0.00008
R4031	476,775	3,752,700	Worker	0.009	0.00008
R4032	476,800	3,752,700	Worker	0.009	0.00008
R4033	476,825	3,752,700	Worker	0.009	0.00008
R4034	477,300	3,752,700	Worker	0.008	0.00007
R4035	477,325	3,752,700	Worker	0.008	0.00007
R4036	477,350	3,752,700	Worker	0.008	0.00007
R4037	477,375	3,752,700	Worker	0.008	0.00006
R4038	477,400	3,752,700	Worker	0.008	0.00006
R4039	477,425	3,752,700	Worker	0.008	0.00006
R4040	477,450	3,752,700	Worker	0.008	0.00006
R4041	477,475	3,752,700	Worker	0.008	0.00006
R4042	477,500	3,752,700	Residential	0.143	0.00006
R4043	477,525	3,752,700	Residential	0.141	0.00006
R4044	477,550	3,752,700	Residential	0.140	0.00006
R4045	477,575	3,752,700	Residential	0.139	0.00006
R4046	477,600	3,752,700	Residential	0.137	0.00006
R4047	477,625	3,752,700	Residential	0.136	0.00006
R4048	477,650	3,752,700	Residential	0.135	0.00006
R4049	475,700	3,752,725	Worker	0.014	0.00011
R4050	475,725	3,752,725	Worker	0.014	0.00011

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R4051	475,750	3,752,725	Worker	0.014	0.00011
R4052	475,775	3,752,725	Worker	0.014	0.00011
R4053	475,800	3,752,725	Worker	0.014	0.00011
R4054	475,825	3,752,725	Worker	0.013	0.00011
R4055	475,850	3,752,725	Worker	0.013	0.00010
R4056	475,875	3,752,725	Worker	0.013	0.00010
R4057	475,900	3,752,725	Worker	0.013	0.00010
R4058	475,925	3,752,725	Worker	0.013	0.00010
R4059	475,950	3,752,725	Worker	0.012	0.00010
R4060	475,975	3,752,725	Worker	0.012	0.00010
R4061	476,000	3,752,725	Worker	0.012	0.00010
R4062	476,500	3,752,725	Worker	0.010	0.00008
R4063	476,525	3,752,725	Worker	0.009	0.00008
R4064	476,550	3,752,725	Worker	0.009	0.00008
R4065	476,575	3,752,725	Worker	0.009	0.00008
R4066	476,600	3,752,725	Worker	0.009	0.00008
R4067	476,625	3,752,725	Worker	0.009	0.00007
R4068	476,650	3,752,725	Worker	0.009	0.00007
R4069	476,675	3,752,725	Worker	0.009	0.00007
R4070	476,700	3,752,725	Worker	0.009	0.00007
R4071	476,725	3,752,725	Worker	0.009	0.00007
R4072	476,750	3,752,725	Worker	0.009	0.00007
R4073	476,775	3,752,725	Worker	0.009	0.00007
R4074	476,800	3,752,725	Worker	0.009	0.00007
R4075	476,825	3,752,725	Worker	0.009	0.00007
R4076	477,325	3,752,725	Worker	0.008	0.00006
R4077	477,350	3,752,725	Worker	0.008	0.00006
R4078	477,375	3,752,725	Worker	0.008	0.00006
R4079	477,400	3,752,725	Worker	0.007	0.00006
R4080	477,425	3,752,725	Worker	0.007	0.00006
R4081	477,450	3,752,725	Worker	0.007	0.00006
R4082	477,475	3,752,725	Worker	0.007	0.00006
R4083	477,500	3,752,725	Residential	0.135	0.00006
R4084	477,525	3,752,725	Residential	0.133	0.00006
R4085	477,550	3,752,725	Residential	0.132	0.00006
R4086	477,575	3,752,725	Residential	0.131	0.00006
R4087	477,600	3,752,725	Residential	0.130	0.00006
R4088	477,625	3,752,725	Residential	0.129	0.00006
R4089	475,725	3,752,750	Worker	0.013	0.00010
R4090	475,750	3,752,750	Worker	0.013	0.00010
R4091	475,775	3,752,750	Worker	0.013	0.00010
R4092	475,800	3,752,750	Worker	0.013	0.00010
R4093	475,825	3,752,750	Worker	0.012	0.00010
R4094	475,850	3,752,750	Worker	0.012	0.00010
R4095	475,875	3,752,750	Worker	0.012	0.00010

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R4096	475,900	3,752,750	Worker	0.012	0.00009
R4097	475,925	3,752,750	Worker	0.012	0.00009
R4098	475,950	3,752,750	Worker	0.012	0.00009
R4099	475,975	3,752,750	Worker	0.011	0.00009
R4100	476,000	3,752,750	Worker	0.011	0.00009
R4101	476,525	3,752,750	Worker	0.009	0.00007
R4102	476,550	3,752,750	Worker	0.009	0.00007
R4103	476,575	3,752,750	Worker	0.009	0.00007
R4104	476,600	3,752,750	Worker	0.009	0.00007
R4105	476,625	3,752,750	Worker	0.009	0.00007
R4106	476,650	3,752,750	Worker	0.008	0.00007
R4107	476,675	3,752,750	Worker	0.008	0.00007
R4108	476,700	3,752,750	Worker	0.008	0.00007
R4109	476,725	3,752,750	Worker	0.008	0.00007
R4110	476,750	3,752,750	Worker	0.008	0.00007
R4111	476,775	3,752,750	Worker	0.008	0.00007
R4112	476,800	3,752,750	Worker	0.008	0.00007
R4113	477,350	3,752,750	Worker	0.007	0.00006
R4114	477,375	3,752,750	Worker	0.007	0.00006
R4115	477,400	3,752,750	Worker	0.007	0.00006
R4116	477,425	3,752,750	Worker	0.007	0.00006
R4117	477,450	3,752,750	Worker	0.007	0.00006
R4118	477,475	3,752,750	Worker	0.007	0.00006
R4119	477,500	3,752,750	Residential	0.127	0.00006
R4120	477,525	3,752,750	Residential	0.126	0.00005
R4121	477,550	3,752,750	Residential	0.125	0.00005
R4122	477,575	3,752,750	Residential	0.124	0.00005
R4123	477,600	3,752,750	Residential	0.123	0.00005
R4124	475,750	3,752,775	Worker	0.012	0.00010
R4125	475,775	3,752,775	Worker	0.012	0.00009
R4126	475,800	3,752,775	Worker	0.012	0.00009
R4127	475,825	3,752,775	Worker	0.012	0.00009
R4128	475,850	3,752,775	Worker	0.011	0.00009
R4129	475,875	3,752,775	Worker	0.011	0.00009
R4130	475,900	3,752,775	Worker	0.011	0.00009
R4131	475,925	3,752,775	Worker	0.011	0.00009
R4132	475,950	3,752,775	Worker	0.011	0.00009
R4133	476,550	3,752,775	Worker	0.008	0.00007
R4134	476,575	3,752,775	Worker	0.008	0.00007
R4135	476,600	3,752,775	Worker	0.008	0.00007
R4136	476,625	3,752,775	Worker	0.008	0.00007
R4137	476,650	3,752,775	Worker	0.008	0.00006
R4138	476,675	3,752,775	Worker	0.008	0.00006
R4139	476,700	3,752,775	Worker	0.008	0.00006
R4140	476,725	3,752,775	Worker	0.008	0.00006

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Table C-1. Health Risk Estimates at All Modeled Receptors
K4 and Cactus Channel Improvement Project
Riverside County, California

Receptor ID	UTM Coordinates[1] (m)		Receptor Type	Maximum Incremental Cancer Risk[2] (in a million)	Maximum Incremental HIC[3]
	X-Coordinate	Y-Coordinate			
R4141	476,750	3,752,775	Worker	0.008	0.00006
R4142	476,775	3,752,775	Worker	0.008	0.00006
R4143	477,375	3,752,775	Worker	0.007	0.00005
R4144	477,400	3,752,775	Worker	0.007	0.00005
R4145	477,425	3,752,775	Worker	0.007	0.00005
R4146	477,450	3,752,775	Worker	0.007	0.00005
R4147	477,475	3,752,775	Worker	0.006	0.00005
R4148	477,500	3,752,775	Residential	0.120	0.00005
R4149	477,525	3,752,775	Residential	0.119	0.00005
R4150	477,550	3,752,775	Residential	0.118	0.00005
R4151	477,575	3,752,775	Residential	0.117	0.00005
R4152	475,825	3,752,800	Worker	0.011	0.00009
R4153	475,850	3,752,800	Worker	0.011	0.00008
R4154	475,875	3,752,800	Worker	0.010	0.00008
R4155	475,900	3,752,800	Worker	0.010	0.00008
R4156	476,600	3,752,800	Worker	0.008	0.00006
R4157	476,625	3,752,800	Worker	0.007	0.00006
R4158	476,650	3,752,800	Worker	0.007	0.00006
R4159	476,675	3,752,800	Worker	0.007	0.00006
R4160	476,700	3,752,800	Worker	0.007	0.00006
R4161	476,725	3,752,800	Worker	0.007	0.00006
R4162	477,450	3,752,800	Worker	0.006	0.00005
R4163	477,475	3,752,800	Worker	0.006	0.00005
R4164	477,500	3,752,800	Residential	0.114	0.00005
R4165	475,098.30	3,752,365.33	Sensitive	1.292	0.00057
R4166	475,137.06	3,752,506.07	Sensitive	0.633	0.00028
R4167	477,636.19	3,751,877.13	Sensitive	0.283	0.00012
R4168	477,569.49	3,752,914.96	Sensitive	0.085	0.00004

Notes:

[1] The projection datum is NAD-83.

[2] Maximum incremental cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens.

[3] The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration to the non-cancer chronic reference exposure level for each chemical.

Abbreviations:

UTM - Universal Transverse Mercator

m - meters

NAD - North American Datum

HIC - chronic hazard index

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BIOLOGICAL CONSULTING





K4 WAREHOUSE & CACTUS CHANNEL IMPROVEMENTS PROJECT BIOLOGICAL RESOURCES REPORT

Riverside County, California

February 28, 2019

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1 INTRODUCTION

Meridian Park K4, LLC proposes to construct a warehouse and associated improvements, the K4 Warehouse project, in Riverside County, California. In addition, improvements to the Cactus Drainage Channel, a drainage bordering the parcel to the north and continuing both east and west of the warehouse site, are proposed. The channel improvement portion of the project is being conducted on behalf of the Riverside County Flood Control and Water Conservation District as part of the District's Master Plan.

The project area is located north of March Air Reserve Base (MARB), south of Cactus Avenue, and extends east-to-west from the Veterans Way / Cactus Avenue intersection to Chanute Avenue. Interstate 215 (I-215) is located approximately 0.75 mile west of the project site. The K4 Warehouse site is located within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California (Figure 1). The project site is comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. The project site is located within the Riverside East and Sunnymead 7.5-minute quadrangles, as mapped by the U.S. Geological Survey (USGS 2015).

The K4 Warehouse site is on a 35.4-acre parcel, the Cactus Channel Improvements occur over a 7.0-acre area immediately south of Cactus Avenue (Figure 1). The K4 Warehouse site is a relatively flat parcel that supports several upland vegetation communities, primarily goldenbush scrub/non-native grassland and developed/disturbed. Surrounding land uses include industrial and commercial development, residential development, and military development. The project site is adjacent to the Meridian Specific Plan area but is outside of it and requires separate land use approvals. The site is within the jurisdiction of the March JPA.

This Biological Technical Report (BTR) describes the existing biological resources within and adjacent to the proposed project footprint; details the methods used to assess existing conditions and potential impacts to sensitive habitats and species; and presents potential avoidance, minimization, and mitigation measures to reduce potential project impacts.

1.1 SITE BACKGROUND AND PLANNING CONTEXT

The project was part of the larger 'Disposal and Reuse of March Air Force Base' and occurs within the 'northeast planning subarea' area identified for future development under that process. Reuse of the entire base was planned under the *March AFB Master Reuse Plan*, and that document served as the basis for the *March Joint Powers Authority (JPA) General Plan*. Environmental review of the general plan was performed in 1999 under the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA, 1999; SCH No. 97071095).

As part of that process, a section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) was pursued for Stephens' kangaroo rat (*Dipodomys stephensi*; SKR), least Bell's vireo (*Vireo bellii pusillus*; LBVI), mountain plover (*Charadrius montanus*), coastal California gnatcatcher (*Polioptila californica californica*; CAGN), Quino checkerspot butterfly (*Euphydryas editha quino*; QCB), southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL), and Riverside fairy shrimp (*Streptocephalus woottoni*).

The project also occurs within the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) plan area. The MSHCP is a regional effort to preserve sensitive habitats and species, and all development in the region that is permitted through the County of Riverside must comply with the MSHCP. The goal of such regional biological planning efforts is to preserve sufficient native habitats such that special-status species are also conserved. Though the JPA is an independent agency and therefore not covered under the MSHCP, project mitigation will be pursued in a manner consistent with the MSHCP, further off-setting potential minor impacts on special-status species that could occur with project implementation.

1.2 PROJECT DESCRIPTION

The proposed project development includes a 718,000-square-foot building equipped with 105 loading docks, 289 automobile parking stalls, 242 truck trailer parking stalls, and new driveways on the approximately 35.4-acre K4 warehouse site parcel. The project also includes converting an existing open-air drainage channel on the south side of Cactus Avenue into a box culvert. Additionally, the project would include implementing regional improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the project frontage, and further to the east ending at the Heacock Channel. This portion of the project is being conducted on behalf of the Riverside County Flood Control and Water Conservation District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County MSHCP.

The project site is bordered to the north by Cactus Avenue and industrial commercial warehouses and to the east, west, and south by MARB buildings. The site is located outside of the existing March Business Center and Meridian Specific Plan areas but within the jurisdiction of the March JPA.

Specific details regarding future operation of the facility are not currently available; however, for the purposes of the California Environmental Quality Act (CEQA) and to ensure full disclosure on all potential allowable uses within the proposed Industrial (IND) lots, the assessment herein assumes a variety of industrial functions within the buildings, consistent with the opportunities and limitations associated with the project site as outlined herein.

The following are requirements in order to achieve project approval:

General Plan Amendment: The project site has a land use designation of Business Park within the existing March JPA General Plan. The project proposes to change the existing Business Park land use designation to Industrial; as such, a General Plan Amendment is required for this change.

Zoning Designation: As the project site is not yet zoned, to be consistent with the requested General Plan land use designations of Industrial, the proposed project is pursuing a zoning designation of Industrial (IND) on the 35.4-acre site (excluding Cactus Avenue Channel).

Plot Plan: A plot plan approval is required to construct the 718,000-square-foot building, 598 automobile parking stalls, and 242 truck trailer parking stalls.

Lot Merger: A lot merger is required to merge the five separate parcels on the project site into one 35.4-acre parcel (excluding Cactus Avenue Channel).

1.3 REGULATORY FRAMEWORK

Several regulations have been established by federal, state, and local agencies to protect and conserve biological resources. The descriptions below provide a brief overview of agency regulations that may be applicable to the project. The final determination as to what types of permits are required is made by the regulating agencies.

FEDERAL REGULATIONS

Federal Endangered Species Act

The federal Endangered Species Act (ESA) of 1973, as amended, provides for listing of endangered and threatened species of plants and animals and designation of critical habitat for listed species. ESA regulates the "taking" of any endangered fish or wildlife species, per Section 9 of the Act. As development is proposed, the responsible agency or individual landowner is required to consult with the USFWS to assess potential impacts to listed species (including plants) or its critical habitat, pursuant to Sections 7 and 10 of the act. USFWS is required to make a determination as to the extent of impact to a particular species a project would have. If it is determined that potential impacts to a species would likely occur, measures to avoid or reduce such impacts must be identified. USFWS may issue an incidental take statement, following consultation and the issuance of a Biological Opinion. This allows for take of the species that is incidental to another authorized activity, provided that the action will not adversely affect the existence of the species. Section 10 of the federal ESA provides for issuance of incidental take permits to non-federal parties with the development of a habitat conservation plan (HCP); Section 7 of the act provides for permitting of federal projects on projects requiring federal permits.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA; 16 U.S. Code [U.S.C.] 703 et seq.) is a federal statute that implements treaties with several countries on the conservation and protection of migratory birds. The number of bird species covered by the MBTA is extensive and is listed at 50 CFR 10.13. The MBTA is enforced by USFWS and prohibits "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory bird, or attempt such actions, except as permitted by regulation.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act of 1899 prohibits discharge of any material into navigable waters, or tributaries thereof, of the United States without a permit. The act also makes it a misdemeanor to excavate, fill, or alter the course, condition, or capacity of any port, harbor, or channel; or to dam navigable streams without a permit.

Many activities originally covered by the Rivers and Harbors Act are now regulated under the Clean Water Act of 1972, discussed below. However, the 1899 Act retains relevance and created the structure under which the U.S. Army Corps of Engineers oversees Clean Water Act 404 permitting.

Clean Water Act

Pursuant to Section 404 of the Clean Water Act (CWA), the U.S. Army Corps of Engineers (Corps) is authorized to regulate any activity that would result in the discharge of dredged or fill material into waters of the U.S. (including wetlands), which include those waters listed in 33 CFR 328.3 (as amended at 80 Federal Register 37104, June 29, 2015. The Corps, with oversight from the U.S. Environmental Protection Agency (USEPA), has the principal authority to issue CWA Section 404 permits.

A water quality certification or waiver pursuant to Section 401 of the CWA is required for all Section 404 permitted actions. The Regional Water Quality Control Board (RWQCB), a division of the State Water Resources Control Board, provides oversight of the 401 permit process in California. The RWQCB is required to provide “certification that there is reasonable assurance that an activity that may result in the discharge to waters of the United States will not violate water quality standards.” Water Quality Certification must be based on the finding that proposed discharge will comply with applicable water quality standards.

The National Pollutant Discharge Elimination System (NPDES) is the permitting program for discharge of pollutants into surface waters of the U.S. under Section 402 of the CWA. Substantial impacts to wetlands may require an Individual Permit. Projects that only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits.

STATE REGULATIONS

California Environmental Quality Act

The California Environmental Quality Act (CEQA) was established in 1970 as California’s counterpart to the National Environmental Policy Act (NEPA). It is a statute that requires state and local agencies to identify significant environmental impacts of their actions and to avoid or mitigate those impacts, where feasible.

CEQA applies to certain activities of state and local public agencies. A public agency must comply with CEQA when it undertakes an activity defined by CEQA as a "project." A project is an activity undertaken by a public agency or a private activity, which must receive some discretionary approval (meaning that the agency has the authority to deny the requested permit or approval) from a government agency that may cause either a direct physical change in the environment or a reasonably foreseeable indirect change in the environment.

California Endangered Species Act and Natural Community Conservation Planning Act

The California Endangered Species Act (CESA) of 1984, in combination with the California Native Plant Protection Act of 1977, regulates the listing and take of plant and animal species designated as endangered, threatened, or rare within the state. California also lists species of special concern based on limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. The California Department of Fish and Wildlife (CDFW) is responsible for assessing development projects for their potential to impact listed species and their habitats. State-listed special-status species are addressed through the issuance of a 2081 permit (Memorandum of Understanding).

In 1991, the California NCCP Act was approved and the NCCP Coastal Sage Scrub program was initiated in Southern California. California law (Section 2800 et seq. of the California Fish and Game Code [CFGC]) established the NCCP program "to provide for regional protection and perpetuation of natural wildlife diversity while allowing compatible land use and appropriate development and growth." The NCCP Act encourages preparation of plans that address habitat conservation and management on an ecosystem basis rather than one species or habitat at a time.

California Fish and Game Code Sections 1600-1602

Pursuant to Division 2, Chapter 6, Section 1602 of the California Fish and Game Code (CFGC), CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake that supports fish or wildlife. A Lake or Streambed Alteration Agreement Application must be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW has jurisdiction over riparian habitats associated with watercourses. Jurisdictional waters are delineated by the outer edge of riparian vegetation or at the top of the bank of streams or lakes, whichever is wider. CDFW jurisdiction does not include tidal areas or isolated resources. CDFW reviews the proposed actions and, if necessary, submits (to the applicant) a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and applicant is the Lake or Streambed Alteration Agreement.

California Fish and Game Code Sections 3503, 3511, 3513, 3801, 4700, 5050, and 5515

Within California, fish, wildlife, and native plant resources are protected and managed by CDFW. The California Fish and Game Commission and/or CDFW are responsible for issuing permits for the take or possession of protected species. The following sections of the CFGC address protected species: Section 3511 (birds), Section 4700 (mammals), Section 5050 (reptiles and amphibians), and Section 5515 (fish). In addition, the protection of birds of prey is provided for in Sections 3503, 3513, and 3800 of the CFGC.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code Section 13000 et seq.) provides for statewide coordination of water quality regulations. The state Water Resources Control Board was established as the statewide authority and nine separate RWQCBs were developed to oversee water quality on a day-to-day basis.

The RWQCB is the primary agency responsible for protecting water quality in California. As discussed above, the RWQCB regulates discharges to surface waters under the federal CWA. In addition, the RWQCB is responsible for administering the California Porter-Cologne Water Quality Control Act.

Pursuant to the Porter-Cologne Water Quality Control Act, the state is given authority to regulate waters of the state, which are defined as any surface water or groundwater, including saline waters. As such, any person proposing to discharge waste into a water body that could affect its water quality must first file a Report of Waste Discharge if Section 404 is not required for the activity. "Waste" is partially defined as any waste substance associated with human habitation, including fill material discharged into water bodies.

REGIONAL AND LOCAL PLANS

Western Riverside Multiple Species Habitat Conservation Plan (MSHCP)

The project occurs within an area covered by the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP). Projects where the lead agency is signatory to the MSHCP are covered under the MSHCP. However, the March Joint Powers Authority is the lead agency for the project and is not a signatory to the MSHCP. As such, the project is not subject to MSHCP regulations nor does it receive take authority granted under the MSHCP.

Riverside County Ordinance Nos. 499 and 559- Tree Removal

Chapter 12.08 of the Riverside County Code of Ordinances sets for regulations regarding roadside tree removal and trimming activities (County of Riverside 2016). In accordance with Unincorporated Riverside County Ordinance No. 499 (as amended through 499.11), a permit must be obtained from the County Transportation Director prior to removing trees or trimming any tree planted in the right of way of a County highway. If such removals are proposed, conditions may be imposed by the County Transportation Director such as requirements for use of a qualified tree surgeon or trimmer, and for bond, insurance or security to protect from damage, as well as relocation and/or replacement by one or more other trees.

Chapter 12.24 of the Riverside County Code of Ordinances also includes regulations related to tree removal (County of Riverside 2016). According to the Unincorporated Riverside County Ordinance No. 559 (as amended through 559.7), the removal of living native trees on parcels or property greater than 0.5 acre in size, located in the unincorporated Riverside County, and above 5,000 feet in elevation requires a permit. The project site elevation is below 5,000 acres; as such, this ordinance is not applicable.

Riverside County Oak Tree Management Guidelines

Riverside County Oak Tree Management Guidelines address oak woodlands in areas where zoning and/or general plan density restrictions will allow the effective use of clustering (County of Riverside 1999). A biological study is required for properties that support oak trees on a lot size of 2.5 acres or greater. Protected oaks include any individual tree larger than 2 inches in diameter at breast height (DBH) or the sum of the diameters of multiple trunks at DBH. Protected species include *Quercus agrifolia*, *Q. chrysolepis*, *Q. engelmann*, *Q. kelloggii*, *Q. morehus*, and *Q. wislezenii* (County of Riverside 1999).

Stephens' Kangaroo Rat Habitat Conservation Plan

The Stephens' Kangaroo Rat Habitat Conservation Plan (HCP) was completed in 1996 by the Riverside County Habitat Conservation Agency, the CDFW, and the USFWS. The HCP was created as a region-wide plan for species permitting and conservation so that individual projects could receive ESA take authority for the species through the County, rather than individually. The HCP established 7 "core reserves," totaling more than 41,000 acres, within a planning area of 533,000 acres. The Riverside County Habitat Conservation Agency is responsible for "completing" the reserves through the addition of land in fee simple or through the acquisition of easements. The HCP also calls for the addition of 2,500 acres of occupied Stephens' kangaroo habitat into the reserves, for total acreage of occupied SKR habitat within core reserves to 15,000 acres

(Chamberlin, 1998). A portion of the reserves occur within the former March Air Base; however, the project site is not among the reserve lands.

General Plan of the March Joint Powers Authority.

As part of the base re-alignment, the General Plan of the March Joint Powers Authority was created as a guiding tool for development within the former Air Base. The general plan is designed to implement the March Air Force Base Master Reuse Plan, which included disposal and redevelopment of approximately 4,400 acres of the approximately 6,500 acres of the former Air Base. The General Plan established serves as a blueprint for future growth and development (March JPA, 1999).

2 METHODS

RBC conducted vegetation mapping; a habitat assessment; general biological surveys; a preliminary jurisdictional wetland/waters delineation; and summer special-status plant surveys at the project site on July 17 and 25, 2018 (Appendices B). RBC also conducted protocol presence/absence surveys for Stephens' kangaroo rat on October 21-26, 2018 (Appendix G). The general biological survey, vegetation mapping and wildlife surveys were conducted within the project area plus a 50-foot buffer, collectively referred to as the Biological Survey Area (BSA) herein. Note that figures in this report depict the full BSA for informational purposes and edge effects analysis; however, only project site information is included in report calculations and tables.

Prior to conducting field surveys, existing information regarding biological resources present or potentially present within the BSA was obtained through a review of pertinent literature and databases, including, but not limited to:

- CDFW California Natural Diversity Database (CNDDB)
- California Native Plant Society (CNPS) Electronic Inventory
- United States Fish and Wildlife Service Database
- National Wetlands Inventory Database

A CNDDB (CDFW 2018) query was conducted for the project site plus a 3-mile radius. The CNPS Electronic Inventory (CNPS 2018) search was conducted for the nine United States Geological Survey (USGS) 7.5' quadrangles surrounding the BSA for an elevation range of 1,500 to 1,600 feet above median sea level (AMSL). The potential for special-status species to occur within the BSA was refined by considering the habitat affinities of each species, the results of field habitat assessments, vegetation mapping, and knowledge of local biological resources.

Additionally, large branchiopod (fairy shrimp) surveys are currently underway; survey results will be shared with the USFWS pursuant to survey protocol.

2.1 VEGETATION COMMUNITIES AND LAND USES

RBC conducted vegetation mapping in the field to provide a baseline of the biological resources that occur or have the potential to occur within the BSA. RBC conducted vegetation mapping by walking throughout the BSA and mapping vegetation communities on aerial photographs at a 1:2400 scale (1 inch = 200 feet). The extent of each habitat type (delineated as a habitat polygon on the vegetation maps) was calculated using the ArcGIS Geographic Information System (GIS). Habitats were classified based on the dominant and characteristic plant species in accordance with vegetation community classifications outlined in Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and consistent with MSCHP vegetation mapping classification. Note that information regarding how each community is classified under the Manual of California Vegetation, 2nd Edition is also provided herein for reference.

2.2 BIOLOGICAL SURVEYS

A general biological survey for plants and animals was conducted concurrently with project vegetation mapping on July 17 and 25, 2018. Plant species encountered during the field survey were identified and recorded in field notebooks. Plant species that could not be identified were brought into the laboratory for identification using the dichotomous keys in the *Jepson Manual* (Baldwin et al. 2012) and following the taxonomic treatment of the Jepson Manual with input from the *Western Riverside County Annotated Checklist* (Roberts et al. 2004). A compiled list of the vascular plant species observed in the BSA is presented in Appendix C.

Wildlife species were documented during the field survey by sight, calls, tracks, scat, or other signs, and were recorded in field notebooks. Binoculars (8X42 magnification) were used to aid in the identification of wildlife. In addition to species observed during the surveys, expected wildlife use of the BSA was assessed based on known habitat preferences of local species and knowledge of their biogeographic distribution in the region. Scientific and common names of animals follow CDFW (2018). A list of wildlife species observed in the study area is presented in Appendix D.

The location of observed biological resources designated as special-status by the USFWS, CDFW, and/or CNPS, were recorded in field notebooks, aerial maps, and/or through the use of Global Positioning System (GPS) handheld units. The BSA was also surveyed for habitat with the potential to support special-status plant and animal species.

2.3 PRELIMINARY JURISDICTIONAL DELINEATION

Prior to conducting the preliminary wetland delineation on July 17, 2018, field maps were created using GIS to incorporate topographic maps, color aerial photograph at a 1:100 scale, and the USFWS National Wetlands Inventory data. Potential jurisdictional features within the project area were evaluated for the presence of defined channels and/or wetland vegetation, soils, and hydrology. Potential jurisdictional areas on-site were examined using the methods set forth in the U.S. Army Corps of Engineers 1987 *Wetland Delineation Manual* (Wetland Manual) (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (Arid West Supplement) (Corps 2008).

Lateral limits of non-wetland waters of the U.S. were identified using field indicators of an ordinary high water mark (Corps 2008). All areas with depressions, drainage channels, or wetland vegetation were evaluated for the presence of an ordinary high water mark. For each feature exhibiting the potential presence of an OHMW, RBC completed a 2010 Arid West Ephemeral and Intermittent Streams OHWM Datasheet (OHWM Datasheet) following the guidance provided in the Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States (Corps 2010).

CDFW jurisdictional boundaries were determined based on the presence of riparian vegetation and/or regular surface flow (hydrology indicators). Streambeds within CDFW jurisdiction were delineated based on the definition of streambed as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life.

This includes watercourses having a surface or subsurface flow that supports riparian vegetation" (Title 14, Section 1.72). Riparian habitat refers to vegetation and habitat associated with a stream. The CDFW jurisdictional habitat includes all riparian shrub or tree canopy that may extend beyond the banks of a stream.

Potential jurisdictional features were recorded using a hand-held GPS unit. Plants were identified according to *The Jepson Manual* (Baldwin et al. 2012). Wetland affiliations of plant species follow the U.S. Department of Agriculture (USDA) *Wetland Indicator Plant List* (USDA 2014). Soil chromas were identified according to *Munsell's Soil Color Charts* (Kollmorgen 2000).

2.4 SPECIAL-STATUS SPECIES SURVEYS

SUMMER PLANT SURVEYS

RBC conducted focused surveys for summer-blooming floral species within the project site in July 2018. The K4 project site was surveyed for special-status plants with a moderate or high potential to occur on site (Table 4). Surveys were conducted for paniculate tarplant (*Deinandra paniculata*), smooth tarplant (*Centromadia pungens* ssp. *laevis*), and other summer blooming species on July 17 and July 25, 2018. All suitable habitat within the project impact area was walked and assessed for special-status floral species presence.

STEPHENS' KANGAROO RAT SURVEYS

RBC conducted focused surveys for Stephens' kangaroo rat within the BSA between October 21 and October 26, 2018. RBC set 140 extra-large Sherman live traps within the BSA for five nights, for a total of 700 trap/nights (traps set per night per survey). Traps were baited with a seed mix of millet and sunflower around 1630, approximately an hour and a half before sunset. Traps were checked once during the night and again just after sunrise (0700). The traps remained closed during the day to avoid unnecessary animal capture. RBC mapped all trap locations in ArcGIS Collector.

3 RESULTS

3.1 PHYSICAL SETTING

The project site is located on relatively flat ground and supports primarily upland vegetation communities with one drainage channel bordering the site to the north at Cactus Avenue, containing sparse riparian vegetation. On-site elevations range from approximately 1548 to 1553 feet AMSL. The site supports primarily disturbed goldenbush scrub/non-native grassland and developed/disturbed upland habitats, with smaller areas of non-native grassland. Soils on-site are primarily Greenfield sandy loams, ranging from moderately coarse to coarse sandy loam to coarse textured alluvium (Appendix E).

3.2 VEGETATION COMMUNITIES AND LAND USES

The project site supports seven vegetation communities and other land covers as shown on Figure 2 and identified in Table 1. The site is periodically disked so conditions are atypical; mapping was performed based on conditions observed during the July 2018 field visit. The upland vegetation communities within the BSA include goldenbush scrub/non-native grassland, developed/disturbed land, and non-native grassland habitats. Areas that are developed including roads and industrial areas were mapped as developed. No large stands of riparian vegetation communities are present on site, although small numbers of individual riparian plants were observed within the Cactus Avenue channel.

Habitats were classified based on the dominant and characteristic plant species in accordance with vegetation community classifications outlined in Holland's *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and consistent with MSCHP vegetation mapping classification. Note that information regarding how each community is classified under the Manual of California Vegetation, 2nd Edition is also provided herein for reference.

Table 1. Vegetation Communities within K4 Warehouse and Cactus Channel Improvement Project Areas

Vegetation Community (Holland Code)	Vegetation Community (MCV 2)	Global/ State Rank	K4 Warehouse Site (acres)	Cactus Channel (acres)	Total
Goldenbush Scrub/Non-Native Grassland	Disturbed Palmer's Goldenbush Scrub*	G3 S3	22.16	-	22.16
Developed/Disturbed	Developed/ Disturbed	-	10.16	0.85	11.01
Non-Native Grassland	Mediterranean California Nauralized Annual and Perennial Grassland	None	0.26	8.40	8.66

Freshwater Marsh	Cattail Marshes	G5 S5	0.04	0.37	0.41
Ornamental	Ornamental	-	-	0.05	0.05
Southern Willow Scrub	Sandbar Willow Thickets	G5 S4.2	0.02	0.02	0.04
Fremont's Cottonwood *(Populus fremontii)*	Fremont Cottonwood Forest	G4 S3.2	-	0.02	0.02
Total			32.64	9.71	42.35

**Goldenbush occurring on the project site is the more common thick-bracted goldenbush rather than the CNPS List 1B.1 Palmer's goldenbush, but this community type is the closest crosswalk.*

VEGETATION COMMUNITIES

Goldenbush Scrub/Non-Native Grassland

Goldenbush scrub/non-native grassland areas within the project area (22.16 acres) support scattered stands of goldenbush (*Ericameria palmeri* var. *pachylepis*) amongst primarily non-native grasses (*Bromus madritensis* ssp. *rubens*, *Bromus sterilis*, *Cynodon dactylon*, etc.). The project site is frequently disked, keeping non-native grasses fairly low to the ground and goldenbush specimens small. Typically, these communities would be split into discrete categories; however, due to atypical site conditions and disturbance, the site is a mosaic of the two communities. Goldenbush scrub/non-native grassland occurs on the western two-thirds of the site.

Developed/Disturbed

Developed/disturbed areas within the project area (11.01 acres) support little to no native vegetation and are comprised of human-made disturbances (agriculture, construction, or other land-clearing activities) or structures such as buildings and roads. The high level of soil disturbance allows only sparse ruderal (weedy) plant species to occur. Major developed areas within the project boundary are concentrated on the eastern third of the site and include a soil stockpile area and areas disturbed by grading and former concrete pads on the site. Areas mapped as developed/disturbed on the project site are overwhelming disturbed areas within only a few small developed areas in the form of concrete bridges and roads.

Non-Native Grassland

Non-native grassland (8.66 acres) predominantly occurs within the Cactus Avenue Channel on the project site. Non-native grassland generally occurs on fine-textured loam or clay soils that are moist during the winter rainy season and very dry during the summer and fall (Holland 1986). Non-native grassland within the biological survey area is largely dominated by common brome (*Bromus madritensis* ssp. *rubens*). Areas mapped as non-native grassland within the Cactus Avenue Channel also support Dallis grass (*Paspalum dilatatum*) and Bermuda grass (*Cynodon dactylon*). Jurisdictional resources were delineated and mapped as part of the project; details regarding aquatic resources is provided in the project jurisdictional delineation report (Appendix F).

Freshwater Marsh

Freshwater marsh within the project area (0.41 acre) supports hydrophytic species including broadleaf cattail, pondweed, and tall flat sedge. Freshwater marsh vegetation occurs within inundated portions of the Cactus Avenue Channel.

Ornamental

Ornamental vegetation within the project area (0.05 acres) supports non-native tree and grass species including tree of heaven (*Ailanthus altissima*) and Bermuda grass. Ornamental vegetation within the project area is located along the Cactus Avenue Channel and at the far west end of the Cactus Avenue Channel.

Southern Willow Scrub

Southern willow scrub (0.04 acre) occurrs within the Cactus Avenue Channel on site. Southern willow scrub is characteristically dominated by dense stands of willows (*Salix* spp.). The on-site southern willow scrub contains limited stands of Goodding's black willow (*Salix gooddingii*; four individuals) and sandbar willow (*Salix exigua* var. *exigua*; 60 small individuals).

Fremont's Cottonwood

A small population of young Fremont cottonwood (*Populus fremontii*; 0.02 acre) occurs within the Cactus Avenue Channel. Fremont cottonwood is a riparian tree species which grows near streams, rivers, and wetlands in the southwestern United States. Fremont cottonwood are typically associated with riparian forests, however the on-site population of this species is limited to 11 individuals.

3.3 PRELIMINARY JURISDICTIONAL AREAS

A west-east, earthen-lined and vegetated drainage ditch, hearby referred to as the Cactus Avenue Channel, runs parallel to Cactus Avenue from just east of Elsworth Street to Heacock Street and was the only observed aquatic resource within the project area. A wetland delineation was performed to determine state and federal jurisdictional status of these areas (Figure 3; Appendix F). The channel supports a large wetland area that met all three parameters per the Arid West Supplement and is therefore jurisdictional wetlands per the Corps, RWQCB, and CDFW. Note that all drainages that are Other Waters of the U.S. will also require permitting though the RWQCB under the Clean Water Act Section 401. Details regarding state and federal jurisdictional status are provided below.

No vernal pools were observed during 2018 project biological surveys; however, depressions with cracked soils were observed on site during July 2018 general biological surveys. These areas may pond during the rainy season; protocol fairy shrimp surveys are currently being undertaken to determine species presence/absence on-site.

A total of 3.01 acres of potential CDFW jurisdictional resources, and 1.82 acres of potential Corps and RWQCB resources occur within the Cactus Avenue Channel, including both wetlands and non-wetlands waters of the US (inclusive of areas on the K4 Warehouse site and the remainder of the channel area). Resources that will potentially be subject to jurisdiction by CDFW, and Corps and RWQCB are shown in Figure 3 and identified in Tables 2 and Table 3.

Table 2. Potential Jurisdictional Resources On-Site: Corps and RWQCB

Corps and RWQCB Jurisdictional Designation	Acreage	Linear Feet	Presence of OHWM	Wetland Presence	Dominant Vegetation
K4 Warehouse Area					
Wetland	0.68	2389	No	Yes	Freshwater marsh
Non-Wetland Waters of the US/State	0	0	Yes	No	Unvegetated; Non-native grassland
Cactus Channel Improvements Area					
Wetland	0.71	2401	No	Yes	Freshwater marsh
Non-Wetland Waters of the US/State	0.42	2876	Yes	No	Unvegetated; Non-native grassland
Total	**1.81**	**7666**			

Table 3 . Potential Jurisdictional Resources On-Site: CDFW

CDFW Jurisdictional Designation	Acreage	Linear Feet	Presence of OHWM	Wetland Presence	Dominant Vegetation
K4 Warehouse Area					
Wetland	0.68	2386	No	Yes	Freshwater marsh
Cactus Avenue Channel Non-Wetland Waters of the US/State	0.47	0	Yes	No	Unvegetated; Non-native grassland
Cactus Channel Improvements Area					
Wetland	0.71	2404	No	Yes	Freshwater marsh
Non-Wetland Waters of the US/State	1.13	2876	Yes	No	Unvegetated; Non-native grassland
Total	**2.99**	**7666**			

3.4 PLANTS AND ANIMALS

The project area supports a low diversity of vegetation communities and plant species diversity. A total of 36 plant species (56 percent native, 44 percent non-native) were observed during project biological surveys. A comprehensive list of plant species that were observed during biological surveys within the BSA is included as Appendix C.

A total of 14 species of birds, two reptiles, three mammals, and one invertebrate species were observed or presumed present based on track and/or scat (Appendix D). Because twilight/nighttime surveys were not conducted, crepuscular and nocturnal animals are likely under-represented in this assessment.

Special-status biological resources are those defined as follows: 1) Species that have been given special recognition by federal, state, or local conservation agencies and organizations due to limited, declining, or threatened/endangered population sizes; 2) Species and habitat types recognized by local and regional resource agencies as sensitive; 3) Habitat areas or vegetation communities that are unique, are of relatively limited distribution, or are of particular value to wildlife; 4) Wildlife corridors and habitat linkages; and/or 5) Biological resources that may or may not be considered sensitive, but are regulated under local, state, and/or federal laws.

For the purposes of this report, species are considered to have special-status if they meet one or more of the following criteria:

- Listed under the federal or state Endangered Species Act (CDFW 2018; USFWS 2018).
- USFWS Birds of Conservation Concern (USFWS 2018)
- CDFW Special Animals List (CDFW 2018)
- CDFW Species of Special Concern (CDFW 2018)
- CDFW Fully Protected Species (CDFW 2018)
- Listed as having a California Rare Plant Rank (CRPR; formerly CNPS List, CNPS 2018)

3.4.1 SPECIAL-STATUS PLANT SPECIES

Special-status plant species include those that are: 1) Listed or proposed for listing by federal or state agencies as threatened or endangered; 2) CRPR List 1 through 4 (CNPS 2018); or 3) Considered rare, endangered, or threatened by the CDFW (CDFW 2018) or other local conservation organizations or specialists.

CNPS is a statewide resource conservation organization that has developed an inventory of California's sensitive plant species. The CRPR system is recognized by the CDFW and essentially serves as an early warning list of potential candidate species for threatened or endangered status. The CRPR system is categorized as outlined in Table 5.

The potential for the project area to support special-status plant species was assessed during the site visits and vegetation mapping; analysis of CNDDB (Figure 4) and CNPS data; and knowledge of the habitat affinities and biogeography of special-status plants in southern California. Based on site suitability and local databases, two special-status plant species had moderate or high potential to occur on-site: 1) Smooth tarplant; and 2) Paniculate tarplant. Both are summer blooming species;

as such, a summer rare plant survery was performed in July 2018. Surveys for smooth tarplant were positive (Appendix C); surveys for paniculate tarplant were negative. A complete list of special-status plants with potential to occur on-site can be found in Table 4.

Some trees are protected under local tree protection ordinances. There are a some willows and very young, small cottonwoods within the Cactus Avenue Channel; however, no oak trees or other protected specimens occur on-site.

Table 4. Special-Status Plant Species with Potential to Occur Within the Project Study Area

Species	Status	Habitat Description	Potential to Occur
California satintail (*Imperata brevifolia*)	CRPR 2B.1	Perennial rhizomatous herb. Blooms Sep-May. Chaparral, coastal scrub, Mojavean desert scrub, alkali meadows and seeps, and riparian scrub. Elev. 0-3,986 ft.	Very low potential to occur. No suitable habitat present; not observed during summer plant surveys.
Chaparral ragwort (*Senecio aphanactis*)	CRPR 2B.2	Annual herb. Blooms Jan-Apr. Chaparral, cismontane woodland, and coastal scrub. Elev. 50-2,625 ft.	Very low potential to occur. No chaparral, cismontane woodland or coastal scrub habitat present on site.
Chaparral sand-verbena (*Abronia villosa* var. *aurita*)	CRPR 1B.1	Annual herb. Blooms Jan-Sep. Sandy chaparral, coastal scrub and desert dunes. Elev. 245-5,250 ft.	Very low potential to occur. Suitable sandy habitat not present.
Coulter's goldfields (*Lasthenia glabrata ssp. coulteri*)	CRPR 1B.1	Annual herb. Blooms Feb-Jun. Coastal salt marshes and swamps, playas, vernal pools. Elev. 3-4,002 ft.	Very low potential to occur. No suitable coastal salt marsh, swamp, or playa habitat present on site.
Coulter's matilija poppy (*Romneya coulteri*)	CRPR 4.2	Perennial rhizomatous herb. Blooms Mar-Jul. Chaparral and coastal scrubs. Elev. 65-3,937 ft.	Low potential to occur. Not observed during summer plant surveys.
Little mousetail (*Myosurus minimus* ssp. *apus*)	CRPR 3.1	Annual herb. Blooms Mar-Jun. Valley/foothill grasslands and alkaline vernal pools. Elev. 65-2,100 ft.	Low potential to occur. Areas that may pond are highly disturbed and unlikely to support native vernal pool species.
Long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)	CRPR 1B.2	Annual herb. Blooms Apr-Jul. Chaparral, coastal scrub, meadows and seeps, valley/foothill grassland, and vernal pools. Elev. 98-5,020 ft.	Low potential to occur. Limited suitable habitat present and not detected during summer plant survey.
Many-stemmed dudleya (*Dudleya multicaulis*)	CRPR 1B.2	Perennial herb. Blooms Apr-Jul. Chaparral, coastal scrub, and valley/foothill grasslands. Elev. 50-2,590 ft.	Very low potential to occur. No suitable habitat present.
Mesa horkelia (*Horkelia cuneata* var. *puberula*)	CRPR 1B.1	Perennial herb. Blooms Feb-Sep. Maritime chaparral, cismontane woodland, and coastal scrub. Elev. 230-2,657 ft.	Very low potential to occur. No suitable habitat present.
Munz's onion (*Allium munzii*)	FE; ST; CRPR 1B.1	Perennial bulbiferous herb. Blooms Mar-May. Chaparral, Cismontane woodland, Coastal scrub, Pinyon and juniper woodland, Valley and foothill grassland. Elev. 970-3,510 ft.	Very low potential to occur. No undisturbed native vegetation communities on site. No clay soils mapped prior to site disturbance (mapped soil is a sandy loam) and no clay soil observed during site visit.

Species	Status	Habitat Description	Potential to Occur
Nevin's barberry (*Berberis nevinii*)	FE; SE; CRPR 1B.1	Perennial evergreen shrub. Blooms Feb-Jun. Chaparral, cismontane woodland, coastal scrub, and riparian scrub. Elev. 230-2,705 ft.	No potential to occur. Species is visible year-round and was not detected during summer plant surveys.
Palmer's grapplinghook (*Harpagonella palmeri*)	CRPR 4.2	Annual herb. Blooms Mar-May. Chaparral, coastal scrub, and valley/foothill grasslands. Elev. 65-3,133 ft.	Very low potential to occur. No clay soils or suitable habitats present on site.
Paniculate tarplant (*Deinandra paniculata*)	CRPR 4.2	Annual herb. Blooms Apr-Nov. Coastal scrub, valley/foothill grassland, vernal pools. Elev. 82-3,084 ft.	Low potential to occur. Known from area so considered moderate potential but not observed during summer rare plant survey.
Parish's brittlescale (*Atriplex parishii*)	CRPR 1B.1	Annual herb. Blooms Jun-Oct. Chenopod scrub, playas, and vernal pools within alkaline habitat. Elev. 82-6,233 ft.	Very low potential to occur. No suitable alkaline habitat present.
Parry's spineflower (*Chorizanthe parryi* var. *parryi*)	CRPR 1B.1	Annual herb. Blooms Apr-Jun. Chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. Elev. 900-4,000 ft.	Low potential to occur. Limited suitable habitat present and not detected during plant survey.
Payson's jewelflower (*Caulanthus simulans*)	CRPR 4.2	Annual herb. Blooms Feb-Jun. Chaparral and coastal scrub. Elev. 295-7,218 ft.	Very low potential to occur. No suitable habitat on-site.
Peninsular spineflower (*Chorizanthe leptotheca*)	CRPR 4.2	Annual herb. Blooms May-Aug. Chaparral, coastal scrub, lower montane coniferous forest. Elev. 984-6,233 ft.	Low potential to occur. Limited suitable habitat present and not detected during summer plant survey.
Plummer's mariposa lily (*Calochortus plummerae*)	CRPR 4.2	Perennial bulbiferous herb. Blooms May-Jul. Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland. Elev. 330-5,580 ft.	Very low potential to occur. No suitable habitats present on site. Species not observed during summer plant surveys, and no dried *Calochortus* fruit observed on site.
Prairie wedge grass (*Sphenopholis obtusata*)	CRPR 2B.2	Perennial herb. Blooms Apr-Jul. Cismontane woodland, meadows and seeps. Elev. 984-6,561 ft.	Very low potential to occur. No woodlands, meadows, or seeps present.
Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*)	CRPR 4.3	Annual herb. Blooms Jan-Jul. Chaparral and coastal sage scrub. Elev. 3-2,905 ft.	Very low potential to occur. No suitable habitat on-site.
Salt spring checkerbloom (*Sidalcea neomexicana*)	CRPR 2B.2	Perennial herb. Blooms Mar-Jun. Chaparral, coastal scrub, lower montane coniferous forests, Mojavean desert scrub, and playas. Elev. 50-5,020 ft.	Very low potential to occur. No suitable alkaline habitat present.
San Bernardino aster (*Symphyotrichum defoliatum*)	CRPR 1B.2	Perennial rhizomatous herb. Blooms Jul-Nov. Cismontane woodlands, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and vernally mesic valley/foothill grasslands. Elev. 7-6,690 ft.	Very low potential to occur. No associated habitats present on site. No suitable mesic habitat present on site.

Species	Status	Habitat Description	Potential to Occur
San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*)	FE; CRPR 1B.1	Annual herb. Blooms Apr-Aug. Playas, mesic valley/foothill grasslands, and vernal pools within alkaline habitat. Elev. 456-1,640 ft.	Very low potential to occur. No suitable alkaline habitat present.
Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*)	FE; SE; CRPR 1B.1	Perennial herb. Blooms Apr-Sep. Chaparral and coastal alluvial fan scrub. Elev. 298-2,000 ft.	Very low potential to occur. No chaparral or coastal alluvial fan scrub present.
Slender-horned spineflower (*Dodecahema leptoceras*)	FE; SE; CRPR 1B.1	Annual herb. Blooms Apr-Jun. Chaparral, cismontane woodland, alluvial fan coastal scrub. Elev. 655-2,490 ft.	Very low potential to occur. No suitable habitat present.
Small-flowered microseris (*Microseris douglasii* ssp. *platycarpha*)	CRPR 4.2	Annual herb. Blooms Mar-May. Cismontane woodlands, coastal scrub, valley/foothill grasslands, and vernal pools. Elev. 50-3,510 ft.	Low potential to occur. No undisturbed native vegetation communities on site. This species can be found in non-native grassland but high site disturbance likely precludes it.
Small-flowered morning-glory (*Convolvulus simulans*)	CRPR 42	Annual herb. Blooms Mar-Jul. Chaparral, coastal scrub, valley and foothill grasslands. Elev. 98-2,296 ft.	Low potential to occur. Limited suitable habitat present.
Smooth tarplant (*Centromadia pungens* ssp. *laevis*)	CRPR 1B.1	Annual herb. Blooms Apr-Sep. Chenopod scrub, meadows and seeps, playa, riparian woodland, valley and foothill grassland. Elev. 0-2,100 ft.	Present. This species is common on the K4 warehouse site with a population of 525-550 individuals occupying 0.15 acre.
Spreading navarretia (*Navarretia fossalis*)	FT; CRPR 1B.1	Annual herb. Blooms Apr-Jun. Chenopod scrub, shallow freshwater marshes and swamps, playas, and vernal pools. Elev. 98-2,150 ft.	Low potential to occur. Not reported from area and not observed during surveys; potentially ponded areas on-site are highly disturbed and unlikely to support native species.
Thread-leaved brodiaea (*Brodiaea filifolia*)	FT; SE; CRPR 1B.1	Perennial bulbiferous herb. Blooms Mar-Jun. Chaparral, cismontane woodlands, coastal scrub, playas, valley/foothill grasslands, vernal pools. Elev. 82-3,675 ft.	Low potential to occur. Not known from region and no suitable habitat present.
Vernal barley (*Hordeum intercedens*)	CRPR 3.2	Annual herb. Blooms Mar-Jun. Coastal dunes, coastal scrub, valley/foothill grassland saline flats and depressions, and vernal pools. Elev. 16-3,280 ft.	Very low potential to occur. Not known from the vicinity; not observed during summer plant survey. On-site disturbance and lack of saline habitat would likely preclude species.
Western spleenwort (*Asplenium vespertinum*)	CRPR 4.2	Perennial rhizomatous herb. Blooms Feb-Jun. Chaparral, Cismontane woodland, Coastal scrub. Elev. 590-3,280 ft.	No potential to occur. No undisturbed native vegetation communities on site. Additionally, visible year-round and not observed during site visit.
White rabbit-tobacco (*Pseudognaphalium leucocephalum*)	CRPR 2B.2	Perennial herb. Blooms (Jul)Aug-Nov(Dec). Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland. Elev. 0-6,890 ft.	Very low potential to occur. No suitable habitat on site; not observed during summer rare plant survey.

Species	Status	Habitat Description	Potential to Occur
Woven-spored lichen (*Texosporium sancti-jacobi*)	CRPR 3	Crustose lichen. Appears on soil, small mammal pellets, dead twigs, and on *Selaginella* spp., as well as chaparral openings. Elev. 950-2,165	Very low potential to occur. Continuous site disturbance would disrupt the establishment of this species.

FE: USFWS Federally Threatened (FE) Species under the Endangered Species Act
FT: USFWS Federally Threatened (FT) Species under the Endangered Species Act
SE: CDFW State Endangered (SE) under the California Endangered Species Act
ST: CDFW State Threatened (ST) under the California Endangered Species Act
CRPR: California Rare Plant Rank

Table 5. California Rare Plant Rank (CRPR) Definitions

California Rare Plant Rank (CRPR)	1A	presumed extirpated in California and rare or extinct elsewhere
	1B	rare, threatened, or endangered in California and elsewhere
	2A	presumed extirpated in California but more common elsewhere
	2B	rare, threatened, or endangered in California but more common elsewhere
	3	plants for which more information needed
	4	plants of limited distribution
CRPR Threat Ranks	0.1	Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
	0.2	Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
	0.3	Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

3.4.1.1 Threatened and Endangered Plant Species

No federally or state threatened, or endangered plants were observed during the general field survey or summer rare plant survey and none have a moderate or high potential to occur on the site based on the disturbed nature of the site and lack of suitable habitats (Table 4).

3.4.1.2 Plant Species of Special Concern

One CRPR 1B.1 list plant, smooth tarplant, was observed on the K4 Warehouse site. Paniculate tarplant would typically be considered to have a moderate probability to occur on-site; however, summer season surveys for this species were negative.

Paniculate Tarplant (Deinandra paniculata)

Paniculate tarplant is an annual herb in the sunflower family (Asteraceae) and has small yellow flowers that bloom from March to November. Paniculate tarplant is native to California and Baja California. In the U.S. it occurs from San Diego County to Santa Barbara County at elevations less than 3,000 feet. It is commonly found in coastal scrub, valley and foothill grassland, and vernal pool habitats (CNPS, 2018). Paniculate tarplant is a CRPR rank 4.2 species and State Rank S4. Its CPRP 4.2 listing means that it is a plant of limited distribution that is moderately threatened in

California (20-80% of occurrences threatened); its state rank S4 means that it is "apparently secure within California." Prior to 2018 surveys, paniculate tarplant was anticipated to have a moderate potential to occur on site. However, following negative 2018 surveys, potential to occur has been reduced from moderate to low.

Smooth Tarplant (Centromadia pungens spp. laevis)

Smooth tarplant was observed on the K4 Warehouse site during 2018 summer surveys (Appendix C). Smooth tarplant has a CRPR rank of 1B.1, meaning it is rare, threatened, or endangered in California and elsewhere, and seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat). Smooth tarplant holds the State Rank S2, meaning the plant is imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province (CNPS 2018). Smooth tarplant was observed in the eastern third of the K4 Warehouse site in disturbed/developed, and in the central portion of the Cactus Avenue Channel within non-native grassland vegetation communities. The total on-site population is approximately 525-550 individuals covering an area of 0.15 acre (Figure 2).

3.4.2 SPECIAL-STATUS WILDLIFE SPECIES AND CRITICAL HABITATS

Prior to conducting field surveys, the potential for the project site to support special-status wildlife species was assessed based on the vegetation mapping, analysis of CNDDB query from July 2018 (Figure 4), review of USFWS data, and knowledge of the habitat affinities and biogeography of special-status wildlife in southern California. Additionally, the base re-alignment Biological Opinion (1999) and supporting information was reviewed as part of this assessment.

No USFWS federally listed endangered species were observed within or immediately adjacent to the BSA during project surveys. One CDFW Species of Special Concern (SSC), San Diego black-tailed jackrabbit, was observed in the BSA during project surveys.

Two listed species, least bell's vireo and Stephens' kangaroo rat have been documented approximately 1.25 miles west and southwest of the project area (Figure 4). A list of the potential of sensitive wildlife to occur on the site is provided in Table 6.

Table 6. Special-Status Wildlife Species with Potential to Occur Within the Project Study Area

Species	Status	Habitat Description	Potential to Occur
INVERTEBRATES			
Riverside fairy shrimp (*Streptocephalus woottoni*)	FE	Vernal pools or other seasonal pools with a depth greater than 30 cm.	Moderate potential to occur. Limited ponding features observed during project surveys that appear to be deep enough for this species, which typically occurs in pools >30 cm depth; moderate potential to occur in the Cactus Avenue channel as it supports temporarily ponded areas that may be deep enough for this species.

Species	Status	Habitat Description	Potential to Occur
Vernal pool fairy shrimp (*Branchinecta lynchi*)	FT	Natural vernal pools or other seasonal pools.	Low to moderate potential to occur. Potential ponding features observed on-site may be suitable for this species, which is typically found in deep, naturally occurring vernal pools. This species also has a minor potential to occur in the Cactus Avenue channel as it supports temporarily ponded areas.
AMPHIBIANS			
Western spadefoot (*Spea hammondii*)	SSC	Temporary ponds, vernal pools, and backwaters of flowing creeks. Also adjacent upland habitats such as grasslands and coastal sage scrub for burrowing.	Moderate potential to occur. Though the site is fairly disturbed, low areas occur on the site that would be suitable for this species if they hold water. Additionally, the Cactus Avenue channel has suitable habitat to support this species.
REPTILES			
Coastal whiptail (*Aspidoscelis tigris stejnegeri*)	SSC	A variety of rocky, sandy, dry habitats including sage scrub, chaparral, woodlands on friable loose soil.	Low potential to occur. Suitable habitat is present; this species is more common near the coast.
Coast horned lizard (*Phrynosoma blainvillii*)	SSC	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands. Found on sandy or friable soils with open scrub. Requires open areas, bushes, and fine loose soil.	Low potential to occur. Suitable habitat is present; however, species is more common near the coast.
Orange-throated whiptail (*Aspidoscelis hyperythra*)	WL	A variety of habitats including sage scrub, chaparral, and coniferous and broadleaf woodlands. Found on sandy or friable soils with open scrub.	Moderate potential to occur. Suitable habitat is present, but this species not observed during field surveys.
Red-diamond rattlesnake (*Crotalus ruber*)	SSC	Chaparral, coastal sage scrub, along creek banks, and in rock outcrops or piles of debris. Often associated with dense vegetation in rocky areas.	Low potential to occur. Suitable rocky habitat is not present.
BIRDS			
Burrowing owl (*Athene cunicularia*)	SSC (at burrowing sites & some wintering sites)	Found in grasslands and open scrub from the coast to foothills. Strongly associated with California ground squirrel (*Otospermophilus beecheyi*) and other fossorial mammal burrows.	Moderate to high potential to occur. Suitable but unoccupied burrows observed on site. Burrowing owls known to occur within 1.25 mile of site.

Species	Status	Habitat Description	Potential to Occur
California horned lark (*Eremophila alpestris actia*)	WL	Found from coastal deserts and grasslands to alpine dwarf-shrub habitat above treeline. Also seen in coniferous or chaparral habitats.	Low to moderate potential to occur. Suitable habitat not present; however, species known to occasionally occupy disturbed grasslands. Nearest documented occurrence approximately 3.5 miles southwest.
Cooper's hawk (*Accipiter cooperii*)	WL (when nesting)	Usually in oak woodlands but occasionally in willow or eucalyptus woodlands.	Low potential to occur. Although not observed during project surveys, this species is known to occur in the area. Limited nesting habitat present on site. No large willows, oaks, or eucalyptus trees present on site.
Least Bell's vireo (*Vireo bellii pusillus*)	FE (when nesting); SE (when nesting)	Riparian woodland with understory of dense young willows or mulefat and willow canopy. Nests often placed along internal or external edges of riparian thickets.	Low potential to occur. Suitable riparian habitat is not present.
Loggerhead shrike (*Lanius ludovicianus*)	SSC (when nesting)	Found within grassland, chaparral, desert, and desert edge scrub, particularly near dense vegetation used for nesting.	Low potential to occur. Suitable foraging habitat is present, but dense nesting habitat is not present.
Mountain plover (*Charadrius montanus*)	SSC (wintering)	Inhabits annual grasslands and agricultural fields	Low potential to occur. Suitable foraging habitat not present.
MAMMALS			
Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)	SSC	Found in low elevation grassland, alluvial sage scrub, and coastal sage scrub.	Low to moderate potential to occur. Alluvial sage scrub and coastal sage scrub not present, however grassland present. Repeated disturbance of the site would likely preclude this species.
Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	SSC	Inhabits coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities.	Low to moderate potential to occur. Suitable habitat on-site and burrows observed that are consistent with pocket mouse size; however, repeated disturbance of the site would likely preclude this species.
Pocketed free-tailed bat (*Nyctinomops femorosaccus*)	SSC	Rugged cliffs, rocky outcrops, and slopes in desert shrub and pine oak forests.	Low potential to occur. Rocky outcrops not present.
San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)	SSC	Habitats include early stages of chaparral, open coastal sage scrub, and grasslands near the edges of brush. Uses open land but requires some shrubs for cover.	Present. Although the site is fairly disturbed, suitable foraging habitat is present for this species.

Species	Status	Habitat Description	Potential to Occur
Southern grasshopper mouse (*Onychomys torridus ramona*)	SSC	Low open and semi-open scrubs habitats including coastal sage scrub, mixed chaparral, low sagebrush, riparian scrub, and annual grassland with scattered shrubs.	Low potential to occur. Suitable desert habitat with friable soils lacking on site. Repeated disturbance of the site would likely preclude this species.
Stephens' kangaroo rat (*Dipodomys stephensi*)	FE; ST	Habitats include annual grassland and coastal sage scrub with sparse shrub cover. Commonly in association with *Eriogonum fasciculatum*, *Artemisia californica*, and *Erodium cicutarium*, in areas with loose, friable, well-drained soil, and flat or gently rolling terrain.	None. No individuals or sign observed during focused SKR surveys.
Western mastiff bat (*Eumops perotis californicus*)	SSC	Chaparral, live oaks, and arid, rocky regions. Requires downward opening crevices.	Low potential to occur. Suitable roosting crevices not present.
Western yellow bat (*Lasiurus xanthinus*)	SSC	Occupies a range of habitats in arid and dry areas. Inhabits secluded woodlands, agricultural lands, and sometimes even residential areas.	Low potential to occur. Suitable roosting habitat not present.

FE: Federally Endangered (FE) Species under the Endangered Species Act
FT: Federally Threatened (FT) Species under the Endangered Species Act
SE: State Endangered (SE) under the California Endangered Species Act
ST: State Threatened (ST) under the California Endangered Species Act
SSC: California Department of Fish and Wildlife Species of Special Concern (SSC)
WL: California Department of Fish and Wildlife Watch List (WL) Species

3.4.2.1 Threatened and Endangered Wildlife Species

Riverside Fairy Shrimp (Streptocephalus woottoni)

The Riverside fairy shrimp is federally listed as endangered (USFWS, 2013). This species is the biotic foundation of the food web for a diverse range of aquatic and terrestrial predators. Riverside fairy shrimp have adapted and evolved to endure dry seasons, when vernal pools are not ponded, by lying dormant in cysts (dormant eggs) until environmental conditions are optimal for the Riverside fairy shrimp life cycle. Hatching and observation periods are variable based on annual and seasonal precipitation levels. Riverside fairy shrimp hatch and mature within 48 to 56 days, dependent on environmental variables such as water temperature. Since the Riverside fairy shrimp matures slowly (as compared to seven to 14 days for San Diego fairy shrimp), it is generally restricted to the cooler water temperatures of deep (greater than 12 inches or 30 centimeters) vernal pools (USFWS 2011).

The Riverside fairy shrimp is considered to have one of the most limited distributions among west coast-endemic fairy shrimps. The species is found in California in Ventura, Orange, Riverside, and San Diego Counties (and is also known to occur in Baja California). The extent of the Riverside fairy shrimp range in California spans 163 miles north-south and all populations, with the exception of the Riverside population, are found within 15 miles of the coast (USFWS 2011).

The Riverside fairy shrimps restricted distribution and requirement for deep vernal pools that pond for a minimum of six weeks is attributed to the species substantial development period. The Riverside fairy shrimp takes approximately 48 to 56 days to carry out its lifecycle. The species is

typically observed from mid-March to April. However, the species may hatch outside of its characteristic season due to early or late precipitation. Riverside fairy shrimp are relatively sedentary and do not possess a strong ability to disperse (USFWS 2011).

Based on the 2008 5-year review for Riverside fairy shrimp, there are 45 known extant or presumed extant occurrences in approximately 200 vernal pools and vernal pool complexes. A CNDDB query (2018) shows two historical occurrence of Riverside fairy shrimp. One population approximately 0.25 mile south of the project site, has been extirpated. The additional population is located approximately 1.70 miles south of the project site and is listed as possibly extirpated (CNDDB; Figure 4).

The flat parcel supports potential ponding features. The Cactus Avenue channel supports features that likely remain inundated for periods greater than 120 days, and therefore may be suitable for Riverside fairy shrimp. As such, Riverside fairy shrimp has a moderate potential to occur on site. Protocol large branchiopod (fairy shrimp) surveys are currently being undertaken to determine species presence/absence on-site; results will be forwarded to the USFWS in conformance with protocol.

Stephens' Kangaroo Rat (Dipodomys stephensi)

Stephens' kangaroo rat is a federal-listed endangered and state-listed threatened species. This species occupies portions of Riverside and San Diego counties. There are three distinct regions with Stephens' kangaroo rat populations: western Riverside County, western San Diego County, and central San Diego County. Stephens' kangaroo rat historically occurred in southwestern San Bernardino County, but this species is believed to be extirpated from that area (USFWS 1997). Habitat for the Stephens' kangaroo rat includes open grasslands, fallow agricultural fields, and sparse coastal sage scrub vegetation communities in areas with penetrable soils and flat to fairly steep sloping topography (USFWS 1997). Stephens' kangaroo rat is found at elevations of 180 to 4,100 feet, with most populations located at elevations below 2,000 feet (USFWS 1997). Habitat for the Stephens' kangaroo rat varies in composition and density from place to place and season to season. Filaree (*Erodium* spp.) frequently dominates the best Stephens' kangaroo rat habitat areas, especially during and shortly after the rainy season (RECON 1989). Areas with dense grass cover are typically not suitable for Stephens' kangaroo rat (USFWS 1997). A nocturnal species, Stephens' kangaroo rat consumes a diet primarily of seeds. The decline of this species is attributed in large part to habitat loss and fragmentation due to urban development and agriculture. Other factors contributing to the loss of the species include off-road vehicles, rodent control, and predation by feral and domestic cats (USFWS 1997).

Stephens' kangaroo rat has been reported within close proximity to the site (CDFW; Figure 4). Suitable habitat for Stephens' kangaroo rat is present on the project site and a burrow consistent with this species was observed during the 2018 general biological surveys. Due to the disturbed nature (disked soil) of the site, the probability of an extant, on-site Stephens' kangaroo rat population is not as high as it might have been historically; however, this species maintains a moderate to high potential for occurrence.

RBC conducted a focused Stephens' kangaroo rat survey within the BSA between October 21 and 26, 2018. No Stephens' kangaroo rats were trapped during the survey and no SKR sign

(tracks, scat, tail-drags, seed caches) were observed within the BSA. The complete SKR survey results are attached as Appendix G.

Vernal Pool Fairy Shrimp (Branchinecta lynchi)

The vernal pool fairy shrimp is federal-listed as threatened. This species occurs from Jackson County near Medford, Oregon, throughout the Central Valley, and west to the central Coast Ranges. Isolated southern populations occur on the Santa Rosa Plateau and near Rancho California in Riverside County (Eng et al.1990). This species is more typical of natural vernal pools, not riverine or other systems. In its southernmost range, e.g., Riverside County, this species tends to occur in pools that pond for long periods of time (USFWS, 2007).

This species has not been reported in the immediate project area (CNDDB; Figure 4). However, on-site ponding features support potentially suitable habitat for vernal pool fairy shrimp. The vernal pool fairy shrimp requires a long ponding period that deeper pools, such as Santa Rosa Plateau with pools up to 16 inches, provide (Chester, 2007). The Cactus Avenue channel supports features that likely remain inundated for long periods, and therefore may be suitable for vernal pool fairy shrimp. As such, the vernal pool fairy shrimp has a low to moderate potential to occur on site. Protocol large branchiopod (fairy shrimp) surveys are currently being undertaken to determine species presence/absence on-site; results will be forwarded to the USFWS in conformance with protocol.

3.4.2.2 Wildlife Species of Special Concern & Watch List Species

Western Spadefoot Toad (Spea hammondii)

The western spadefoot is a California Species of Special Concern. This species was reported in the CNDDB query (Figure 4), with the nearest historical occurrence located approximately 1.5 miles northwest of the project site. A 2011 Stephens' kangaroo rat management report notes the observation of western spadefoot in a ponded area at the north end of the Meridian West Campus project Site (approximately 1.55 miles west-northwest of the proposed K4 Warehouse site).

RBC documented potentially suitable habitat for western spadefoot during 2018 surveys. Potential ponding areas on-site and the drainage channel on the south side of Cactus Avenue have the potential to support this species. As such, western spadefoot has a moderate potential to occur at the site.

Orange-Throated Whiptail (Aspidoscelis hyperythra)

The orange-throated whiptail is a CDFW watch list species that inhabits chaparral, non-native grassland, coastal sage scrub, juniper woodland, and oak woodland in southwestern California and Baja California from sea level to 3,400 feet. Its diet consists primarily of the termite (*Reticulitermes hesperus*) so it is tied to perennial vegetation (Bostic 1966) including California buckwheat (McGurty 1981). Orange-throated whiptails are diurnal but spend the hottest part of the day in the shade (Pianka 1986). The orange-throated whiptail does not reproduce parthenogenetically and mates from April to July with a clutch size of around 2 eggs. Hibernation for adults takes place in late July to September with juveniles hibernating all the way to December (Bostic 1966).

The orange throated-whiptail is threatened by habitat loss and conversion of shrub-dominated habitats to non-native grassland. Additionally, non-native Argentine ants (*Irdomyrmex humilis*) are an invasive species known to displace many native insects and may influence the food base the orange-throated whiptail (Jennings and Hayes 1994). The orange-throated whiptail was not observed within the survey area during biological surveys, however has a moderate potential to occur based on habitat suitability and regional occurrences.

Burrowing Owl (Athene cunicularia)

Burrowing owl is a California Species of Special Concern at nesting sites and is federally protected by the Migratory Bird Treaty Act (MBTA). The western subspecies of burrowing owl (*A. c.* hypugaea) breeds from southern Canada to the western half of the United States and into Baja California and central Mexico. In California, suitable habitat for BUOW is generally characterized by short, sparse vegetation with few shrubs, level to gentle topography, and well-drained soils, such as naturally occurring grassland, shrub steppe, and desert habitats (Haug et al. 1993). BUOW may also occur in agricultural areas, ruderal grassy fields, vacant lots, and pastures containing suitable vegetation structure and useable burrows with foraging habitat in proximity (Gervais et al. 2008). BUOW usually use burrows dug by California ground squirrel (*Otospermophilus beecheyi*) and round-tailed ground squirrel (*Citellus tereticaudus*) and dens or holes dug by other fossorial species including badger (*Taxidea taxus*), coyote (*Canis latrans*), and fox (e.g., San Joaquin kit fox (*Vulpes macrotis mutica*)) (Ronan 2002). BUOW also frequently use natural rock cavities, debris piles, culverts, and pipes for nesting and roosting (Rosenberg et al. 2004) and have been documented using artificial burrows for nesting and cover (Smith and Belthoff 2001).

Burrowing owls have declined throughout much of their range because of habitat loss due to urbanization, agricultural conversion, and destruction of ground squirrel colonies (Remsen 1978). The incidental poisoning of burrowing owls and the destruction of their burrows during eradication programs aimed at rodent colonies have also caused their decline (Collins 1979; Remsen 1978). Although burrowing owls are relatively tolerant of lower levels of human activity, human related impacts such as shooting and introduction of non-native predators, have negative population impacts. Burrowing owls often nest and perch near roads where they are vulnerable to roadside shooting, fatal car strikes, and general harassment (Remsen 1978).

Focused burrowing owl surveys have not been conducted for the project. A wintering burrowing owl was documented by RBC approximately 1.5 miles west of the project site near the Meridian West Campus site on December 23, 2015. Burrowing owl was not observed on the project site during 2018 biological surveys. However, based on the presence of on-site suitable burrows and the ability of burrowing owls to occupy fairly disturbed and urban environments, this species has a moderate to high potential to occur on both the K4 Warehouse and the Cactus Channel Improvement sites.

California Horned Lark (Eremophila alpestris actia)

California horned lark is a Species of Special Concern found from coastal deserts and grasslands to alpine dwarf-shrub habitat above treeline and in coniferous or chaparral habitats. It is a common to abundant resident in a variety of open habitats, usually found in habitats where trees and large shrubs are absent. Within southern California, California horned larks' nest on the ground in open fields, grasslands, and rangelands. Horned larks forage in areas with low-growing vegetation and

feed primarily on grains and other seeds and shift to mostly insects in the summer months. California horned lark breeds from March through July, with a peak in activity in May. Outside of the breeding season pairs do not maintain territories and instead form large gregarious, somewhat nomadic flocks.

Threats to the California horned lark include habitat destruction and fragmentation. The habitats preferred by California horned larks are easily converted to other landscapes and human uses such as farmland and development. Pesticides have been shown to poison and kill horned larks (Beason 1995). As a ground nester, California horned lark is vulnerable to mowing in a variety of habitats and pesticide use in agricultural fields.

California horned lark were not observed in the BSA during biological surveys, however the species has been reported approximately 3.5 miles southwest of the project site (Figure 2; CNDDB 2018). However, California horned lark has a low to moderate potential to occur on both the both the K4 Warehouse and the Cactus Channel Improvement sites based on the ability of the species ability to utilize disturbed grassland habitats.

San Diego Black-Tailed Jackrabbit (Lepus californicus)

San Diego black-tailed jackrabbit is a California Species of Special Concern. San Diego black-tailed jackrabbit is found from the coast to the western slope of the coastal mountains, up to 6,000 feet. It inhabits open land but requires some shrubs for cover. Typical habitats include early stages of chaparral; open coastal sage scrub, and grasslands near the edges of brush. Grasses and forbs are their preferred foods. Chew and Chew (1970) reported a diet of 65% shrub browse and 35% herbage. Breeding occurs throughout the year, and young are born under shrubs with no special nest structure. Home ranges averaging 45 acres have been recorded in California (Lechleitner 1958).

San Diego black-tailed jackrabbit is considered a Species of Special Concern in California because the population declines threaten this subspecies with extinction in the state. It is currently considered vulnerable due to a restricted range and small number of populations. Major threats to black-tailed jackrabbits include habitat loss and fragmentation due to agriculture and urban development.

One individual was observed within the K4 Warehouse project site (Figure 2), and although the site is fairly disturbed, foraging habitat for San Diego black-tailed jackrabbit is present.

Los Angeles Pocket Mouse (Perognathus longimembris brevinasus)

Los Angeles pocket mouse is a California Species of Special Concern. This species occurs in coastal basins of southern California, from Los Angeles east to Cabazon, south to Temecula (Bolster 1998). This species is uncommon to rare throughout its range. Los Angeles pocket mouse inhabits low elevation (550-2,650 feet) grasslands, alluvial sage scrub, and coastal sage scrub. This species hibernates (October-February) and primarily feeds on seeds and forbs, and infrequently arthropods and larva (Bolster 1998).

Suitable Los Angeles pocket mouse foraging habitat is present on site; however the disturbed nature of the site reduces potential for occurrence. In addition, this species was not observed during project surveys. As such, this species has a low to moderate potential to occur at the site.

Northwestern San Diego Pocket Mouse (Chaetodipus fallax fallax)

The northwestern San Diego pocket mouse is a CDFW Species of Special Concern found in coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities and is associated with rocky and gravelly substrates. In San Diego County the San Diego pocket mouse was associated with shrub cover greater than 50 percent (Bolger 1997). The northwestern San Diego pocket mouse is one of six subspecies of San Diego pocket mouse (Williams et al. 1993) and is primarily a granivore (seed-eater). Beyond specialization on seeds, little is known of the foraging behavior of the San Diego pocket mouse. However, other pocket mice (*Chaetodipus*, *Perognathus* spp.) tend to forage under shrub and tree canopies, or around rock crevices. San Diego pocket mice are nocturnal and spend their days in burrows.

The San Diego pocket mouse is threatened by development, habitat fragmentation, and degradation. A study by Bolger et al. (1997) suggests that isolated habitat patches must be at least 62 to 198 acres to sustain native rodent populations.

Suitable San Diego pocket mouse habitat occurs on both the both the K4 Warehouse and the Cactus Channel Improvement sites, and burrows that are consistent with pocket mouse size were observed during general biological surveys. Due to the small size and disturbed nature of the site, the potential for this species in not high but there remains a low to moderate potential for occurrence.

3.4.2.3 Critical Habitat

The Endangered Species Act defines critical habitat as a specific geographic area, or areas, that contain features essential for the survival and recovery of endangered and threatened species. Critical habitat is designated by USFWS for endangered and threatened species and may include sites for breeding and rearing, movement or migration, feeding, roosting, cover, and shelter. Critical habitat may also include areas that are not currently occupied by the species, but that will be needed for its recovery. Special management of critical habitat, including measures for water quality and quantity, host animals and plants, food availability, pollinators, sunlight, and specific soil types is required to ensure the long-term survival and recovery of the identified species.

No USFWS-designated critical habitat or proposed critical habitat occurs within five miles of the proposed project site (USFWS, 2018). Therefore, no impacts to critical habitat are expected with implementation of the proposed project.

3.5 WILDLIFE CORRIDORS

A wildlife corridor can be defined as a physical feature that links wildlife habitat, often consisting of native vegetation that joins two or more larger areas of similar wildlife habitat. Corridors enable migration, colonization, and genetic diversity through interbreeding and are therefore critical for the movement of animals and the continuation of viable populations. Corridors can consist of large, linear stretches of connected habitat (such as riparian vegetation) or as a sequence of stepping-stones across the landscape (discontinuous areas of habitat such as wetlands and ornamental vegetation), or corridors can be larger habitat areas with known or likely importance to local fauna.

Regional corridors are defined as those linking two or more large patches of habitat, and local corridors are defined as those allowing resident animals to access critical resources (food, cover, and water) in a smaller area that might otherwise be isolated by urban development. A viable wildlife migration corridor consists of more than an unobstructed path between habitat areas. Appropriate vegetation communities must be present to provide food and cover for both transient species and resident populations of less mobile animals. There must also be a sufficient lack of stressors and threats within and adjacent to the corridor for species to use it successfully.

The project area does not serve as a wildlife corridor, as the areas surrounding the site are substantially developed.

4 IMPACT ANALYSIS

Direct impacts are caused by the project and occur at the same time and place as the project. Any alteration, disturbance, or destruction of biological resources that would result from project-related activities is considered a direct impact. Direct impacts would include direct losses to native habitats, potential jurisdictional waters, wetlands, and special-status species; and diverting natural surface water flows. Direct impacts could include injury, death, and/or harassment of listed and/or special-status species. Direct impacts could also include the destruction of habitats necessary for species breeding, feeding, or sheltering. Direct impacts to plants can include crushing of adult plants, bulbs, or seeds.

Indirect impacts can result from project-related activities where biological resources are affected in a manner that is not direct. Indirect impacts may occur later in time or at a place that is farther removed in distance from the project than direct impacts, but indirect impacts are still reasonably foreseeable and attributable to project-related activities. Examples include habitat fragmentation; elevated noise, dust, and lighting levels; changes in hydrology, runoff, and sedimentation; decreased water quality; soil compaction; increased human activity; and the introduction of invasive wildlife (domestic cats and dogs) and plants.

Cumulative impacts refer to incremental individual environmental effects of two or more projects when considered together. Such impacts taken individually may be minor, but are collectively significant in light of regional impacts.

March JPA's 2015 Local California Environmental Quality Act (CEQA) Guidelines Form J thresholds of significance have been used to determine whether project implementation would result in a significant direct, indirect, and/or cumulative impact. These thresholds are based on Appendix G of the state CEQA Guidelines (CCR Title 14, Division 6, Chapter 3, Sections 15000–15387). A significant biological resources impact would occur if the project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS;
- Have a substantial adverse effect on federal protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marshes, vernal pools, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy, or ordinance;
- Conflict with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or state habitat conservation plan.

4.1 K4 WAREHOUSE IMPACT ANALYSIS

4.1.1 K4 WAREHOUSE UPLAND VEGETATION IMPACTS

The proposed project would result in permanent impacts on upland vegetation communities and land uses, including goldenbush scrub/non-native grassland and non-native grassland, will result from the proposed K4 Warehouse project. Additionally, the project will result in impacts to developed and disturbed land uses (Figure 5, Table 7).

The only upland habitat present on-site that may be considered sensitive by the resource agencies (CDFW, USFWS) is goldenbush scrub; however, this habitat is sparse and heavily intermixed with non-native grassland. It is not comprised of the rare goldenbush species for which this community is likely considered sensitive; the goldenbush on-site is thick-bracted goldenbush (*Ericamerica palmeri* var. *pachylepis*; no CRPR or other listing) whereas it is Palmer's goldenbush (*Ericamerica palmeri* var. *palmeri*) that is rare and is a CRPR 1B.1 species. The loss of non-native grassland is adverse due to its value for raptor foraging habitat, however would not be a significant loss.

Additionally, as part of the base realignment and subsequent negotiations, 664 acres of native habitat were set aside for conservation in consideration of development within the base re-use area. These conservation areas include upland habitats similar to those that occur on-site. As such, impacts on upland habitats are considered adequately mitigated under previous agency consultation and are less than significant.

Table 7. K4 Warehouse Upland Vegetation Communities/Land Use Project Impacts

Vegetation Community	Project Site (acres)
Goldenbush Scrub/Non-Native Grassland	22.16
Developed/Disturbed	10.16
Non-native Grassland	0.26
Total	**32.58**

4.1.2 K4 WAREHOUSE POTENTIAL JURISDICTIONAL AREA IMPACTS

The proposed K4 warehouse access driveways would permanentally impact approximately 0.06 acre (131 linear feet) of potential Corps and RWQCB wetland waters of the U.S./State. Such crossings are necessary in order to provide ingress/egress to the site from Cactus Avenue. No non-wetland, ephemeral Corps/RWQCB waters of the U.S./State would be impacted with development of the K4 Warehouse (Table 8).

The CDFW has a slightly more expansive jurisdiction than Corps/RWQCB. All Corps/RWQCB potentially jurisdictional areas would also be CDFW jurisdictional, and an additional 0.02 acre would also be potentially CDFW jurisdictional. In total, approximately 0.08 acre (131 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) areas would be impacted with implementation of the K4 Warehouse development (Table 8). Impacts on these areas would potentially require permitting from the Corps, RWQCB, and CDFW. The K4 Warehouse project as planned is within permit limits for a Corps Nationwide Permit No. 39 and is below the 200 linear foot limitation.

Table 8. K4 Warehouse Project Potential Corps and RWQCB Jurisdictional Resource Impacts and CDFW Jurisdictional Resource Impacts

Agency Jurisdiction	Acreage	Linear Feet
Potentially Jurisdictional Corps and RWQCB Disturbed Wetland Waters	0.06	131
Potentially Jurisdictional CDFW Streambed (Wetland and Non-Wetland)	0.08	131

4.1.3 K4 WAREHOUSE SPECIAL-STATUS PLANTS AND ANIMAL IMPACTS

Federally and State Listed Threatened/Endangered Species

One federally and/or state listed species has been documented on-site and two have a moderate potential to occur on the project site (Section 3.4.2).

Riverside Fairy Shrimp (Streptocephalus woottoni) and Vernal Pool Fairy Shrimp (Branchinecta lynchi)

Riverside fairy shrimp has a moderate potential to occur on site and the vernal pool fairy shrimp has a low to moderate potential to occur on site. The K4 Warehouse parcel supports low areas that may pond during rain events, and the Cactus Avenue channel supports features that likely remain inundated for periods greater than 120 days, and therefore may be suitable for fairy shrimp.

Focused fairy shrimp surveys have not been conducted for the project. As such, any ground-disturbing activities have the potential to significantly impact this species. If present, any impacts on Riverside fairy shrimp or vernal pool fairy shrimp would be significant and require consultation and approval through the USFWS. Protocol shrimp surveys are underway in order to determine the presence or absence of these species on site; results will be submitted to the USFWS in accordance with species protocols.

Stephens' Kangaroo Rat

Protocol Stephens' kangaroo rat surveys were conducted within the BSA and the results were negative. No SKR or SKR sign including tracks, scat, tail drags, or seed caches, were documented during the survey conducted between October 21 and 26, 2018. Therefore, no direct impacts to this species are expected to occur with project implementation.

Species of Special Concern

CRPR Listed Plant Species

One plant species, smooth tarplant, has been documented on the K4 Warehouse site. Smooth tarplant is a CRPR rank 1B.1 species and State Rank S2. Its CRPR 1B.1 listing means that it is rare throughout its range (endemic to California) and has likely declined substantially over the last century. Smooth tarplant State Rank S2 signifies the plant is imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province (CNPS 2018).

CRPR 1B plants "meet the definitions of the California Endangered Species Act of the California Fish and Game Code and are eligible for state listing." Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125; (c) and/or §15380" (CNPS 2018). Its State Rank of S2 means that it is "imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province."

A smooth tarplant population of approximately 525-550 individuals (approximately 0.15 acre) would be permanently impacted with construction of the K4 Warehouse project (Figure 2). Direct impacts to smooth tarplant would be potentially significant. As part of the March Air Force Base closure process, 664 acres of lands were placed into conservation easement to offset species and habitat losses associated with base redevelopment, including development of the project site. Conserved areas occur west of I-15 and approximately 1.5 miles west of the K4 project site and provide similar habitats to those that will be impacted by the project (Appendix A). The conservation area is comprised of similar habitats as those occurring on the project site, and at least one population of 50 smooth tarplant individuals was observed during a brief 2018 survey of the conservation area. It is also likely, given the habitats present within the conserved areas, that there are additional populations of smooth tarplant within the conserved areas. As such, many habitat and species losses have already been addressed through conservation of this site, including smooth tarplant and other CRPR species. With implementation of mitigation outlined in Section XX, impacts on smooth tarplant would be less than significant conditional upon satisfaction of previous mitigation requirements.

Wildlife Species of Special Concern & Watch List Species

Burrowing Owl

Burrowing owl or sign (active burrow, white-wash, pellets, etc.) was not observed during 2018 biological surveys. Suitable foraging and nesting habitat (burrows) occur on site, however, and there is potential for this species to colonize the site prior to project construction. If the site becomes occupied by breeding burrowing owl, direct impacts in the form of habitat destruction, and potentially death, injury, or harassment of nesting birds, their eggs, and their young could occur. Injury or mortality occurs most frequently during the vegetation clearing stage of construction and involves eggs, nestlings, and recently fledged young that cannot safely avoid equipment. Potential impacts on burrowing owl were identified in the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA, 1999), and project impacts on burrowing owls are potentially significant.

Other Special-status Wildlife Species

One other Species of Special Concern wildlife species, San Diego black-tailed jackrabbit, was observed within the K4 Warehouse project area during 2018 surveys (Appendix D). Other Species of Special Concern and 'Watch List' species with a moderate or high potential to occur at the site include western spadefoot, orange-throated whiptail, California horned lark, northwestern San Diego pocket mouse, and Los Angeles pocket mouse.

The project will be construction of an industrial warehouse building, and access to the site from Cactus Avenue. Adult avian species would likely flush during initial project activities, and with implementation of nesting bird protections (MM-6), potential impact on nests would be avoided.

As part of the March Air Force Base closure process, 664 acres of lands were placed into conservation easement to offset species and habitat losses associated with base redevelopment, including development of the project site. As such, many habitat and species losses have already been addressed through conservation of this site. The conservation area occurs west of the site, and provides similar habitats to those that will be impacted by the project (Appendix A). According to the CNLM Stephens' kangaroo monitoring report (2012), the preserve lands are dominated by non-native grasslands, with patches of Riversidean sage scrub and riparian areas. Additionally, direct impacts on avian species will be avoided through nesting bird mitigation (see Section 5.3). Thus, direct avian impacts would be avoided.

Loss of habitat for species of concern and watch list species have been offset through conservation of 664 acres as part of the larger base closure efforts. Impacts on these species would be less than significant, conditional upon satisfaction of previous mitigation requirements.

4.1.4 K4 WAREHOUSE NESTING BIRD IMPACTS

The K4 Warehouse project area has a minor potential to support avian nests, which would be protected under the Migratory Bird Treaty Act and/or the California Fish and Game Code (§3503) under which it is unlawful to "take, possess, or needlessly destroy" avian nests or eggs. Thus, potential impacts could occur if vegetation clearing is undertaken during the breeding season. Removal of habitat would occur outside of the breeding season (February 1 to September 15), or would be surveyed by a qualified biologist prior to construction initiation. If active nests are found, the project clearing in that area plus an appropriate buffer (determined by the qualified biologist in consultation with CDFW) would be delayed until nestlings have fledged. Please refer to section 5.3 for full nest protection requirements.

4.1.5 K4 WAREHOUSE WILDLIFE CORRIDOR IMPACTS

The project is surrounded in all directions by developed land. Thus, the project area does not serve as a wildlife corridor, and therefore the project would not impact wildlife corridors.

4.1.6 K4 WAREHOUSE LOCAL POLICIES & ORDINANCES IMPACTS

No native oaks occur within the K4 Warehouse project site; therefore, no impacts to oaks that are protected under the Riverside County Oak Tree Management Guidelines would occur with project implementation.

The only trees that occur near roadways are willows associated with on-site drainages; there are no street tree plantings. Pursuant to Unincorporated Riverside County Ordinance No. 499.11 (as amended though 499.11), "No person, firm, corporation, public district, public agency or political subdivision shall remove or severely trim any tree planted in the right of way of any County highway without first obtaining a permit from the County Transportation Director to do so." [emphasis added]. As there have been no street trees planted on the project site, no impacts to trees protected under Ordinance No. 499.11 would occur with project implementation.

Chapter 12.24 of the Riverside County Code of Ordinances also includes regulations related to tree removal (County of Riverside 2016). According to the Unincorporated Riverside County Ordinance No. 559 (as amended through 559.7), the removal of living native trees on parcels or property greater than 0.5 acre in size, located in the unincorporated Riverside County, and above 5,000 feet in elevation requires a permit. The project site elevation is below 5,000 acres; as such, this ordinance is not applicable and no impacts to trees protected under Riverside County Ordinance No. 559 would occur with project implementation.

4.1.7 K4 WAREHOUSE CUMULATIVE IMPACTS

The project would result in minor impacts to potentially jurisdictional features, disturbed goldenbush scrub/non-native grassland, as well as special-status species. All impacts will be fully mitigated in accordance with previous agreements and in consultation with state and federal wildlife agencies. Project impacts were considered in connection with the larger March Air Base re-use, and this area is included in the regional MSHCP plan. The MSHCP is a regional effort to offset significant cumulative biological impacts, and all development in the region that is permitted through the County of Riverside must comply with the MSHCP. Because of this regional biological planning, cumulative biological impacts are avoided for development in the western Riverside region when developments are pursued in compliance with the plan. Though the JPA is an independent agency and therefore not a participant under the MSHCP, project mitigation will be pursued in a manner consistent with the MSHCP and all special-status species impacts will be permitted through state and federal agencies. As such, cumulative impacts are considered less than significant.

4.2 CACTUS CHANNEL IMPROVEMENTS IMPACT ANALYSIS

4.2.1 CACTUS CHANNEL IMPROVEMENTS UPLAND VEGETATION IMPACTS

The proposed project would result in permanent impacts on upland vegetation communities and land uses, including non-native grassland and ornamental lands. Additionally, the project will result in impacts to developed and disturbed land uses (Figures 6a-b, Table 9).

Upland habitats on-site are all non-native and are not considered sensitive by the resource agencies. The loss of non-native grassland is adverse due to its value for raptor foraging habitat, however would not be a significant loss. Additionally, as part of the base realignment and subsequent negotiations, 664 acres of native habitat were set aside for conservation in consideration of base re-use development.

Table 9. Cactus Channel Upland Vegetation Communities/Land Use Project Impacts

Vegetation Community	Project Site (acres)
Developed/Disturbed	0.85
Non-native Grassland	8.40
Ornamental	0.05
Total	**9.30**

4.2.2 CACTUS CHANNEL IMPROVEMENTS POTENTIAL JURISDICTIONAL AREA IMPACTS

The proposed Cactus Channel Improvements would permanentally impact approximately 1.34 acre (4659 linear feet) of potential Corps and RWQCB wetland waters of the U.S./State and approximately 0.42 acre (2876 linear feet) of non-wetland, ephemeral Corps/RWQCB waters of the U.S./State (Table 10).

Approximately 2.90 acres (7535 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) and/or associated riparian habitat within the Cactus Avenue Channel would be impacted with the proposed Cactus Channel Improvements (Table 10). The 2.9 acres of CDFW impacts include 2.5 acres of non-native grassland, 0.37 acre of freshwater marsh, 0.02 acre of Fremont's cottonwood, and 0.02 acre of southern willow scrub. Impacts on jurisdictional areas would be significant and would require consultation with the Corps, RWQCB, and CDFW (Table 10). The Corps may evaluate the Cactus Avenue Channel culvert project under a Standard Individual Permit (SIP) which would require an analysis of alternatives pursuant to the Section 404(b)(1) Guidelines. Additionally, the Corps, RWQCB, and/or CDFW may require a functional assessment (e.g., California Rapid Assessment Method [CRAM]) to quantitatively estimate the stream/wetland condition for the evaluation of the proposed project.

Table 10. Cactus Channel Project Potential Corps and RWQCB Jurisdictional Resource Impacts and CDFW Jurisdictional Resource Impacts

Agency Jurisdiction	Acreage	Linear Feet
Potentially Jurisdictional Corps and RWQCB Disturbed Wetland Waters	1.34	4659
Potentially Jurisdictional Corps and RWQCB Non-Wetland, Ephemeral Waters of the US/State	0.42	2876
Total Potential Corps/RWQCB Impacts:	*1.76*	*7535*
Potentially Jurisdictional CDFW Streambed (Wetland and Non-Wetland)	2.9	7535

Note: Corps/RWQCB jurisdictional areas are the same as/within CDFW jurisdictional areas; acreages do not represent separate lands.

4.2.3 CACTUS CHANNEL IMPROVEMENTS SPECIAL-STATUS PLANTS AND ANIMAL IMPACTS

Federally and State Listed Threatened/Endangered Species

Three federally and/or state listed species have a moderate potential to occur on the project site (Section 3.4.2).

Riverside Fairy Shrimp (Streptocephalus woottoni) and Vernal Pool Fairy Shrimp (Branchinecta lynchi)

Riverside fairy shrimp has a moderate potential to occur on site and the vernal pool fairy shrimp has a low to moderate potential to occur on site. The Cactus Avenue channel supports features that likely remain inundated for periods greater than 120 days, and therefore may be suitable for fairy shrimp.

As such, any ground-disturbing activities have the potential to significantly impact this species. If present, any impacts on Riverside fairy shrimp or vernal pool fairy shrimp would be significant and require consultation and approval through the USFWS. Protocol shrimp surveys are underway in

order to determine the presence or absence of these species on site; results will be submitted to the USFWS in accordance with species protocols.

Stephens' Kangaroo Rat

Protocol Stephens' kangaroo rat surveys were conducted within the BSA and the results were negative. No SKR or SKR sign including tracks, scat, tail drags, or seed caches, were documented during the survey conducted between October 21 and 26, 2018. Therefore, no direct impacts to this species are expected to occur with project implementation.

Species of Special Concern

Several Species of Special Concern have potential to occur within the Cactus Channel Improvements project area.

Burrowing Owl

Burrowing owl or sign (active burrow, white-wash, pellets, etc.) was not observed during 2018 biological surveys. Suitable foraging and nesting habitat (burrows) occur on site, however, and there is potential for this species to colonize the site prior to project construction. If the site becomes occupied by breeding burrowing owl, direct impacts in the form of habitat destruction, and potentially death, injury, or harassment of nesting birds, their eggs, and their young could occur. Injury or mortality occurs most frequently during the vegetation clearing stage of construction and involves eggs, nestlings, and recently fledged young that cannot safely avoid equipment. Potential impacts on burrowing owl were identified in the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA, 1999), and project impacts on burrowing owls are potentially significant.

Other Special-status Wildlife Species

One other Species of Special Concern, the San Diego black-tailed jackrabbit, was observed on the K4 Warehouse site immediately adjacent the proposed Cactus Channel Improvements work area during 2018 surveys (Appendix D). Other Species of Special Concern and 'Watch List' species

with a moderate or high potential to occur at the site include western spadefoot, orange-throated whiptail, California horned lark, northwestern San Diego pocket mouse, and Los Angeles pocket mouse.

The project will be undergrounding of the Cactus Avenue Channel. Adult avian species would likely flush during initial project activities, and with implementation of nesting bird protections (MM-6), potential impact on nests would be avoided.

As part of the March Air Force Base closure process, 664 acres of lands were placed into conservation easement to offset species and habitat losses associated with base redevelopment, including development of the project site. As such, many habitat and species losses have already been addressed through conservation of this site. The conservation area occurs west of the site and provides similar habitats to those that will be impacted by the project (Appendix A). According

to the CNLM Stephens' kangaroo monitoring report (2012), the preserve lands are dominated by non-native grasslands, with patches of Riversidean sage scrub and riparian areas. Additionally, direct impacts on avian species will be avoided through nesting bird mitigation (see Section 5.3). Thus, direct avian impacts would be avoided.

Loss of habitat for species of concern and watch list species have been offset through conservation of 664 acres as part of the larger base closure efforts. Impacts on these species would be less than significant, conditional upon satisfaction of previous mitigation requirements.

4.2.4 CACTUS CHANNEL IMPROVEMENTS NESTING BIRD IMPACTS

The project area has a minor potential to support avian nests, which would be protected under the Migratory Bird Treaty Act and/or the California Fish and Game Code (§3503) under which it is unlawful to "take, possess, or needlessly destroy" avian nests or eggs. Thus potential impacts could occur if vegetation clearing is undertaken during the breeding season. Removal of habitat would occur outside of the breeding season (February 1 to September 15), or would be surveyed by a qualified biologist prior to construction initiation. If active nests are found, the project clearing in that area plus an appropriate buffer (determined by the qualified biologist in consultation with CDFW) would be delayed until nestlings have fledged. Please refer to section 5.3 for full nest protection requirements.

4.2.5 CACTUS CHANNEL IMPROVEMENTS WILDLIFE CORRIDOR IMPACTS

The project is surrounded in all directions by developed land. Thus, the project area does not serve as a wildlife corridor, and therefore the project would not impact wildlife corridors.

4.2.6 CACTUS CHANNEL IMPROVEMENTS LOCAL POLICIES & ORDINANCES IMPACTS

No native oaks occur within the project site; therefore, no impacts to oaks that are protected under the Riverside County Oak Tree Management Guidelines would occur with project implementation.

The only trees that occur near roadways are occasional willows within the channel; there are no street tree plantings. Pursuant to Unincorporated Riverside County Ordinance No. 499.11 (as amended though 499.11), "No person, firm, corporation, public district, public agency or political subdivision shall remove or severely trim any tree planted in the right of way of any County highway

without first obtaining a permit from the County Transportation Director to do so." [emphasis added]. As there have been no street trees planted on the project site, no impacts to trees protected under Ordinance No. 499.11 would occur with project implementation.

Chapter 12.24 of the Riverside County Code of Ordinances also includes regulations related to tree removal (County of Riverside 2016). According to the Unincorporated Riverside County Ordinance No. 559 (as amended through 559.7), the removal of living native trees on parcels or property greater than 0.5 acre in size, located in the unincorporated Riverside County, and above 5,000 feet in elevation requires a permit. The project site elevation is below 5,000 acres; as such, this ordinance is not applicable and no impacts to trees protected under Riverside County Ordinance No. 559 would occur with project implementation.

4.2.7 CACTUS CHANNEL IMPROVEMENTS CUMULATIVE IMPACTS

The Cactus Channel Improvements would result in impacts to potentially jurisdictional features, non-native grassland, and potential impacts on special-status species. All impacts will be fully mitigated in accordance with previous agreements and in consultation with state and federal wildlife agencies. Project impacts were considered in connection with the larger March Air Base re-use, and this area is included in the regional MSHCP plan. The MSHCP is a regional effort to offset significant cumulative biological impacts, and all development in the region that is permitted through the County of Riverside must comply with the MSHCP. Because of this regional biological planning, cumulative biological impacts are avoided for development in the western Riverside region when developments are pursued in compliance with the plan. Though the JPA is an independent agency and therefore not a participant under the MSHCP, project mitigation will be pursued in a manner consistent with the MSHCP and all special-status species impacts, and jurisdictional resource impacts will be permitted through state and federal agencies. The channel is constructed and any impacts would not contribute to a significant regional loss of such habitats. Cumulative impacts are considered less than significant.

5 MITIGATION

The following discussion provides project-specific mitigation/avoidance measures for potential impacts on special-status resources.

5.1 K4 WAREHOUSE MITIGATION

5.1.1 K4 WAREHOUSE SITE MONITORING AND ADJACENCY IMPACT AVOIDANCE

To prevent inadvertent disturbance to areas outside the limits of the proposed project activities, following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum twice a month) to ensure implementation within the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements.

MM- K4-1: To prevent inadvertent disturbance to areas outside the limits of the proposed project construction limits, the following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum once a month) to ensure implementation with the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements.

1) To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground disturbance activities and all construction activities, including equipment staging and maintenance shall be conducted within the marked disturbance limits. The work limit delineation will be maintained throughout project construction.
2) Biologist will flush special-status species (i.e., avian or other mobile species) from suitable habitat areas to the maximum extent practicable immediately prior to initial vegetation removal activities.
3) Construction vehicles shall not exceed 15 miles per hour on unpaved roads adjacent to project site or the right-of-way accessing the site.
4) If trash and debris need to be stored overnight during the maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof will be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day, but must be removed each night.
5) Cut vegetation must be hauled out of the channel and stored, if necessary, where it cannot be washed by rainfall or runoff into the channel. When maintenance activities are completed, any excess materials or debris will be removed from the project site.
6) Temporary structures and storage of construction materials will not be located in jurisdictional waters, including wetlands and riparian areas.
7) Staging/storage areas for construction equipment and materials will not be located in jurisdictional waters, including wetland and riparian areas.
8) Pets on or adjacent to construction-sites will not be permitted by the operator.

9) As per the Landscaping Guidelines of the Resource Management Element of the March JPA General Plan (1999), drought tolerant vegetation and native vegetation will be used to the extent feasible, consistent with March JPA Landscape Water Efficiency Ordinance #JPA 16-03, with the purpose of preserving existing mature trees and native vegetation. Landscape plans shall be reviewed by a qualified botanist to recommend appropriate provisions to minimize the spread of invasive plant species as defined by the County of Riverside and listed by the California Invasive Plant Council (www.cal-ipc.org) and California Native Plant Society (www.cnps.org) within the project area. Provisions may include: a) installation of container plants and/or hydro-seeding areas adjacent to existing, undisturbed native vegetation areas with native plant species common within temporary impact areas; and (b) review and screening of proposed plants to identify and avoid potential invasive species and weed removal during the initial planting of landscaped areas.

5.1.2 K4 WAREHOUSE JURISDICTIONAL AREAS MITIGATION

The project area supports 0.08 acres of CDFW jurisdictional wetlands (streambed and non-streambed), and 0.06 acre of this area is also Corps jurisdictional non-wetland waters of the U.S. project impacts on wetland communities are significant and will be permitted and mitigated in consultation with the state and federal agencies.

Final mitigation ratios will be determined in consultation with the CDFW, Corps, and/or RWQCB based on agency evaluation of current resource functions and values. A minimum 1:1 ratio (0.08 acres) is typically required, though ratios may be higher. If mitigation is not achieved on-site, it must be performed in an in an agency-approved location that will be conserved and managed in perpetuity.

MM-K4-2: Applicable 404, 401, and 1600 permits and/or clearances shall be obtained prior to any disturbance of the jurisdictional features on-site. All mitigation measures and conditions contained within the permits shall be implemented. Additionally, the following precautions shall be taken during project construction activities. Mitigation options include on-site, offsite, in lieu fee mitigation, or a combination, to replace the disturbed jurisdictional features. Mitigation shall be determined in consultation with the agencies. Best Management Practices (BMPs) shall be implemented to avoid indirect impacts to jurisdictional waters, including the following:

1) Vehicles and equipment will not be operated in ponded or flowing water except as described in the permits.
2) Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows.
3) Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages.
4) Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters.

5) No equipment maintenance will occur within 100 feet of jurisdictional waters and no petroleum products or other pollutants from the equipment will be allowed to enter these areas or enter any off-site state-jurisdictional waters under any flow

5.1.3 K4 WAREHOUSE SPECIAL-STATUS SPECIES MITIGATION

5.1.3.1 K4 Warehouse Threatened and Endangered Species Mitigation

Riverside Fairy Shrimp (Streptocephalus woottoni) and Vernal Pool Fairy Shrimp (Branchinecta lynchi)

Ponding surveys and protocol shrimp surveys should be conducted in order to determine the presence or absence of these species on site.

As described previously, listed fairy shrimp have potential for occurrence in the project area. As such, focused surveys for these species should be conducted as part of project CEQA process.

MM-K4-3: A qualified biologist with a USFWS permit for Riverside fairy shrimp and vernal pool fairy shrimp shall conduct protocol surveys within the project area. If detected, consultation with the USFWS shall be pursued and either a finding of no jeopardy or a take permit shall be obtained for the project. All mitigation measures and conditions contained within any project permits shall be implemented.

5.1.3.2 K4 Warehouse Species of Special Concern Mitigation

Burrowing Owl

Burrowing owl, a federal bird of conservation concern and state Species of Special Concern, was not observed during 2018 general biological surveys, but has the potential to inhabit the site. As such, pre-construction surveys will be required.

MM-K4-4: In accordance with the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA, 1999), the following mitigation for burrowing owl is required:

> *Thirty days prior to the onset of construction activities, a qualified biologist with appropriate resource agency permits shall survey the construction limits of the Project for the presence of burrowing owls and occupied nest burrows. Any occupied burrows found during the survey efforts shall be mapped on the construction plans. (Draft MEIR, p. 3-96)*
>
> *If nesting and/or activity is present at any burrow site, then the active burrow shall be protected until nesting activity has ended to ensure compliance with Section 3503.5 of the California Fish and Game Code. Nesting activity for burrowing owls in the region of the Planning Area normally occurs from February 1 to August 31. To protect any burrow site, the following restrictions on construction are required between February 1 to August 31:*
>
> *1) Clearing limits will be established a minimum of 100 feet in any direction from any occupied burrow; and*

2) *Access and surveying will not be allowed within 50 feet of any occupied burrow. (Ibid.)*

Construction during the non-nesting season can occur only at the sites if a qualified biologist has determined that the burrows are no longer active. If an active burrow is observed during the non-nesting period, the burrow site will be monitored by a qualified biologist, and when the owl is outside the burrow entrance, the biologist will flush any owl to open space areas. The biologist will then excavate the burrow site with tools or fill the burrow with soil so owls cannot return to the burrow site. (Ibid.)

Note that clearing limit and access distances may be revised during project consultation with CDFW; distances are typically 300-feet for current permits/mitigation.

Smooth Tarplant

A smooth tarplant population of approximately 525-550 individuals (approximately 0.15 acre) would be permanently impacted with construction of the K4 Warehouse project.

MM-K4-5: Smooth Tarplant Mitigation and Monitoring Plan. Surveys shall be conducted for smooth tarplant the season prior to each phase of construction. Surveys shall occur within the Project site and include suitable habitat within a 100-foot buffer (access permitting), at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with CDFW protocols and by a qualified botanist knowledgeable of the local flora. Since annual variation in weather may result in fewer specimens being observed, the locations of plants considered will be cumulative (i.e., all known plant locations over the course of the various surveys, will be noted). The full extent of the occurrence within the survey area shall be recorded using GPS.
The location of smooth tarplant shall be mapped and number of individuals for each occurrence documented. The outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented:

1) Establish Environmentally Sensitive Areas (ESAs). Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the Project disturbance areas and within 100 feet of Project disturbance areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field (e.g., with temporary construction fencing) to ensure that avoided plants are not inadvertently harmed during construction.
2) Monitoring. A qualified biologist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.
3) Smooth Tarplant Mitigation Plan. If impacts to smooth tarplant cannot be avoided a Smooth Tarplant Mitigation Plan shall be submitted to CDFW for review and approval prior to ground disturbance to occupied habitat. Upon approval, the plan will be implemented by the applicant or its designee. The plan will demonstrate the feasibility of enhancing or restoring smooth tarplant habitat in areas to be managed as natural

open space (i.e., within the designated conservation areas west of I-215) without conflicting with other resource management objectives. Habitat enhancement replacement will be at a 1:1 ratio (acres enhanced or restored:acres impacted).

4) The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals.

5.1.4 K4 WAREHOUSE NESTING BIRD MITIGATION

MM-K4-6: To avoid direct impacts to raptors and/or native/migratory birds, removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15). If removal of habitat in the proposed area of disturbance must occur during the breeding season, a qualified biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-construction (precon) survey shall be conducted within ten (10) calendar days prior to the start of construction activities (including removal of vegetation). If nesting birds are observed, a letter report or mitigation plan in conformance with applicable State and Federal Law (i.e. appropriate follow up surveys, monitoring schedules, construction and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided. The report or mitigation plan shall be submitted to the CDFW and/or USFWS as applicable for review and approval and implemented to the satisfaction of those agencies. The project biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction. If nesting birds are not detected during the precon survey, no further mitigation is required.

5.2 CACTUS CHANNEL IMPROVEMENTS MITIGATION

5.2.1 CACTUS CHANNEL IMPROVEMENTS SITE MONITORING AND ADJACENCY IMPACT AVOIDANCE

To prevent inadvertent disturbance to areas outside the limits of the proposed project activities, following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum twice a month) to ensure implementation within the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements.

MM-CC-1: To prevent inadvertent disturbance to areas outside the limits of the proposed project construction limits, the following monitoring requirements and BMPs shall be implemented. A biologist shall be contracted to perform regular random checks (at minimum once a month) to ensure implementation with the following monitoring requirements and BMPs. Monitoring reports and a post-construction monitoring report will be prepared to document compliance with these requirements.

1) To prevent inadvertent disturbance to areas outside the limits of work, the construction limits shall be clearly demarcated (e.g., installation of flagging or temporary visibility construction fence) prior to ground disturbance activities and all construction activities, including equipment staging and maintenance shall be conducted within the marked disturbance limits. The work limit delineation will be maintained throughout project construction.
2) Biologist will flush special-status species (i.e., avian or other mobile species) from suitable habitat areas to the maximum extent practicable immediately prior to initial vegetation removal activities.
3) Construction vehicles shall not exceed 15 miles per hour on unpaved roads adjacent to project site or the right-of-way accessing the site.
4) If trash and debris need to be stored overnight during the maintenance activities, fully covered trash receptacles that are animal-proof and weather-proof will be used by the maintenance contractor to contain all food, food scraps, food wrappers, beverage containers, and other miscellaneous trash. Alternatively, standard trash receptacles may be used during the day, but must be removed each night.
5) Cut vegetation must be hauled out of the channel and stored, if necessary, where it cannot be washed by rainfall or runoff into the channel. When maintenance activities are completed, any excess materials or debris will be removed from the project site.
6) Temporary structures and storage of construction materials will not be located in jurisdictional waters, including wetlands and riparian areas.
7) Staging/storage areas for construction equipment and materials will not be located in jurisdictional waters, including wetland and riparian areas.
8) Pets on or adjacent to construction-sites will not be permitted by the operator.
9) As per the Landscaping Guidelines of the Resource Management Element of the March JPA General Plan (1999), drought tolerant vegetation and native vegetation will be used to the extent feasible, consistent with March JPA Landscape Water Efficiency Ordinance #JPA 16-03, with the purpose of preserving existing mature trees and native vegetation. Landscape plans shall be reviewed by a qualified botanist to recommend appropriate provisions to minimize the spread of invasive plant species as defined by the County of Riverside and listed by the California Invasive Plant Council (www.cal-ipc.org) and California Native Plant Society (www.cnps.org) within the project area. Provisions may include: a) installation of container plants and/or hydro-seeding areas adjacent to existing, undisturbed native vegetation areas with native plant species common within temporary impact areas; and (b) review and screening of proposed plants to identify and avoid potential invasive species and weed removal during the initial planting of landscaped areas.

5.2.2 CACTUS CHANNEL IMPROVEMENTS JURISDICTIONAL AREAS MITIGATION

The Cactus Channel Improvement project area supports 2.90 acres of CDFW jurisdictional wetlands (streambed and non-streambed), and 1.76 acre of this area is also Corps jurisdictional non-wetland waters of the U.S. or waters of the U.S./State. Project impacts on wetland communities are significant and will be permitted and mitigated in consultation with the state and federal agencies.

Final mitigation ratios will be determined in consultation with the CDFW, Corps, and/or RWQCB based on agency evaluation of current resource functions and values. A minimum 1:1 ratio (2.90 acres) is typically required, though ratios may be higher. If mitigation is not achieved on-site, it must be performed in an in an agency-approved location that will be conserved and managed in perpetuity.

MM-CC-2: Applicable 404, 401, and 1600 permits and/or clearances shall be obtained prior to any disturbance of the jurisdictional features on-site. All mitigation measures and conditions contained within the permits shall be implemented. Additionally, the following precautions shall be taken during project construction activities. Mitigation options include on-site, offsite, in lieu fee mitigation, or a combination, to replace the disturbed jurisdictional features. Mitigation shall be determined in consultation with the agencies. Best Management Practices (BMPs) shall be implemented to avoid indirect impacts to jurisdictional waters, including the following:

1) Vehicles and equipment will not be operated in ponded or flowing water except as described in the permits.
2) Water containing mud, slit, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows.
3) Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages.
4) Raw cement/concrete or washing thereof, asphalt, paint or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, will be prevented from contaminating the solid and/or entering avoided jurisdictional waters.
5) No equipment maintenance will occur within 100 feet of jurisdictional waters and no petroleum products or other pollutants from the equipment will be allowed to enter these areas or enter any off-site state-jurisdictional waters under any flow

5.2.3 CACTUS CHANNEL IMPROVEMENTS SPECIAL-STATUS SPECIES MITIGATION

5.2.3.1 Cactus Channel Improvements Threatened and Endangered Species Mitigation

Riverside Fairy Shrimp (Streptocephalus woottoni) and Vernal Pool Fairy Shrimp (Branchinecta lynchi)

Ponding surveys and protocol shrimp surveys should be conducted in order to determine the presence or absence of these species on site.

As described previously, listed fairy shrimp have potential for occurrence in the project area. As such, focused surveys for these species should be conducted as part of project CEQA process.

MM-CC-3: A qualified biologist with a USFWS permit for Riverside fairy shimp and vernal pool fairy shrimp shall conduct protocol surveys within the project area. If detected, consultation with the USFWS shall be pursued and either a finding of no jeopardy or a take permit shall be obtained for the project. All mitigation measures and conditions contained within any project permits shall be implemented.

5.2.3.2 Cactus Channel IMprovements Species of Special Concern Mitigation

Burrowing Owl

Burrowing owl, a federal bird of conservation concern and state Species of Special Concern, was not observed during 2018 general biological surveys, but has the potential to inhabit the site. As such, pre-construction surveys will be required.

MM-CC-4: In accordance with the *Master Environmental Impact Report for the General Plan of the March Joint Powers Authority* (March JPA, 1999), the following mitigation for burrowing owl is required:

> *Thirty days prior to the onset of construction activities, a qualified biologist with appropriate resource agency permits shall survey the construction limits of the Project for the presence of burrowing owls and occupied nest burrows. Any occupied burrows found during the survey efforts shall be mapped on the construction plans. (Draft MEIR, p. 3-96)*
>
> *If nesting and/or activity is present at any burrow site, then the active burrow shall be protected until nesting activity has ended to ensure compliance with Section 3503.5 of the California Fish and Game Code. Nesting activity for burrowing owls in the region of the Planning Area normally occurs from February 1 to August 31. To protect any burrow site, the following restrictions on construction are required between February 1 to August 31:*

1) *Clearing limits will be established a minimum of 100 feet in any direction from any occupied burrow; and*
2) *Access and surveying will not be allowed within 50 feet of any occupied burrow. (Ibid.)*

Construction during the non-nesting season can occur only at the sites if a qualified biologist has determined that the burrows are no longer active. If an active burrow is observed during the non-nesting period, the burrow site will be monitored by a qualified biologist, and when the owl is outside the burrow entrance, the biologist will flush any owl to open space areas. The biologist will then excavate the burrow site with tools or fill the burrow with soil so owls cannot return to the burrow site. (Ibid.)

Note that clearing limit and access distances may be revised during project consultation with CDFW; distances are typically 300-feet for current permits/mitigation.

5.2.4 CACTUS CHANNEL IMPROVEMENTS NESTING BIRD MITIGATION

MM-CC-5: To avoid direct impacts to raptors and/or native/migratory birds, removal of habitat that supports active nests in the proposed area of disturbance should occur outside of the breeding season for these species (February 1 to September 15). If removal of habitat in the proposed area of disturbance must occur during the breeding season, a qualified biologist shall conduct a pre-construction survey to determine the presence or absence of nesting birds in the proposed area of disturbance. The pre-construction (precon) survey shall be conducted within ten (10) calendar days prior to the start of construction activities (including removal of vegetation). If

nesting birds are observed, a letter report or mitigation plan in conformance with applicable State and Federal Law (i.e. appropriate follow up surveys, monitoring schedules, construction and noise barriers/buffers, etc.) shall be prepared and include proposed measures to be implemented to ensure that take of birds or eggs or disturbance of breeding activities is avoided. The report or mitigation plan shall be submitted to the CDFW and/or USFWS as applicable for review and approval and implemented to the satisfaction of those agencies. The project biologist shall verify and approve that all measures identified in the report or mitigation plan are in place prior to and/or during construction. If nesting birds are not detected during the precon survey, no further mitigation is required.

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FIGURE 1

Project Location

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 1,000 2,000 FEET

N

Source: Google; National Geographic Society

Detail Area 1

Elsworth St

FWM

Cactus Ave

D/D

NNG

FWM

GBS/
NNGd

Key Map

Detail
Area 1

Detail Area 2

Frederick St

Veterans Wy

Cactus Ave

D/D

FWM

FWM

NNG

SWS

ORN

NNG

FWM

SWS

NNG

1

D/D

50

GBS/NNGd

D/D

10

15

1

10

3

20

1

400

20

3

Detail Area 2

Survey Area

50-foot Buffer

Special Status Species

Black-tailed Jackrabbit (*Lepus californicus*)

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Vegetation

D/D - Developed/Disturbed

FWM - Freshwater Marsh

GBS/NNGd - Golden Bush Scrub/Non-native Grassland Disturbed

NNG - Non-native Grassland

ORN - Ornamental

SWS - Southern Willow Scrub

FIGURE
2A

Biological Resources

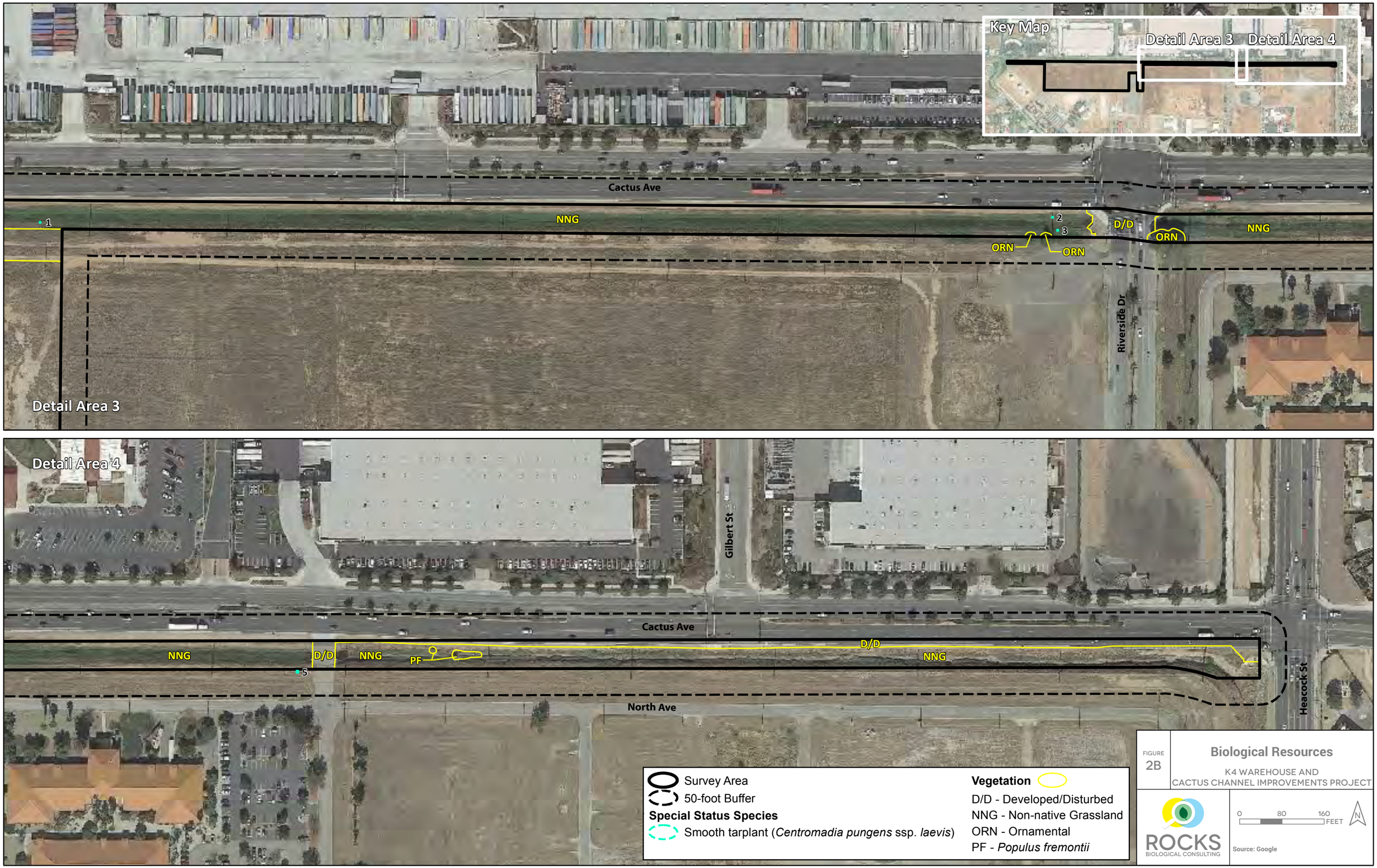
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

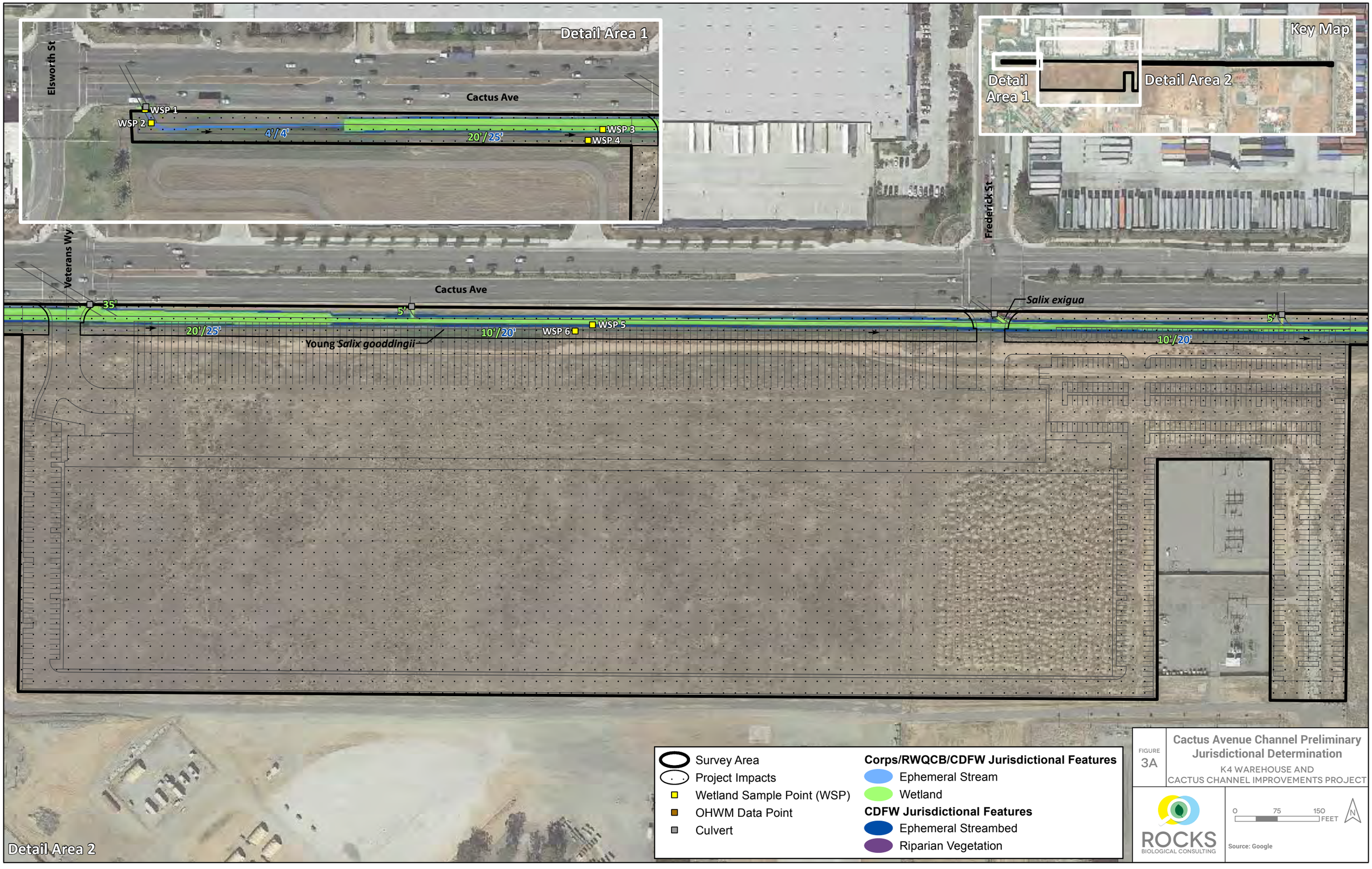
ROCKS
BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google


Key Map
Detail Area 3
Detail Area 4
Cactus Ave
NNG
1
2
3
D/D
ORN
ORN
ORN
NNG
Riverside Dr
Detail Area 3
Detail Area 4
Gilbert St
Cactus Ave
NNG
D/D
NNG
PF
D/D
NNG
5
Heacock St
North Ave
Survey Area
50-foot Buffer
Special Status Species
Smooth tarplant (Centromadia pungens ssp. laevis)
Vegetation
D/D - Developed/Disturbed
NNG - Non-native Grassland
ORN - Ornamental
PF - Populus fremontii
FIGURE 2B
Biological Resources
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 80 160 FEET
N
Source: Google


Detail Area 1
Elsworth St
Cactus Ave
WSP 1
WSP 2
4'/4'
WSP 3
20'/25'
WSP 4
Key Map
Detail Area 1
Detail Area 2
Veterans Wy
Cactus Ave
Frederick St
35'
5'
20'/25'
Young Salix gooddingii
10'/20'
WSP 6
WSP 5
Salix exigua
5'
10'/20'
Detail Area 2
Survey Area
Project Impacts
Wetland Sample Point (WSP)
OHWM Data Point
Culvert
Corps/RWQCB/CDFW Jurisdictional Features
Ephemeral Stream
Wetland
CDFW Jurisdictional Features
Ephemeral Streambed
Riparian Vegetation
FIGURE 3A
Cactus Avenue Channel Preliminary Jurisdictional Determination
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 75 150 FEET
N
Source: Google

Key Map

Detail Area 3

Detail Area 4

Cactus Ave

10'/20'

11'/15'

15'/20'

15'/20'

WSP 7

WSP 8

OHWM 1

WSP 9

10'/15'

Riverside Dr

Detail Area 3

Detail Area 4

Gilbert St

Young *Populus fremontii*

Cactus Ave

5'/10'

10'/15'

OHWM 2

WSP 10

5'/10'

5'/10'

North Ave

Heacock St

Survey Area

Project Impacts

Wetland Sample Point (WSP)

OHWM Data Point

Culvert

Corps/RWQCB/CDFW Jurisdictional Features

Ephemeral Stream

Wetland

CDFW Jurisdictional Features

Ephemeral Streambed

Riparian Vegetation

FIGURE 3B

Cactus Avenue Channel Preliminary Jurisdictional Determination

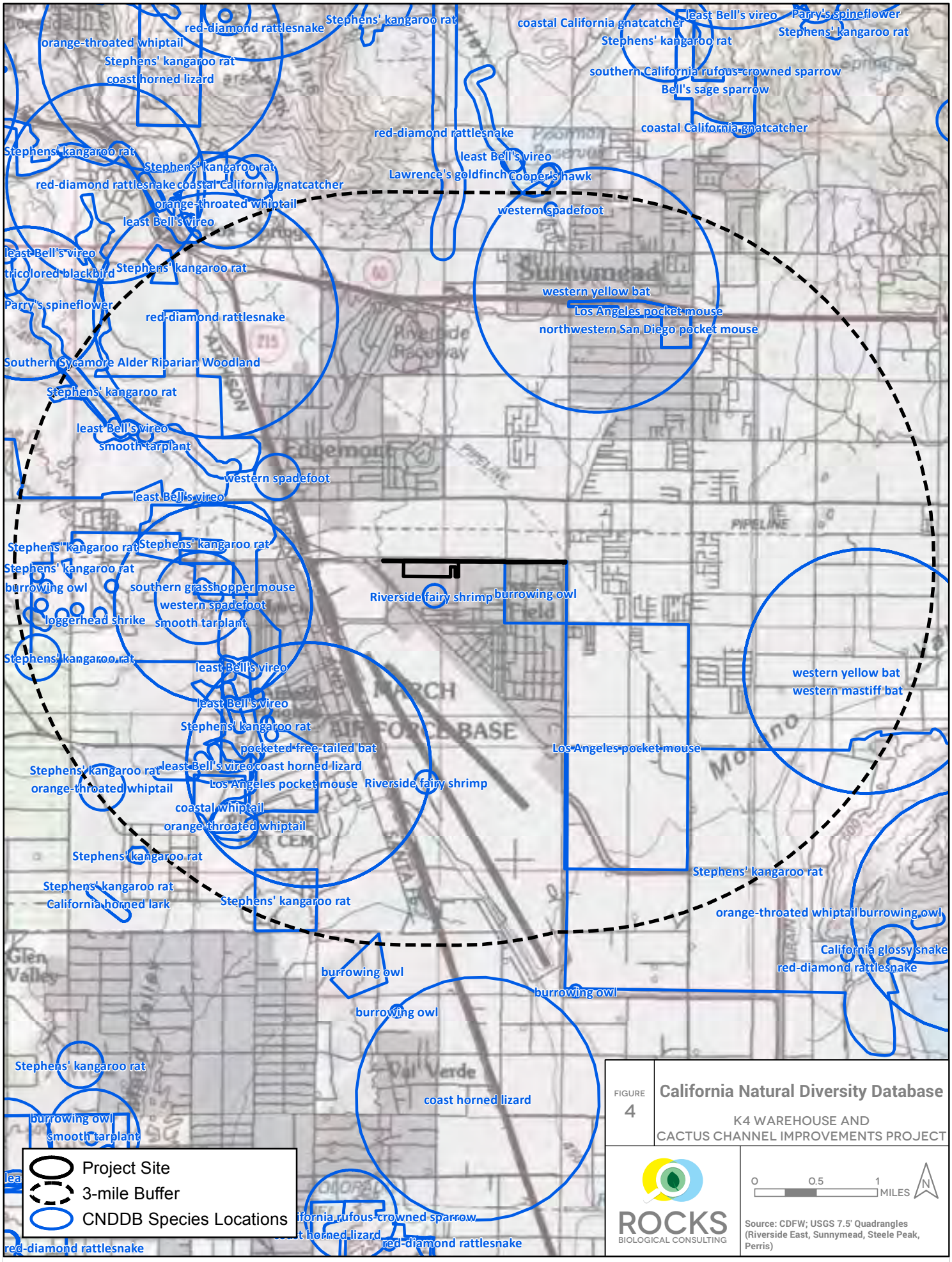
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

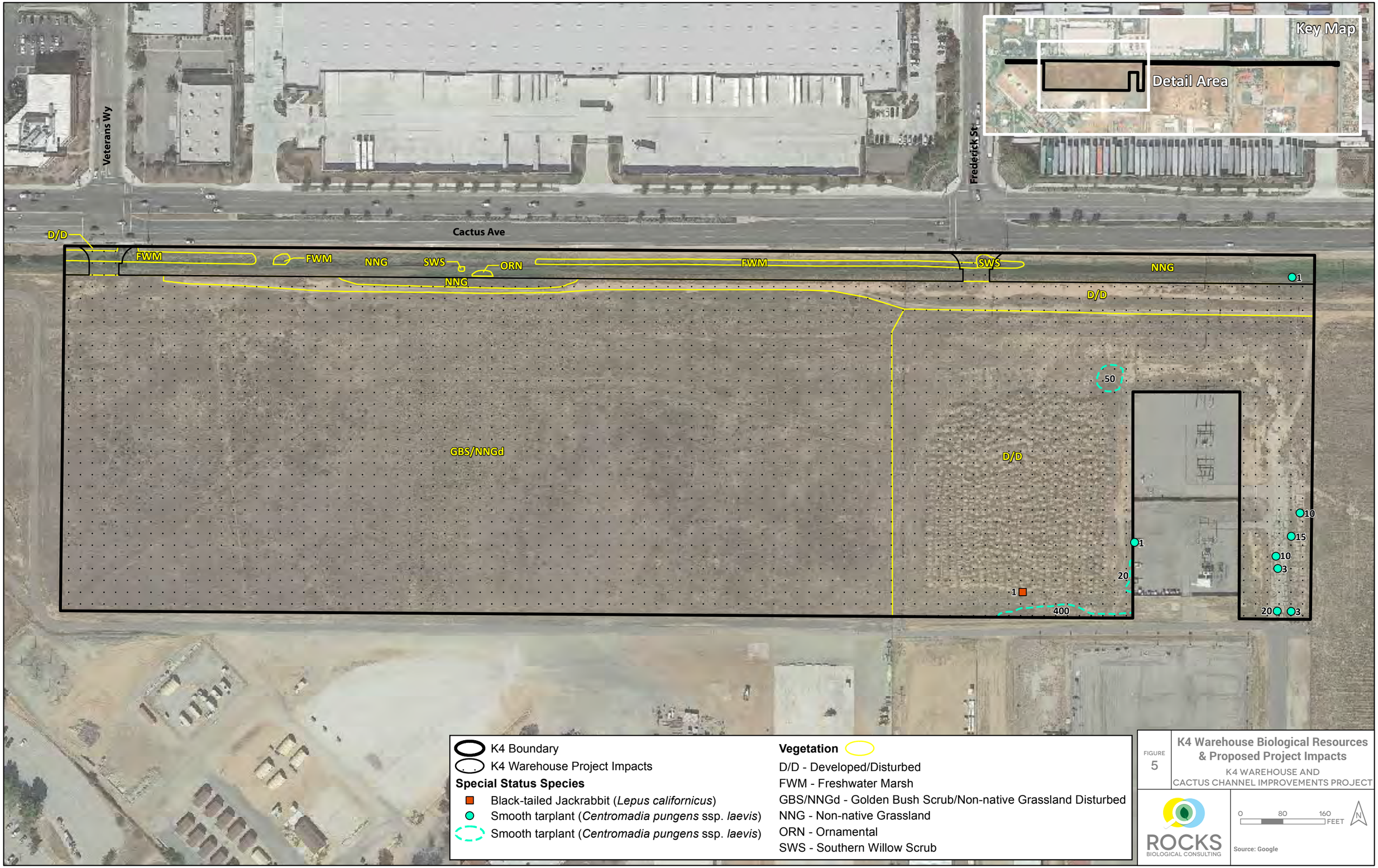
ROCKS BIOLOGICAL CONSULTING

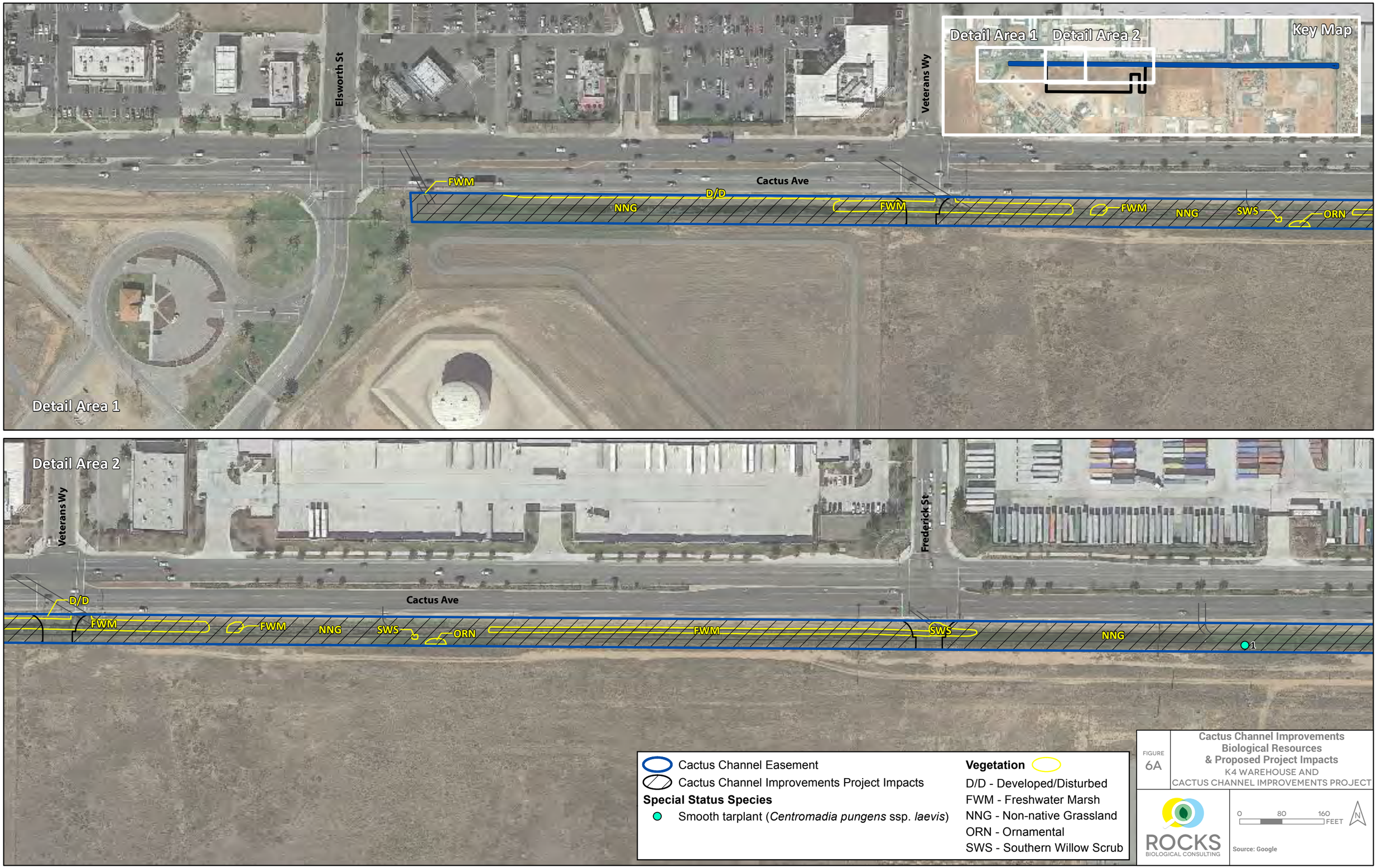
0 75 150 FEET

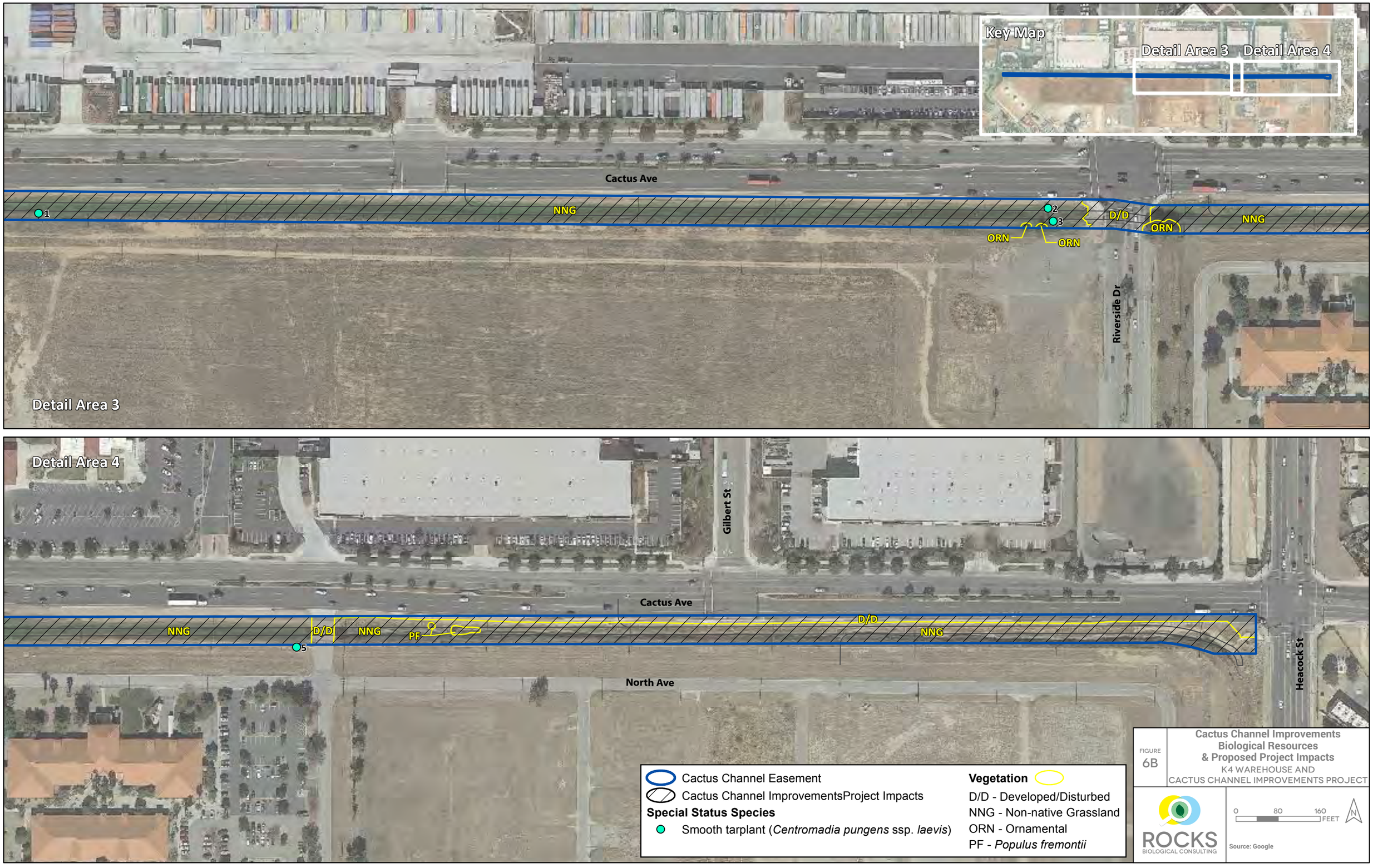
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Source: Google


red-diamond rattlesnake
Stephens' kangaroo rat
orange-throated whiptail
Stephens' kangaroo rat
coast horned lizard
coastal California gnatcatcher
least Bell's vireo
Parry's spineflower
Stephens' kangaroo rat
Stephens' kangaroo rat
southern California rufous-crowned sparrow
Bell's sage sparrow
coastal California gnatcatcher
red-diamond rattlesnake
Stephens' kangaroo rat
least Bell's vireo
Stephens' kangaroo rat
Lawrence's goldfinch
Cooper's hawk
red-diamond rattlesnake
coastal California gnatcatcher
orange-throated whiptail
western spadefoot
least Bell's vireo
least Bell's vireo
tricolored blackbird
Stephens' kangaroo rat
western yellow bat
Parry's spineflower
red-diamond rattlesnake
Los Angeles pocket mouse
northwestern San Diego pocket mouse
Southern Sycamore Alder Riparian Woodland
Stephens' kangaroo rat
least Bell's vireo
smooth tarplant
western spadefoot
least Bell's vireo
Stephens' kangaroo rat
Stephens' kangaroo rat
Stephens' kangaroo rat
burrowing owl
southern grasshopper mouse
western spadefoot
Riverside fairy shrimp
burrowing owl
loggerhead shrike
smooth tarplant
Stephens' kangaroo rat
least Bell's vireo
western yellow bat
western mastiff bat
least Bell's vireo
Stephens' kangaroo rat
pocketed free-tailed bat
Los Angeles pocket mouse
Stephens' kangaroo rat
least Bell's vireo
coast horned lizard
orange-throated whiptail
Los Angeles pocket mouse
Riverside fairy shrimp
coastal whiptail
orange-throated whiptail
Stephens' kangaroo rat
Stephens' kangaroo rat
Stephens' kangaroo rat
California horned lark
Stephens' kangaroo rat
orange-throated whiptail
burrowing owl
California glossy snake
red-diamond rattlesnake
burrowing owl
burrowing owl
Stephens' kangaroo rat
coast horned lizard
burrowing owl
smooth tarplant
Project Site
3-mile Buffer
CNDDB Species Locations
California rufous-crowned sparrow
coast horned lizard
red-diamond rattlesnake
red-diamond rattlesnake
Sunnymead
Riverside Raceway
Edgemont
MARCH AIR FORCE BASE
Glen Valley
Val Verde
PIPELINE
FIGURE 4
California Natural Diversity Database
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 0.5 1 MILES
N
Source: CDFW; USGS 7.5' Quadrangles (Riverside East, Sunnymead, Steele Peak, Perris)


Key Map
Detail Area
Veterans Wy
Frederick St
Cactus Ave
D/D
FWM
FWM
NNG
SWS
ORN
NNG
FWM
SWS
NNG
1
D/D
50
GBS/NNGd
D/D
10
15
1
10
3
20
1
400
20
3
K4 Boundary
K4 Warehouse Project Impacts
Special Status Species
Black-tailed Jackrabbit (Lepus californicus)
Smooth tarplant (Centromadia pungens ssp. laevis)
Smooth tarplant (Centromadia pungens ssp. laevis)
Vegetation
D/D - Developed/Disturbed
FWM - Freshwater Marsh
GBS/NNGd - Golden Bush Scrub/Non-native Grassland Disturbed
NNG - Non-native Grassland
ORN - Ornamental
SWS - Southern Willow Scrub
FIGURE 5
K4 Warehouse Biological Resources & Proposed Project Impacts
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 80 160 FEET
N
Source: Google


Detail Area 1
Detail Area 2
Key Map
Elsworth St
Veterans Wy
Cactus Ave
FWM
D/D
NNG
FWM
FWM
NNG
SWS
ORN
Detail Area 1
Detail Area 2
Veterans Wy
Cactus Ave
Frederick St
D/D
FWM
FWM
NNG
SWS
ORN
FWM
SWS
NNG
1
Cactus Channel Easement
Cactus Channel Improvements Project Impacts
Special Status Species
Smooth tarplant (Centromadia pungens ssp. laevis)
Vegetation
D/D - Developed/Disturbed
FWM - Freshwater Marsh
NNG - Non-native Grassland
ORN - Ornamental
SWS - Southern Willow Scrub
FIGURE 6A
Cactus Channel Improvements
Biological Resources
& Proposed Project Impacts
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS
BIOLOGICAL CONSULTING
0 80 160 FEET
N
Source: Google


Key Map
Detail Area 3
Detail Area 4
Cactus Ave
NNG
D/D
ORN
1
2
3
Riverside Dr
Detail Area 3
Detail Area 4
Gilbert St
Cactus Ave
NNG
D/D
PF
5
North Ave
Heacock St
Cactus Channel Easement
Cactus Channel ImprovementsProject Impacts
Special Status Species
Smooth tarplant (Centromadia pungens ssp. laevis)
Vegetation
D/D - Developed/Disturbed
NNG - Non-native Grassland
ORN - Ornamental
PF - Populus fremontii
FIGURE 6B
Cactus Channel Improvements
Biological Resources
& Proposed Project Impacts
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 80 160 FEET
N
Source: Google

APPENDIX A

SITE PHOTOGRAPHS

Appendix A

Site Photographs



Photo 1. Overview of project site, facing west. Photograph shows goldenbush scrub/non-native grassland vegetation community on the project site. July 17, 2018.



Photo 2. Overview of project site, facing south. Photograph shows goldenbush scrub/non-native grassland vegetation on the project site. July 17, 2018.



Photo 3. View of southern end of site, facing north toward developed/disturbed vegetation and the area next to old concrete/asphalt where water may shallowly pond. July 17, 2018.



Photo 4. View of southern end of site, facing west. Photograph shows developed/disturbed vegetation on the southern end of site south of the stockpile area. July 17, 2018.



Photo 5. View of smooth tarplant on southeast side of project site, just south of stockpile area. July 17, 2018.



Photo 6. View of Cactus Avenue Channel at intersection of Cactus Avenue and Veterans Way, facing northwest. Cattails dominate this inundated portion of the channel. July 17, 2018.



Photo 7. View of Cactus Avenue Channel, facing east. Non-native grassland vegetation community shown on sides of and within channel. July 17, 2018.



Photo 8. Non-native grassland vegetation at western end of Cactus Avenue Channel, facing east. Dominant plant species at this portion of the channel include common brome and Bermuda grass. July 25, 2018.



Photo 9. Middle portion of Cactus Ave Channel, facing west. Cattails and dense non-native grassland thrive due to the influx of water from storm drains. 25, 2018.



Photo 10. View of eastern end of Cactus Avenue Channel, facing east. Most of channel supports non-native vegetation community but a small patch of Fremont cottonwood has recently established. July 25, 2018.



Photo 11. Middle portion of Cactus Avenue Channel, facing southeast. Photograph shows dense non-native grassland within channel and small patch of the non-native tree of heaven. July 25, 2018.



Photo 12. View of culvert at intersection of Cactus Avenue and Elsworth Street. Photograph shows cattails within inundated portion of culvert. July 25, 2018.

APPENDIX B

BIOLOGICAL SURVEY DATES

Appendix B

Biological Survey Dates

Date/s	Task	Personnel
July 17, 2018	Jurisdictional delineation, vegetation mapping, plant and wildlife survey	Emily Trevino, Lee Ripma, Shanti Santulli
July 25, 2018	Vegetation mapping, plant and wildlife survey	Lee Ripma
October 22, 2018 October 23, 2018 October 24, 2018 October 25, 2018 October 26, 2018	Stephens' Kangaroo Rat surveys	Phil Brylski, Ian Hirschler

APPENDIX C

LIST OF VASCULAR PLANT SPECIES OBSERVED WITHIN THE PROJECT STUDY AREA

Appendix C

List of Vascular Plant Species Observed within the Project Study Area

Scientific Name	Common Name
Amaranthaceae (amaranth family)	
Amaranthus blitoides	prostrate amaranth
Asteraceae (sunflower family)	
*Anthemis cotula**	dog fennel, mayweed
Centromadia pungens ssp. *laevis* (CRPR 1B.1)	smooth tarplant (CRPR 1B.1)
Corethrogyne filaginifolia	common sandaster
Encelia sp.	brittlebush species
Ericameria palmeri var. *pachylepis*	broad scaled palmer's goldenbush
Helianthus sp.	sunflower species
Stephanomeria sp.	Stephanomeria species
	thistle species
Brassicaceae (mustard family)	
*Hirschfeldia incana***	short-pod mustard
Chenopodiaceae (goosefoot family)	
*Atriplex semibaccata***	Australian saltbush
*Salsola tragus***	prickly Russian-thistle, tumbleweed
Cyperaceae (sedge family)	
Cyperus eragrostis	tall cyperus
Euphorbiaceae (spurge family)	
*Euphorbia maculata**	spotted spurge
Fabaceae (legume family)	
Acmispon americanus var. *americanus*	Spanish-clover
Juglandaceae (walnut family)	
*Carya illinoinensis**	pecan
Onagraceae (evening-primrose family)	
Epilobium sp.	willowherb species
Ludwigia palustris	pacific marsh-purslane
Oenothera sp.**	evening primrose species
Poaceae (grass family)	
Bromus madritensis ssp. *rubens***	foxtail brome
*Bromus sterilis**	poverty brome
*Cynodon dactylon***	Bermuda grass
*Paspalum dilatatum**	dallis grass
Paspalum distichum	common knotgrass
*Polypogon monspeliensis***	annual beard grass
Polygonaceae (buckwheat family)	
Polygonum aviculare	prostrate knotweed
*Rumex crispus***	curly dock

Scientific Name	Common Name
Portulacaceae (purslane family)	
*Portulaca oleracea**	common purslane
Potamogetonaceae (pondweed family)	
Potamogeton sp.	pondweed species
Salicaceae (willow family)	
Salix gooddingii	Goodding's black willow
Salix exigua var. *exigua*	sandbar willow
Populus fremontii	Fremont cottonwood
Simaroubaceae (quassia or simarouba family)	
*Ailanthus altissima**	tree of heaven
Solanaceae (nightshade family)	
Datura wrightii	western jimson weed
Typhaceae (cattail family)	
Typha latifolia	broadleaf cattail
Zygophyllaceae (calotrop family)	
*Tribulus terrestris***	puncture vine

CRPR: *California Rare Plant Rank (California Native Plant Society)*

* *Non-Native Species (CalFlora)*

** *Invasive and Non-Native Species (CalFlora)*

APPENDIX D

LIST OF WILDLIFE SPECIES OBSERVED WITHIN THE PROJECT STUDY AREA

Appendix D

List of Wildlife Species Observed within the Project Study Area

Common Name	Scientific Name
REPTILES	
Colubridae (colubrid snakes)	
San Diego gopher snake	*Pituophis catenifer annectens*
Phrynosomatidae (spiny lizards)	
common side-blotched lizard	*Uta stansburiana*
INVERTEBRATES	
Nymphalidae (brush-footed butterflies)	
common buckeye	*Junonia coenia*
BIRDS	
Accipitridae (eagles, hawks, and kites)	
red-tailed hawk	*Buteo jamaicensis*
Aegithalidae (bushtits)	
bushtit	*Psaltriparus minimus*
Charadriidae (plovers and lapwings)	
killdeer	*Charadrius vociferus*
Columbidae (pigeons and doves)	
mourning dove	*Zenaida macroura*
Corvidae (crows, jays, and magpies)	
American crow	*Corvus brachyrhynchos*
common raven	*Corvus corax*
Falconidae (falcons and caracaras)	
American kestrel	*Falco sparverius*
Fringillidae (finches)	
house finch	*Haemorhous mexicanus*
lesser goldfinch	*Spinus psaltria*
Passerellidae (sparrows and towhees)	
savannah sparrow	*Passerculus sandwichensis*
white-crowned sparrow	*Zonotrichia leucophrys*
Tyrannidae (tyrant flycatchers)	
black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
western kingbird	*Tyrannus verticalis*

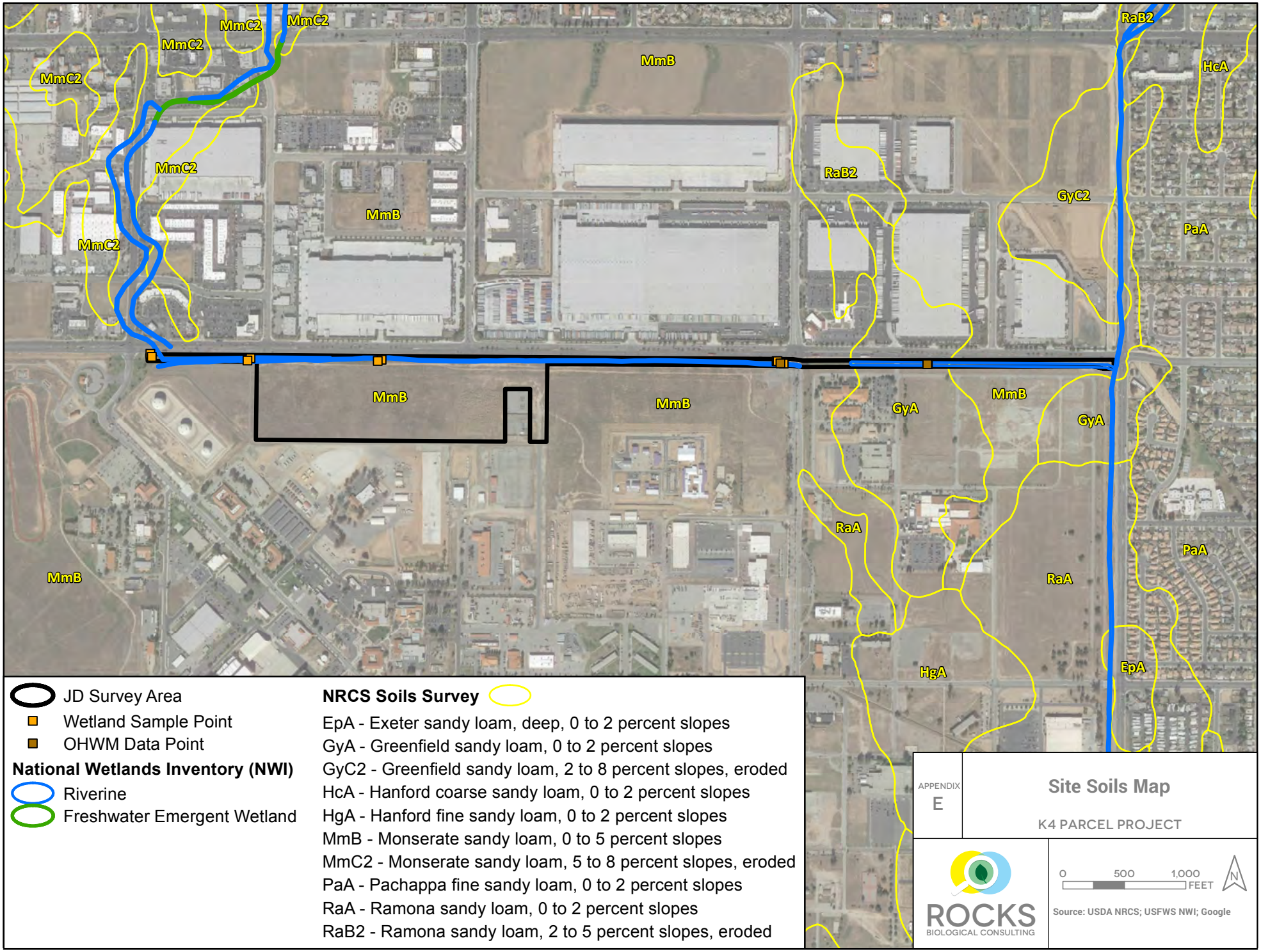
Appendix D

List of Wildlife Species Observed within the Project Study Area

MAMMALS	
Cricetidae (deer mice and relatives)	
deer mouse	*Peromyscus maniculatus*
Leporidae (rabbits and hares)	
Audubon's cottontail	*Sylvilagus audubonii*
San Diego black-tailed jackrabbit (SSC)	*Lepus californicus bennettii*
SSC: *California Department of Fish and Wildlife (CDFW) Species of Special Concern*	

APPENDIX E

SITE SOILS MAP


MmC2
MmC2
MmC2
MmC2
MmC2
MmC2
MmB
MmB
MmB
MmB
MmB
RaB2
RaB2
HcA
GyC2
PaA
GyA
GyA
MmB
RaA
RaA
PaA
HgA
EpA
JD Survey Area
Wetland Sample Point
OHWM Data Point
National Wetlands Inventory (NWI)
Riverine
Freshwater Emergent Wetland
NRCS Soils Survey
EpA - Exeter sandy loam, deep, 0 to 2 percent slopes
GyA - Greenfield sandy loam, 0 to 2 percent slopes
GyC2 - Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcA - Hanford coarse sandy loam, 0 to 2 percent slopes
HgA - Hanford fine sandy loam, 0 to 2 percent slopes
MmB - Monserate sandy loam, 0 to 5 percent slopes
MmC2 - Monserate sandy loam, 5 to 8 percent slopes, eroded
PaA - Pachappa fine sandy loam, 0 to 2 percent slopes
RaA - Ramona sandy loam, 0 to 2 percent slopes
RaB2 - Ramona sandy loam, 2 to 5 percent slopes, eroded
APPENDIX
E
Site Soils Map
K4 PARCEL PROJECT
ROCKS
BIOLOGICAL CONSULTING
0
500
1,000
FEET
N
Source: USDA NRCS; USFWS NWI; Google

APPENDIX F

K4 WAREHOUSE & CACTUS CHANNEL IMPROVEMENTS PROJECT JURISDICTIONAL DELINEATION REPORT

ROCKS
BIOLOGICAL CONSULTING





K4 WAREHOUSE & CACTUS CHANNEL IMPROVEMENTS PROJECT JURISDICTIONAL DELINEATION REPORT

Riverside County, California

February 20, 2019

Prepared for:
Meridian Park K4, LLC
567 San Nicholas Drive, Suite 270
Newport Beach, CA 92660

Prepared by:
Rocks Biological Consulting
2621 Denver Street, Ste. B
San Diego, CA 92110
(619) 701-6798

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1.2 Project Description 3
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Figure 6a-6b. Biological Resources
Figure 7. Photo Locations - Key Map
Figure 7a-7b. Photo Locations

APPENDICES

Appendix A. Checklist: Minimum Standards for Acceptance of Aquatic Resources Delineation Reports, Los Angeles District Regulatory Division, Corps

Appendix B. Arid West Wetland Delineation and Ephemeral and Intermittent Streams OHWM Datasheets

Appendix C. Site Photographs

Appendix D. JD Request Forms

Appendix E. GIS Data

1 INTRODUCTION

Rocks Biological Consulting (RBC) conducted a formal jurisdictional delineation for the K4 Warehouse and Cactus Channel Improvements Project (project) to identify areas potentially jurisdictional under the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act; the Regional Water Quality Control Board (RWQCB) pursuant to Section 401 of the Clean Water Act and the Porter-Cologne Act; and streambed and riparian habitats under California Department of Fish and Wildlife (CDFW) pursuant to California Fish and Game Code (§1602). This information is necessary to evaluate potential jurisdictional impacts and permit requirements associated with the project, can be used by the agencies to assess project conformance with state and federal regulations, and serves as a request for the Corps to complete a Preliminary Jurisdictional Determination (PJD) based on the information provided in this report. Furthermore, Appendix A provides a checklist of the information contained in this report in compliance with the Corps Los Angeles District's *Minimum Standards for Acceptance of Aquatic Resources Delineation Reports* (Corps 2017).

1.1 PROJECT LOCATION

The approximately 35.4-acre project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California (Figure 1). Interstate 215 (I-215) is located approximately 0.8 mile east of the Project site. The Project site is comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The latitude and longitude of the approximate center of the site is 33.909420, -117.263420. The Project site sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey (USGS; Figure 2).

1.2 PROJECT DESCRIPTION

The proposed K4 Warehouse project includes the construction of a 718,000-square-foot warehouse building on the 34.5-acre parcel. Access to the Project is across the Cactus Avenue Channel (discussed further in this report) that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the project frontage, and further to the east ending at the Heacock Channel at Heacock Street. Additionally, the Riverside County Flood Control District and Water Conservation District are proposing to underground the current drainage ditch in a box culvert, e.g., the Cactus Channel improvements. The culvert would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width total). The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District, and it would function as part of the District's Master Plan. If the channel improvements are not complete prior to warehouse development, the K4 Warehouse development will be constructed with two access driveways that cross the Cactus Avenue Channel.

1.3 REGULATORY BACKGROUND

Several regulations have been established by federal, state, and local agencies to protect and conserve aquatic resources. The descriptions below provide a brief overview of agency regulations that may be applicable to the project. Regulatory agencies make the final determination of whether a project requires authorization pursuant to these regulations.

1.3.1 APPLICABLE AQUATIC RESOURCE PROTECTION REGULATIONS

Clean Water Act

Pursuant to Section 404 of the Clean Water Act (33 USC § 1251 et seq.; CWA), the Corps is authorized to regulate any activity that would result in the discharge of dredged or fill material into waters of the U.S. (including wetlands), which include those waters listed in 33 Code of Federal Regulations (CFR) 328.3 (as amended at 80 Federal Register (FR) 37104, June 29, 2015). The Corps, with oversight from the U.S. Environmental Protection Agency (USEPA), has the principal authority to issue CWA Section 404 permits. The Corps would require a Standard Individual Permit (SIP) for more than minimal impacts to waters of the U.S. as determined by the Corps. Projects with minimal individual and cumulative adverse effects on the environment may meet the conditions of an existing Nationwide Permit (NWP).

A water quality certification or waiver pursuant to Section 401 of the CWA is required for all Section 404 permitted actions. The RWQCB, a division of the State Water Resources Control Board, provides oversight of the 401-certification process in California. The RWQCB is required to provide "certification that there is reasonable assurance that an activity that may result in the discharge to waters of the United States will not violate water quality standards." Water Quality Certification must be based on the finding that proposed discharge will comply with applicable water quality standards.

The National Pollutant Discharge Elimination System (NPDES) is the permitting program for discharge of pollutants into surface waters of the U.S. under Section 402 of the CWA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code § 13000 et seq.) provides for statewide coordination of water quality regulations. The State Water Resources Control Board was established as the statewide authority and nine separate RWQCBs were developed to oversee water quality on a day-to-day basis. The RWQCB is the primary agency responsible for protecting water quality in California. As discussed above, the RWQCB regulates discharges to surface waters under the federal CWA. In addition, the RWQCB is responsible for administering the California Porter-Cologne Water Quality Control Act.

Pursuant to the Porter-Cologne Water Quality Control Act, the state is given authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. As such, any person proposing to discharge waste into a water body that could affect its water quality must first file a Report of Waste Discharge if Section 404 is not required for the activity. "Waste" is partially defined as any waste substance associated with human habitation, including fill material discharged into water bodies.

California Fish and Game Code Section 1600-1602

Pursuant to Division 2, Chapter 6, Section 1602 of the California Fish and Game Code (CFGC), CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake that supports fish or wildlife. A Notification of Lake or Streambed Alteration must be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW has jurisdiction over riparian habitats associated with watercourses. Jurisdictional waters are delineated by the outer edge of riparian vegetation (i.e., drip line) or at the top of the bank of streams or lakes, whichever is wider. CDFW jurisdiction does not include tidal areas or isolated resources. CDFW reviews the proposed actions and, if necessary, submits (to the applicant) a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and applicant is the Lake or Streambed Alteration Agreement.

1.4 CONTACT INFORMATION

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Agency access to the project site can be coordinated with the applicant and/or agent upon request.

2 METHODS

Prior to the on-site delineation, field maps were created using a Geographic Information System (GIS) and a color aerial photograph at a 1:100 scale. RBC staff also reviewed U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) and topography data (Figure 2) and U.S.

Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils map data and U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (Figure 4) to further determine the potential locations of jurisdictional aquatic resources. Google Earth, NetrOnline Historic Aerials, and University of California-Santa Barbara database was also utilized to assess historic presence or absence of flow in the project area.

Shanti Santulli, Lee Ripma, and Emily Trevino of Rocks Biological Consulting (RBC) conducted the jurisdictional delineation field visit on July 17, 2018. Areas with depressions, drainage patterns, and/or wetland vegetation within the project impact area were evaluated for potential jurisdictional status, with focus on the presence of defined channels and/or wetland vegetation, soils and hydrology. Field staff examined potential jurisdictional wetland areas using the methods set forth in the Corps 1987 *Wetland Delineation Manual* (Wetland Manual) (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (Arid West Supplement) (Corps 2008a). Wetland plant indicator status was determined using the *National Wetland Plant List* (NWPL; Corps 2016) and hydric soils indicators on *Field Indicators of Hydric Soils in the United States, Version 8.1* (NRCS 2017). Soil chromas were identified in the field according to *Munsell's Soil Color Charts* (Kollmorgen 2000).

Lateral limits of potential non-wetland waters of the U.S./State for the Corps and RWQCB were identified using field indicators of an ordinary high-water mark (OHWM) as described in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Corps 2008b). For each feature exhibiting the potential presence of an OHMW, RBC completed a 2010 Arid West Ephemeral and Intermittent Streams OHWM Datasheet (OHWM Datasheet) following the guidance provided in the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Corps 2010).

CDFW potential jurisdictional boundaries were determined based on the presence of riparian habitat and/or streambed. Streambeds considered within CDFW jurisdiction were delineated based on the definition of streambed as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports riparian vegetation" (Title 14, Section 1.72). Riparian habitat refers to vegetation and habitat associated with a stream. The CDFW jurisdictional habitat includes all riparian shrub or tree canopy that may extend beyond the banks of a stream.

While in the field, potentially jurisdictional features were recorded using a hand-held Global Positioning System (GPS) unit with a level of accuracy ranging from four to 12 feet. RBC staff refined the data using aerial photographs and topo maps with two-foot contours to ensure accuracy. Off-site portions of drainages were visited to confirm the presence of the indicators above, if appropriate, and general flow path. Plants were identified according to The Jepson Manual 2nd edition (Baldwin et al. 2012). Vegetation community classifications follow Holland (1986) and nomenclature follows Jepson eFlora (2018).

All figures generated for this jurisdictional delineation report follow the Corps' Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (Corps, 2016).

3 RESULTS

3.1 TOPOGRAPHY

The site is primarily flat with elevations around 1,550 feet. The only shift in topography observed on site occurred within a west-east trending drainage that runs parallel to Cactus Avenue from just east of Elsworth Street to Heacock Steet (Cactus Avenue Channel, discussed further below; Figure 5).

3.2 WATERSHED

The proposed project area is within the San Jacinto Hydrologic Unit Code [HUC] 8 (18070202), Lower San Jacinto River Hydrologic Unit Code [HUC] 10 (1807020203), Perris Reservoir Hydrologic Unit Code [HUC] 12 (180702020305) (Figure 2).

3.3 HYDROLOGY

USGS NHD maps a "blue-line stream" along the northern boundary of the project area, which flows south along Heacock Street into the Perris Valley storm drain system (Figure 2). USFWS NWI also map Riverine designations within the projects northern boundary, draining east until diverting south along Heacock Street (Figure 4).

Known hydrologic sources for the observed on-site drainages, discussed further below, are several culverted storm-drain outlets (which collect and convey runoff from the commercial area north of the channel), sheet flows from the adjacent March Air Force Base, and direct precipitation. Flows generally drain from west to east until the intersection of Cactus Avenue and Heacock Street, where flows are diverted south into a drainage ditch along Heacock Street which drains into the Perris Valley storm drain system. Flows continue into the San Jacinto River and ultimately into Lake Elsinore.

Table 1 describes the estimated monthly total and average precipitation for the project area between 2007 and 2018 to provide the pertinent pre-site visit precipitation data. RBC staff accessed precipitation data through the NRCS Agricultural Applied Climate Information System (AgACIS) database from the March AFB station in Riverside County on July 17, 2018.

Table 1. Precipitation Data

Monthly Total Precipitation (inches) for March AFB, CA (NOAA)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2007	M	M	M	M	M	M	M	M	M	M	M	M	M
2008	M	M	M	M	M	M	M	M	M	M	M	M	M
2009	M	M	M	M	M	M	M	T	0.42	T	0.07	1.43	M
2010	5.78	1.95	0.16	0.39	0.02	0	T	T	0.06	0.61	0.53	7.7	17.2
2011	0.33	2.6	1.51	0.37	0.26	0	0.19	0.01	0.03	0.15	1.29	0.34	7.08
2012	0.31	0.46	0.95	0.79	0.01	0	0.07	2.32	0.1	0.03	0.26	1.99	7.29
2013	0.57	0.78	0.72	T	0.28	0	0.02	0.4	T	0.43	0.46	0.36	4.02
2014	T	1.19	0.68	0.49	0	0	T	0.57	0.05	T	0.18	2.91	6.07
2015	0.6	0.33	0.13	0.14	0.61	T	1.39	T	0.45	0.31	0.05	0.3	4.31
2016	2.24	0.12	0.56	0.96	0.28	T	T	0	0.06	0.32	0.7	3.11	8.35
2017	3.78	1.91	0.01	T	0.02	T	0.01	0.59	T	T	T	T	6.32
2018	1.44	0.23	M	T	0.08	0	T	M	M	M	M	M	M
Mean	**1.67**	**1.06**	**0.59**	**0.35**	**0.17**	**T**	**0.19**	**0.43**	**0.13**	**0.21**	**0.39**	**2.02**	**7.58**

*Per AgACIS database: "Monthly summarized data - means, sums, daily extremes or frequencies for the selected variable for each month of the year for the selected range of years. HDD, CDD and GDD are heating, cooling and growing degree days, respectively. Note: trace precipitation/snowfall/snow depth amounts are treated as zero in sums, means, and frequency counts. Annual average temperatures are the average of the twelve-monthly values. Values of 'M' indicate missing data and 'T' indicates a trace."

Table 1 indicates that the field survey date of July 17, 2018 occurred during below-average historic precipitation (trace precipitation treated as 0.0 inches) for the month of July, which averaged 0.19 inches between 2010-2018. The 2017 average precipitation of 6.32 inches was 1.26 inches below the average annual precipitation of 7.58 inches from 2010-2017.

3.4 SOILS

Based on the NRCS map of the project area (Figure 4), the following soil occurs within the project site boundary and is described below per the USDA's Official Soil Series Description and Series Classification database:

Monserate sandy loam, 0 to 5 percent slopes

The Monserate series consist of well to well drained and moderately slow permeable soils. These soils are found primarily on nearly level to moderately steep terraces and fans in southern California and are primarily used for growing grain or pasture. The NRCS does not list this soil as hydric.

Greenfield sandy loam, 0 to 2 percent slopes

The Greenfield series consist of well drained soils moderately permeable soils. These soils form in moderately coarse and coarse textured alluvium, found on alluvial fans and terraces, and are primarily used for the production of irrigated field, forage and fruit crops. The NRCS does not list this soil as hydric.

3.5 FEATURES OBSERVED

A west-east, earthen-lined and vegetated drainage ditch, hearby referred to as the Cactus Avenue Channel, runs parallel to Cactus Avenue from just east of Elsworth Street to Heacock Street and was the only observed aquatic resource within the project area.

RBC investigated ten wetland delineation sampling points within the Cactus Avenue Channel in the survey area boundaries to determine the presence or absence of federally jurisdictional wetlands within the channel (Figure 5; Appendix B). RBC also completed two Arid West Ephemeral and Intermittent Streams OHWM Datasheets (OHWM Datasheets) in the project survey boundary (Figure 5; Appendix B). The descriptions provided below detail the existing characteristics of each feature determined in the field. Appendix C provides site photographs of the features, and Figure 7 displays representative photo points also discussed below.

Cactus Avenue Channel

The Cactus Avenue Channel receives flows from several culverts along Cactus Avenue, as noted on Figure 5. The feature originates on the project survey area from a culvert along Cactus Avenue, east of the intersection of Elsworth Street and flows east approximately 1.5-miles until being diverted south into a drainage ditch along Heacock Street. RBC staff observed both wetland and non-wetland features within the Cactus Avenue Channel, as further described below.

Wetland Sample Point (WSP) 1 was taken adjacent to the initial, westernmost culvert outlet along the channel. WSP 1 was dominated by *Potamogeton sp.* (OBL) and contained standing water at the time of the jurisdictional delineation; as such, WSP 1 met the parameters for hydrophytic vegetation and wetland hydrology based on field observation of the applicable indicators for both (Appendix B, WSP 1). Additionally, RBC assumed the presence of hydric soils at WSP 1 per the 1987 Wetland Manual, which states that hydric soils can be assumed present if the sample point is located “within a plant community type where all dominant species have an indicator status of OBL” (Environmental Laboratory 1987). WSP 1 showed standing water/ponding within a well-defined, depressional area by a culvert outlet as well as the presence of a dominant OBL plant species (*Potamogeton sp.*). As such, WSP 1 met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters. WSP 2, taken approximately 25 feet downstream of WSP 1, did not meet parameters for wetland hydrology, hydric soils, or hydrophytic vegetation (Appendix B, WSP 2). Vegetation observed at WSP 2 included common brome (*Bromus madritensis ssp. rubens*; UPL) and bermuda grass (*Cynodon dactylon*; FACU). A small disturbed (i.e., mowed), 4-foot wide drainage/streambed was observed between WSP 1 and WSP 3 (Appendix C, Photo 4).

WSP 3, taken within a large section of the channel that had been recently mowed, met the parameters for hydrophytic vegetation, wetland hydrology, and hydric soils (Appendix B, WSP 3). Hydrophytic vegetation at WSP 3 included common knotgrass (*Paspalum distichum*; FACW) and mayweed (*Anthemis cotula*; FACU). The wetland boundary observed was approximately 20 feet wide with a bed and bank (including the delineated wetland area) of approximatedly 25 feet wide at this portion of the channel. WSP 4, taken in the adjacent uplands of WSP 3 to help determine the wetland boundary, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators (Appendix B, WSP 4). Downstream of WSP 3/4, RBC staff observed an approximate 800-foot long stretch of the channel containing cattail (*Typha latifolia*; OBL), tall flat sedge (*Cyperus* eragrostis; FACW), and visible standing water. A large, 35-foot wide culvert at the intersection of Cactus Avenue and Veterans Way appeared to be the primary hydrologic input into this area, causing standing water/saturation both upstream and downstream of the culvert (Appendix C, Photo 12).

WSP 5 was taken approximately 230 feet downstream from the end of the standing water observed downstream of the Cactus Avenue and Veterans Way culvert, where the bed of the channel narrows to approximately 10 feet wide with 20-foot wide banks; WSP 5 met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters (Appendix B, WSP 5). The hydrophytic vegetation observed within the sample point included tall flat sedge (FACW); prominent redox features were also observed (Appendix C, Photo 16). WSP 6, taken in the adjacent uplands, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soil indicators (Appendix B, WSP 6). The feature continues downstream towards the intersection of Cactus Avenue and Riverside Drive. WSP 7, taken near a culvert outlet at the Riverside Drive intersection, met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters (Appendix B, WSP 7). Hydrophytic vegetation observed at WSP 7 included tall flat sedge (FACW), prostrate amaranth (*Amaranthus blitoides*; FACU), dallis grass (*Paspalum dilatatum*; FAC), and curly dock (*Rumex crispus*; FAC). WSP 8, taken in the adjacent uplands of WSP 7, and WSP 9, taken downstream from the tall flat sedge-dominated area, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators (Appendix B, WSP 8 and WSP 9).

Although wetland parameters were not present at WSP 9, RBC staff observed a 15-foot wide OHWM within 20-foot wide banks just west of the Riverside Drive and Cactus Avenue intersection within the channel based on the presence of a break in slope, change in sediment texture, and change in vegetation species (Figure 5; Appendix B, OHWM 1). The ephemeral feature flows east and narrows from a ten- to five-foot wide OHWM within 15- to ten-foot wide banks before reaching the intersection of Cactus Avenue and Heacock Street (Figure 5; Appendix B, OHWM 2). WSP 10, taken within the channel, adjacent to a small cluster of young Fremont's cottonwood (*Populus fremontii*; NL), met the wetland hydrology parameter; however, the sample point did not show evidence of hydrophytic vegetation or hydric soils (Appendix B, WSP 10).

Ponding Area

RBC field staff observed a small area of potential ponding with some minor soil cracking along the eastern boundary of the K4 Warehouse portion of the project site, approximately 400 feet south of the Cactus Avenue Channel, at the end of a driveway. The area appeared to be a road rut/puddle in a disturbed asphalt and otherwise bare ground area. During the time of the jurisdictional delineation site visit, the area was dry, unvegetated, and lacked any indicators of an OHWM. An RBC biologist conducted an additional field survey on October 4, 2018 and noted ponding in the area. As such, protocol fairy shrimp surveys are underway to determine the presence/absence of the federally endangered Riverside fairy shrimp (*Streptocephalus wootton)* given the moderate potential for this species to occur on site. RBC staff did not dig a soil pit to check for hydric soil indicators in case the area may be inhabited by Riverside fairy shrimp.

3.6 JURISDICTIONAL RESOURCES AND ANALYSES

A majority of the Cactus Avenue Channel within the survey area met all three parameters per the Arid West Supplement and would therefore be considered potentially jurisdictional wetlands per the Corps and RWQCB. These wetland areas were disturbed by regular mowing of the channel. As such, the presence or absence of wetland boundaries was largely defined by observation of hydric soil indicators (i.e., presence and prominence/abundance of redox features. These wetland areas occur within the bed and banks of potentially jurisdictional CDFW streambed, as shown on Figure 5.

RBC determined the presence of an OHWM and bed and bank, without wetland, throughout the channel from just west of Riverside Drive to Heacock Street and considers this area potential non-wetland, ephemeral waters of the U.S./State jurisdictional by the Corps and RWQCB and ephemeral streambed jurisdictional by the CDFW. Furthermore, there were some areas with small patches of riparian vegetation (i.e., sandbar willow [*Salix exigua*], Fremont's cottonwood, and Goodding's Black Willow [*Salix gooddingii*]) that occur along the streambed and would be considered potentially jurisdictional CDFW riparian habitat; these riparian areas did not meet the federal wetland parameters. The trapezoidal nature of the channel and associated wide banks account for the increase in CDFW estimated jurisdiction, which extends beyond the delineated Corps/RWQCB/CDFW wetland and non-wetland areas in most areas within the channel.

The small ponding area noted in Section 3.5 was not considered potentially jurisdictional as it lacked indicators of an OHWM and would not meet the three required parameters of federally jurisdictional wetland absent vegetation (Picture 36) even if hydric soils were assumed for the area.

Tables 2 and 3 provide approximate acreages of potential jurisdictional resources, per applicable regulatory agency, delineated within the project survey area and related information. Table 4 provides vegetation community acreages within the project area (Figure 6). Please note, some areas that met federal wetland parameters are mapped as non-native grassland on Figure

6 given the presence of non-native grassland species (many of which had a FAC or higher indicator status).

Table 2. Potential Jurisdictional Resources within the Project Area: Corps and RWQCB

Feature Name	Acreage	Linear Feet	Cowardin Code	Presence of OHWM	Wetland Presence	Dominant Vegetation	Location (lat/long)
Cactus Avenue Channel Wetland	1.39	4790	PEM	No	Yes	Freshwater marsh	33.909944442, -117.2615647
Cactus Avenue Channel Non-Wetland	0.42	2876	R6	Yes	No	Unvegetated; Non-native grassland	33.909960615, -117.2509659
Total	1.81	7666					

Table 3. Potential Jurisdictional Resources within the Project Area: CDFW

Feature Name	Acreage	Linear Feet	Cowardin Code	Presence of OHWM	Wetland Presence	Dominant Vegetation	Location (lat/long)
Cactus Avenue Channel Wetland	1.39	4790	PEM	No	Yes	Freshwater marsh	33.909944442, -117.2615647
Cactus Avenue Channel Non-Wetland	1.60	2876	R6	Yes	No	Unvegetated; Non-native grassland	33.909960615, -117.2509659
Total	2.99	7666					

Table 4. Vegetation Communities within Project Survey Area

Vegetation Community	Project Site (acres)
Golden Bush Scrub/Non-native Grassland Disturbed	22.16
Developed/Disturbed	11.01
Non-native Grassland	8.66
Freshwater Marsh	0.41
Ornamental	0.05
Southern Willow Scrub	0.04

Fremont's Cottonwood	0.02
Total	42.35

3.7 PROPOSED JURISDICTIONAL IMPACTS

The project consists of both the construction of the K4 Warehouse and construction of a box culvert along the Cactus Avenue Channel. The proposed project with both project components would permanently impact approximately 1.81 acres (7666 linear feet) of potential Corps and RWQCB disturbed waters of the U.S./State (wetland and non-wetland), of which, 0.06 acre (131 linear feet) of impacts are associated with the K4 Warehouse site and 1.76 acres (7535 linear feet) are associated with the Cactus Avenue Channel culvert project.

The proposed project with both project components would impact approximately 2.99 acres (7666 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) and/or associated riparian habitat, of which, 0.08 acre (131 linear feet) are associated with the K4 Warehouse and 2.9 acre (7535 linear feet) are associated with the culvert along the Cactus Avenue Channel.

4 CONCLUSION

The K4 Warehouse and Cactus Channel Improvements Project area supports a drainage ditch, Cactus Avenue Channel, containing disturbed wetland and non-wetland aquatic resources potentially jurisdictional by the Corps, RWQCB, and CDFW as shown in Tables 2 and 3.

Assuming concurrence with the provided jurisdictional delineation and estimated impact calculations, both portions of the proposed project, the K4 Warehouse and Cactus Avenue Channel culvert, would each require Section 404 authorization from the Corps, a Section 401 water quality certification from the RWQCB, and a Streambed Alteration Agreement from CDFW. The K4 Warehouse project alone could meet the required acreage threshold for authorization under the Corps' streamlined Nationwide Permit (NWP) process, while RBC expects the Corps to evaluate the Cactus Avenue Channel culvert project under a Standard Individual Permit (SIP) which will require an analysis of alternatives pursuant to the Section 404(b)(1) Guidelines. Additionally, the Corps, RWQCB, and/or CDFW may require a functional assessment (e.g., California Rapid Assessment Method [CRAM]) to quantitatively estimate the stream/wetland condition for the evaluation of the proposed project.

Please note that the applicable agencies will make final jurisdictional determinations. RBC recommends early coordination with the resource agencies to determine the final jurisdictional boundaries, applicable permitting processes, compensatory mitigation requirements, and other potential permitting issues specific to the proposed project. Agency representatives may request access to the site to field-verify the results of this jurisdictional delineation report with the project applicant, or a designated representative.

The information provided in this report should remain valid for up to five years from the date of the field effort for the jurisdictional delineation unless site conditions change substantially, or a regulatory agency requires an updated report.

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FIGURE 1

Project Location

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 1,000 2,000 FEET

N

Source: Google; National Geographic Society

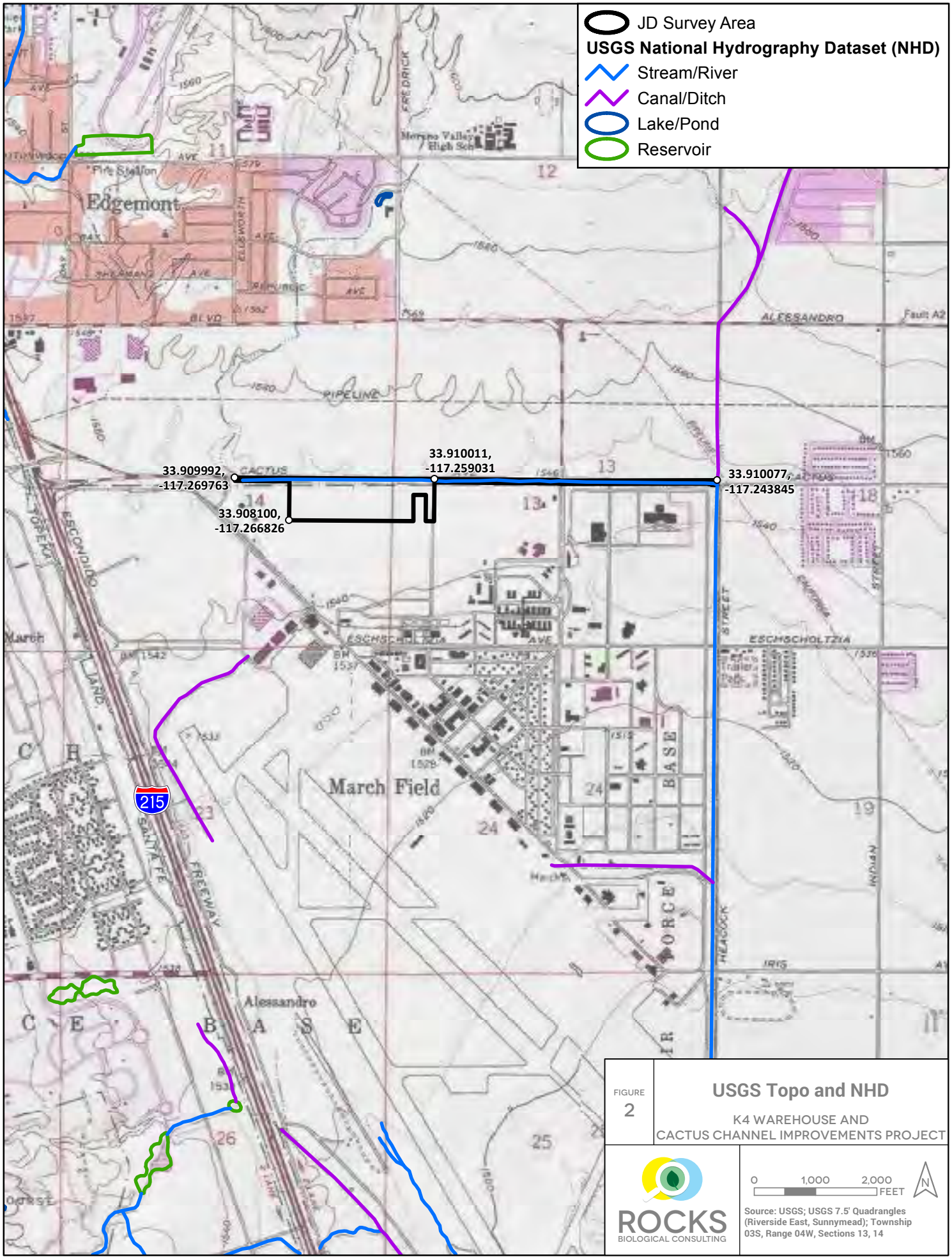


FIGURE 2

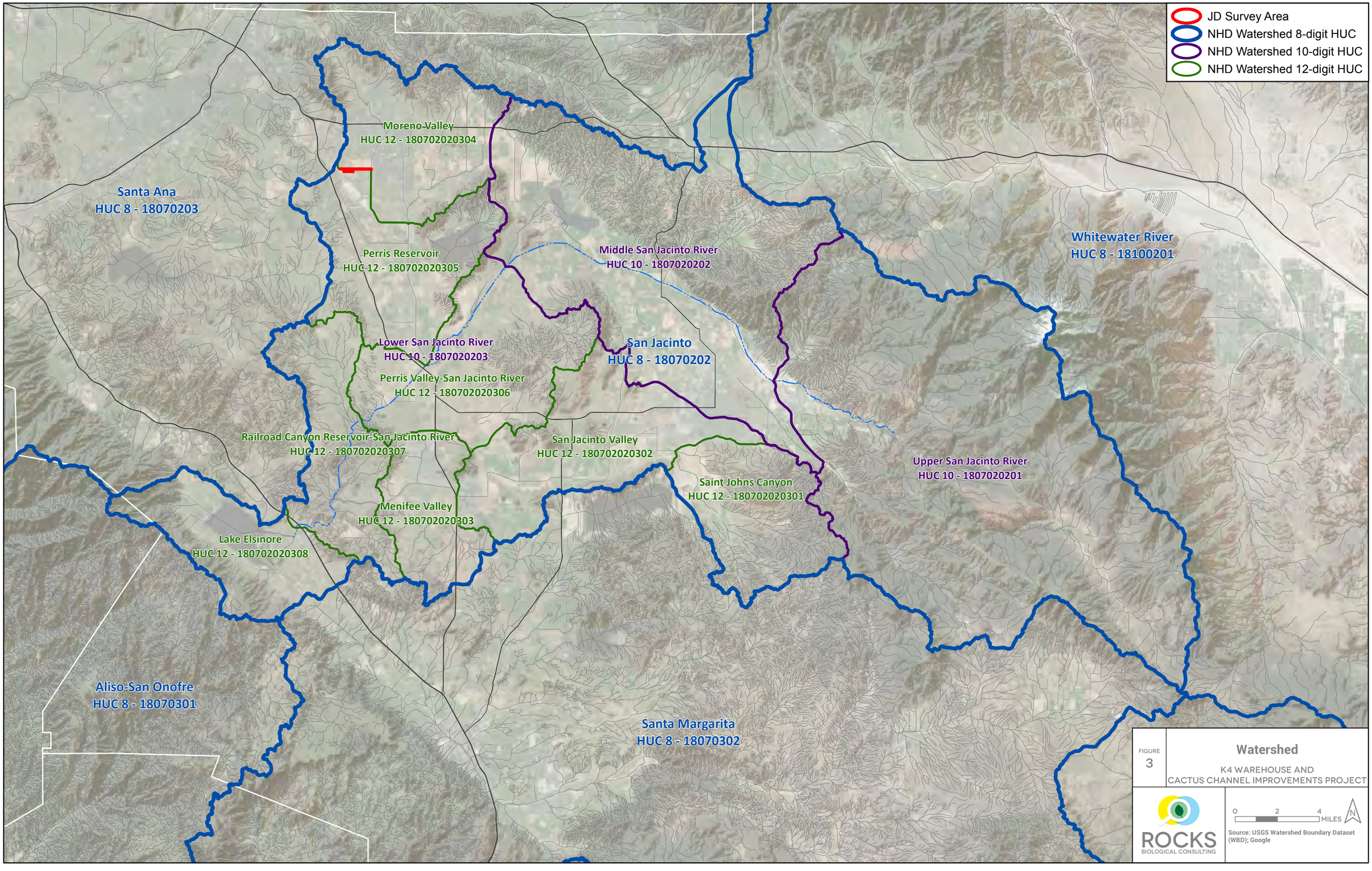
USGS Topo and NHD

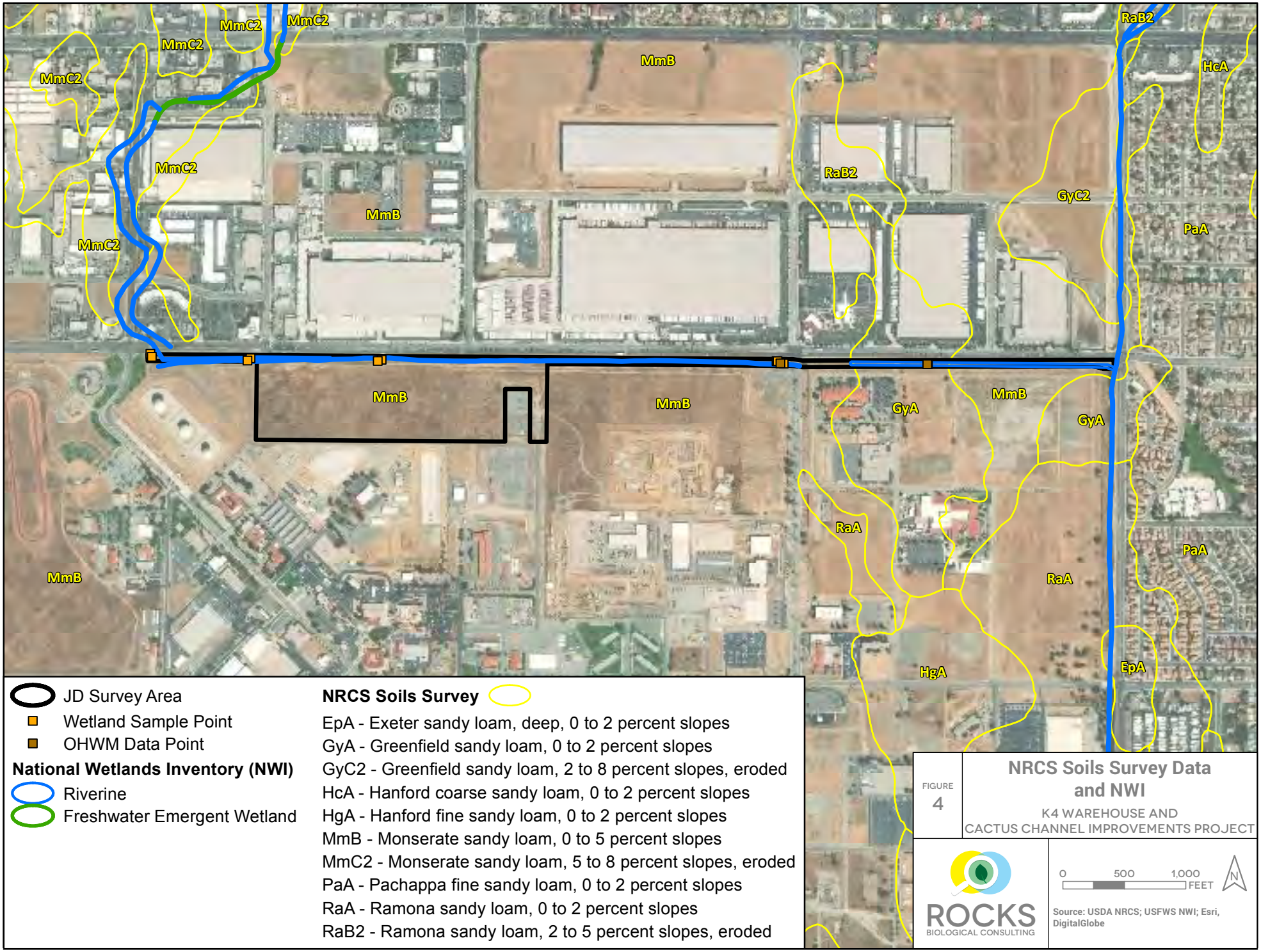
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 1,000 2,000 FEET

Source: USGS; USGS 7.5' Quadrangles (Riverside East, Sunnymead); Township 03S, Range 04W, Sections 13, 14


JD Survey Area
NHD Watershed 8-digit HUC
NHD Watershed 10-digit HUC
NHD Watershed 12-digit HUC
Moreno Valley
HUC 12 - 180702020304
Santa Ana
HUC 8 - 18070203
Perris Reservoir
HUC 12 - 180702020305
Middle San Jacinto River
HUC 10 - 1807020202
Whitewater River
HUC 8 - 18100201
Lower San Jacinto River
HUC 10 - 1807020203
San Jacinto
HUC 8 - 18070202
Perris Valley-San Jacinto River
HUC 12 - 180702020306
Railroad Canyon Reservoir-San Jacinto River
HUC 12 - 180702020307
San Jacinto Valley
HUC 12 - 180702020302
Upper San Jacinto River
HUC 10 - 1807020201
Saint Johns Canyon
HUC 12 - 180702020301
Menifee Valley
HUC 12 - 180702020303
Lake Elsinore
HUC 12 - 180702020308
Aliso-San Onofre
HUC 8 - 18070301
Santa Margarita
HUC 8 - 18070302
FIGURE
3
Watershed
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS
BIOLOGICAL CONSULTING
0
2
4
MILES
N
Source: USGS Watershed Boundary Dataset (WBD); Google


MmC2
MmC2
MmC2
MmC2
MmC2
MmC2
MmB
MmB
MmB
MmB
MmB
RaB2
RaB2
HcA
GyC2
PaA
GyA
GyA
MmB
RaA
RaA
PaA
HgA
EpA
JD Survey Area
Wetland Sample Point
OHWM Data Point
National Wetlands Inventory (NWI)
Riverine
Freshwater Emergent Wetland
NRCS Soils Survey
EpA - Exeter sandy loam, deep, 0 to 2 percent slopes
GyA - Greenfield sandy loam, 0 to 2 percent slopes
GyC2 - Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcA - Hanford coarse sandy loam, 0 to 2 percent slopes
HgA - Hanford fine sandy loam, 0 to 2 percent slopes
MmB - Monserate sandy loam, 0 to 5 percent slopes
MmC2 - Monserate sandy loam, 5 to 8 percent slopes, eroded
PaA - Pachappa fine sandy loam, 0 to 2 percent slopes
RaA - Ramona sandy loam, 0 to 2 percent slopes
RaB2 - Ramona sandy loam, 2 to 5 percent slopes, eroded
FIGURE 4
NRCS Soils Survey Data and NWI
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 500 1,000 FEET
N
Source: USDA NRCS; USFWS NWI; Esri, DigitalGlobe

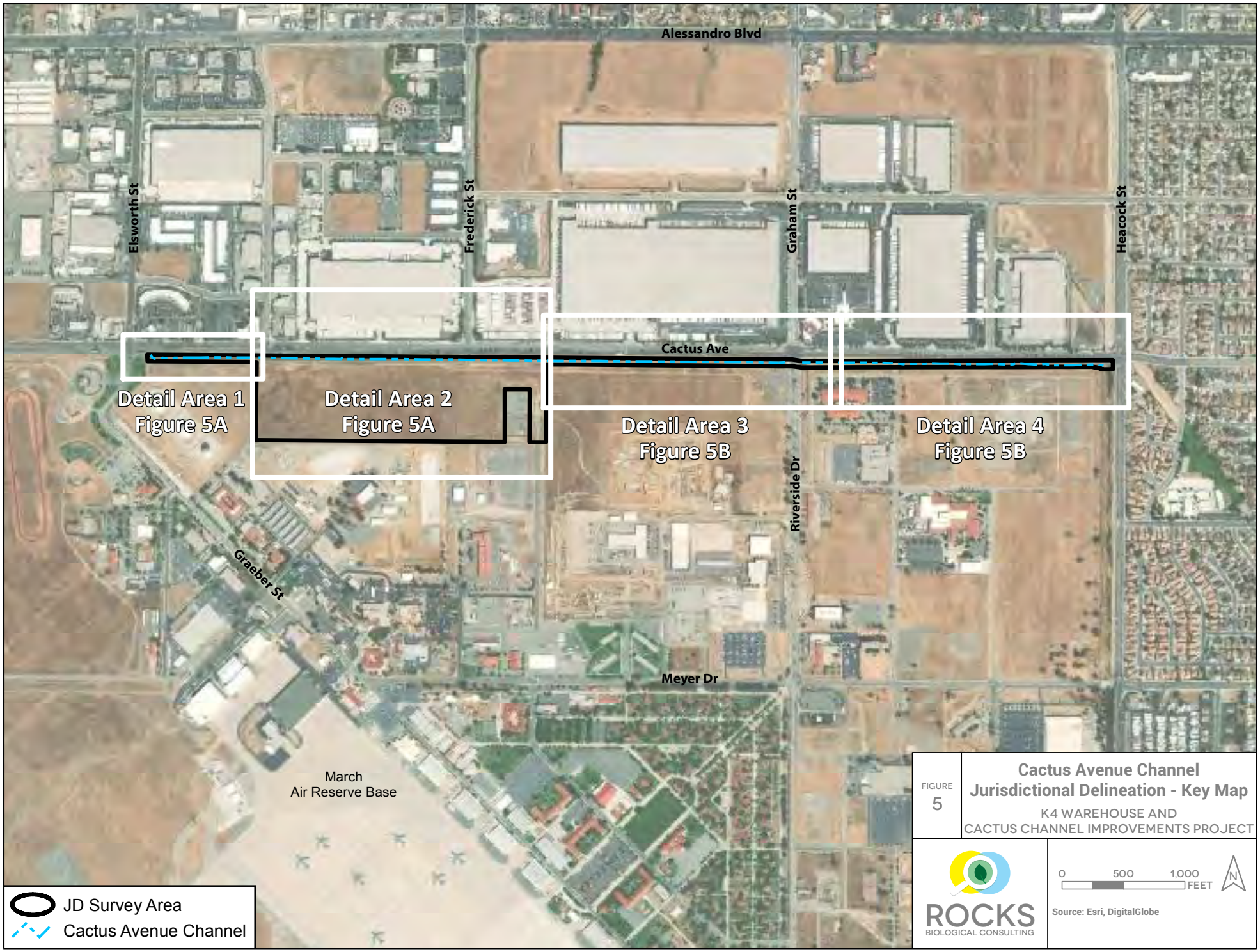


FIGURE 5

Cactus Avenue Channel Jurisdictional Delineation - Key Map

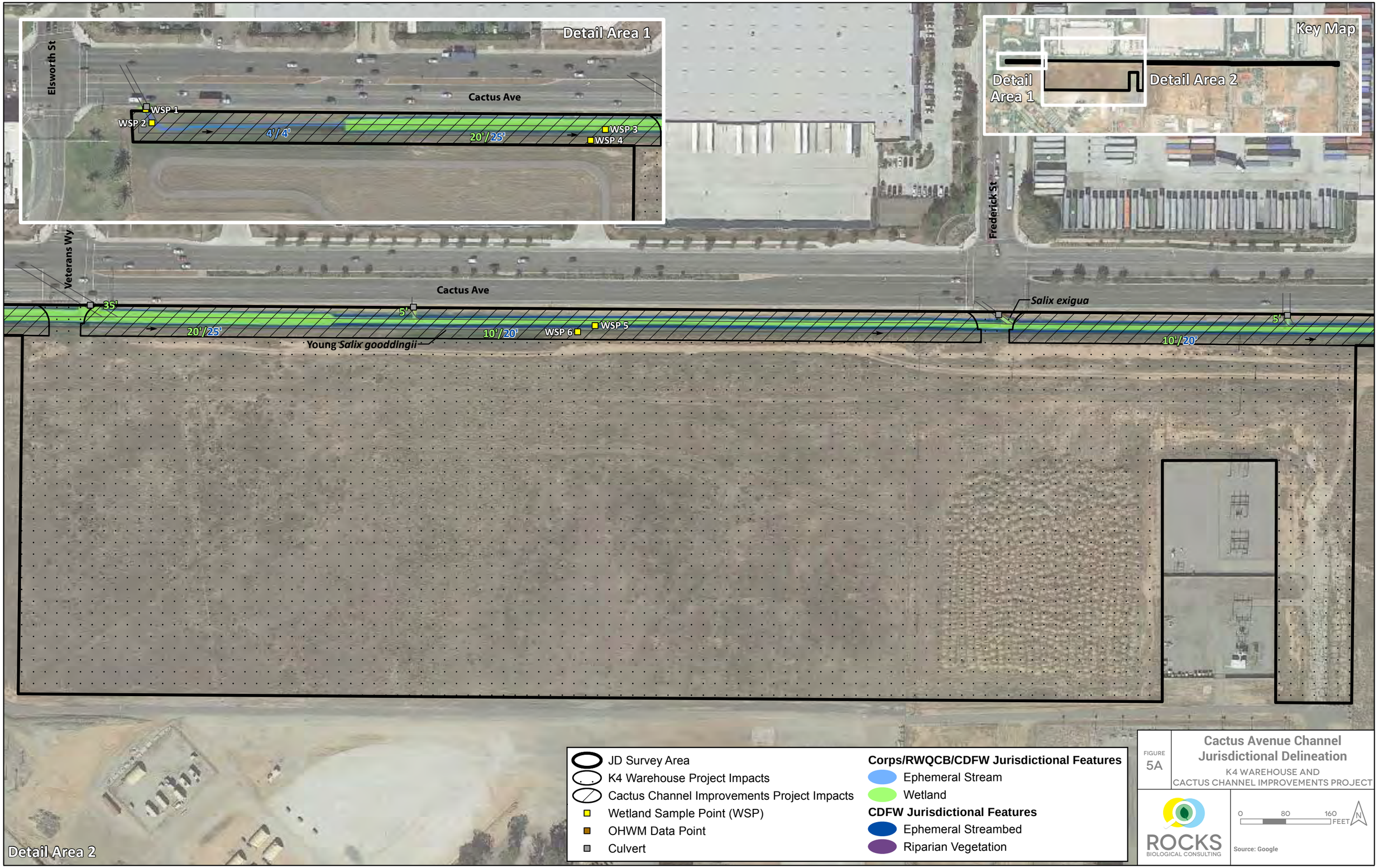
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe


Detail Area 1
Elsworth St
Cactus Ave
WSP 1
WSP 2
4'/4'
20'/25'
WSP 3
WSP 4
Key Map
Detail Area 1
Detail Area 2
Veterans Wy
Frederick St
Cactus Ave
35'
5'
20'/25'
10'/20'
WSP 6
WSP 5
Young Salix gooddingii
Salix exigua
5'
10'/20'
Detail Area 2
JD Survey Area
K4 Warehouse Project Impacts
Cactus Channel Improvements Project Impacts
Wetland Sample Point (WSP)
OHWM Data Point
Culvert
Corps/RWQCB/CDFW Jurisdictional Features
Ephemeral Stream
Wetland
CDFW Jurisdictional Features
Ephemeral Streambed
Riparian Vegetation
FIGURE
5A
Cactus Avenue Channel
Jurisdictional Delineation
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS
BIOLOGICAL CONSULTING
0
80
160
FEET
N
Source: Google

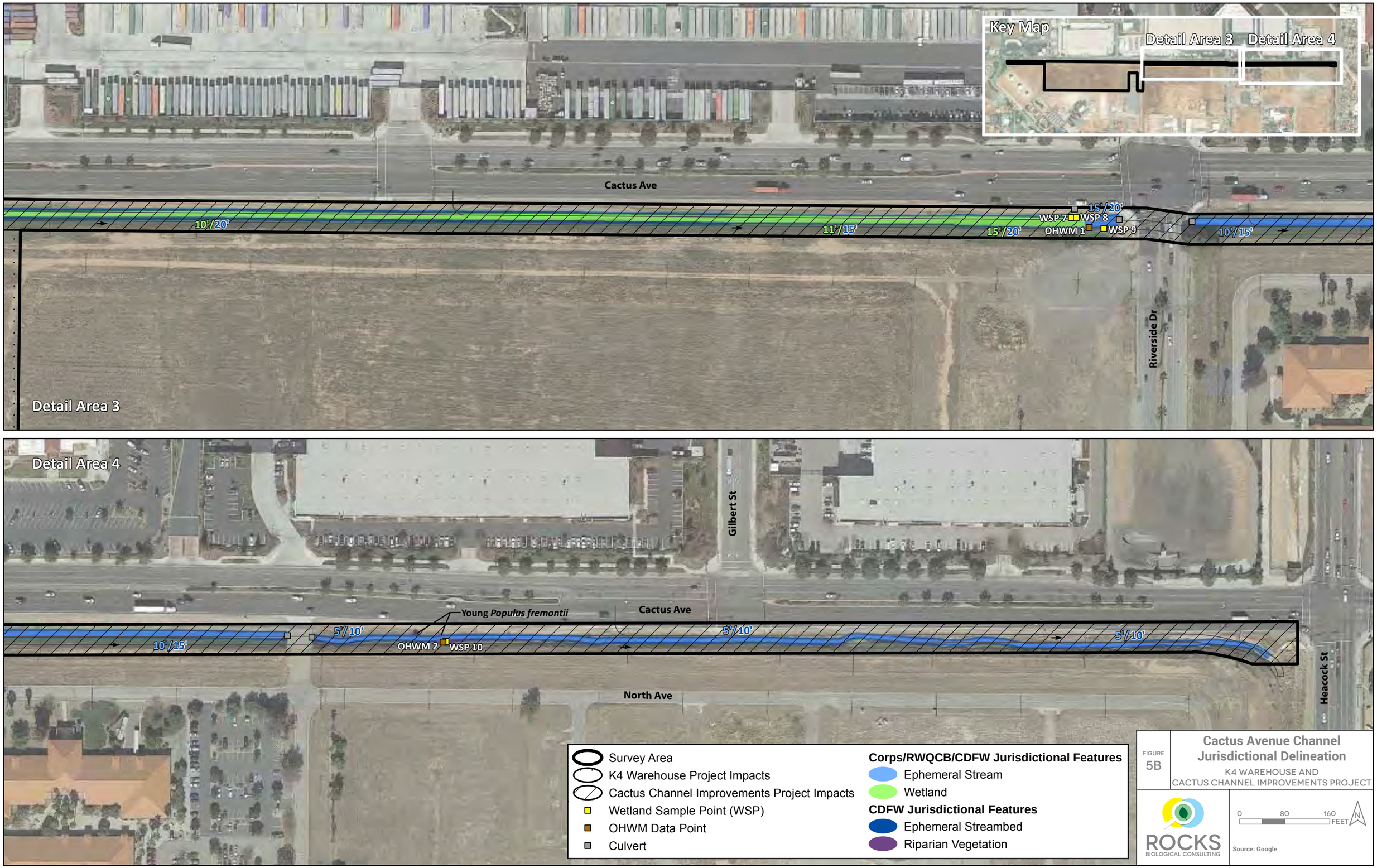


FIGURE 5B

Cactus Avenue Channel Jurisdictional Delineation

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

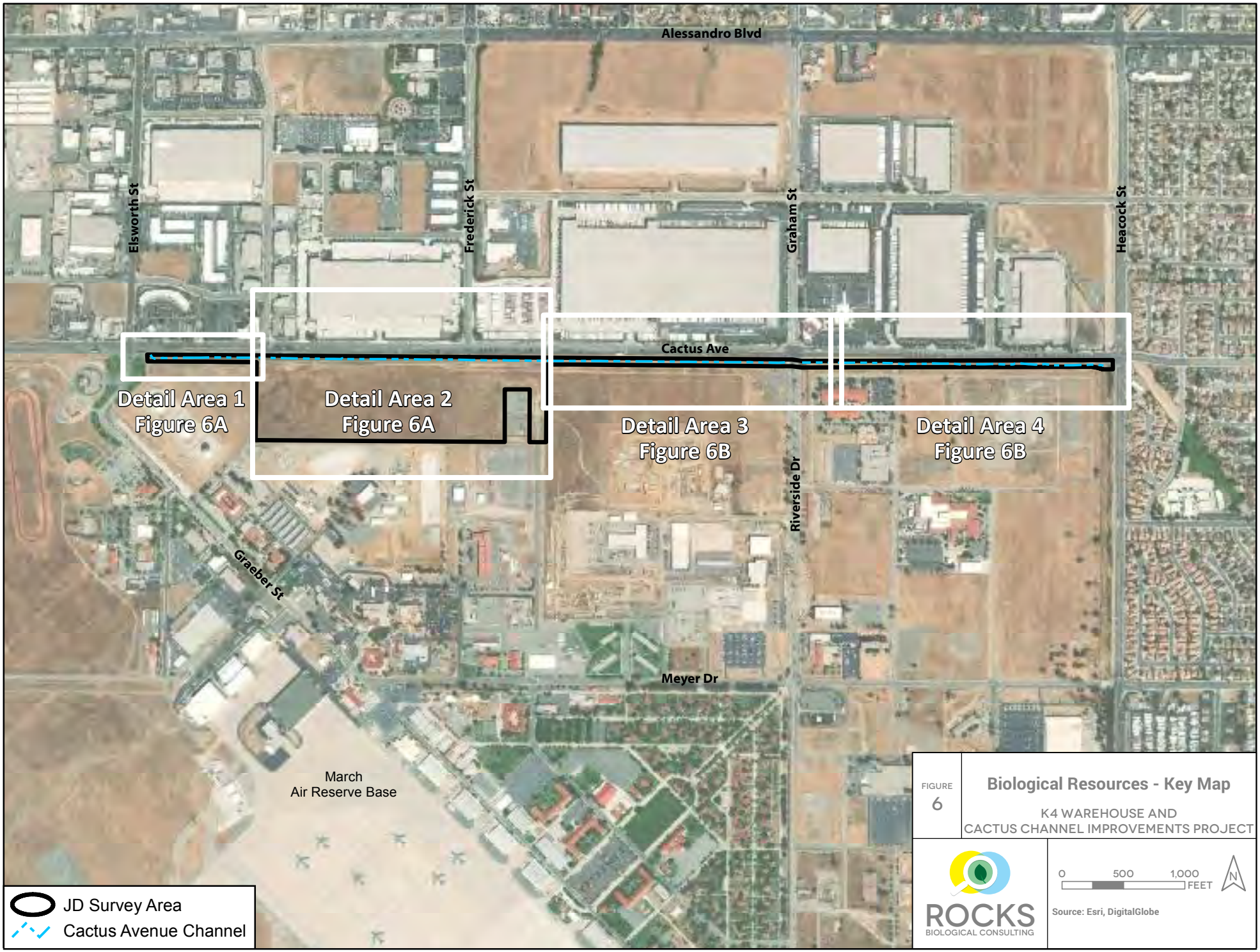


FIGURE 6

Biological Resources - Key Map

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe

Detail Area 1

Elsworth St

FWM

Cactus Ave

D/D

NNG

FWM

GBS/
NNGd

Key Map

Detail
Area 1

Detail Area 2

Veterans Wy

Frederick St

Cactus Ave

D/D

FWM

FWM

NNG

SWS

ORN

NNG

FWM

SWS

NNG

D/D

1

GBS/NNGd

D/D

50

1

20

1

400

10

15

10

3

20

3

Detail Area 2

JD Survey Area

50-foot Buffer

Special Status Species

Black-tailed Jackrabbit (*Lepus californicus*)

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Vegetation

D/D - Developed/Disturbed

FWM - Freshwater Marsh

GBS/NNGd - Golden Bush Scrub/Non-native Grassland Disturbed

NNG - Non-native Grassland

ORN - Ornamental

SWS - Southern Willow Scrub

FIGURE
6A

Biological Resources

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

Key Map

Detail Area 3

Detail Area 4

Cactus Ave

NNG

1

2

3

D/D

ORN

ORN

ORN

NNG

Riverside Dr

Detail Area 3

Detail Area 4

Gilbert St

Cactus Ave

NNG

D/D

5

PF

D/D

NNG

North Ave

Heacock St

JD Survey Area

50-foot Buffer

Special Status Species

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Vegetation

D/D - Developed/Disturbed

NNG - Non-native Grassland

ORN - Ornamental

PF - *Populus fremontii*

FIGURE 6B

Biological Resources

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

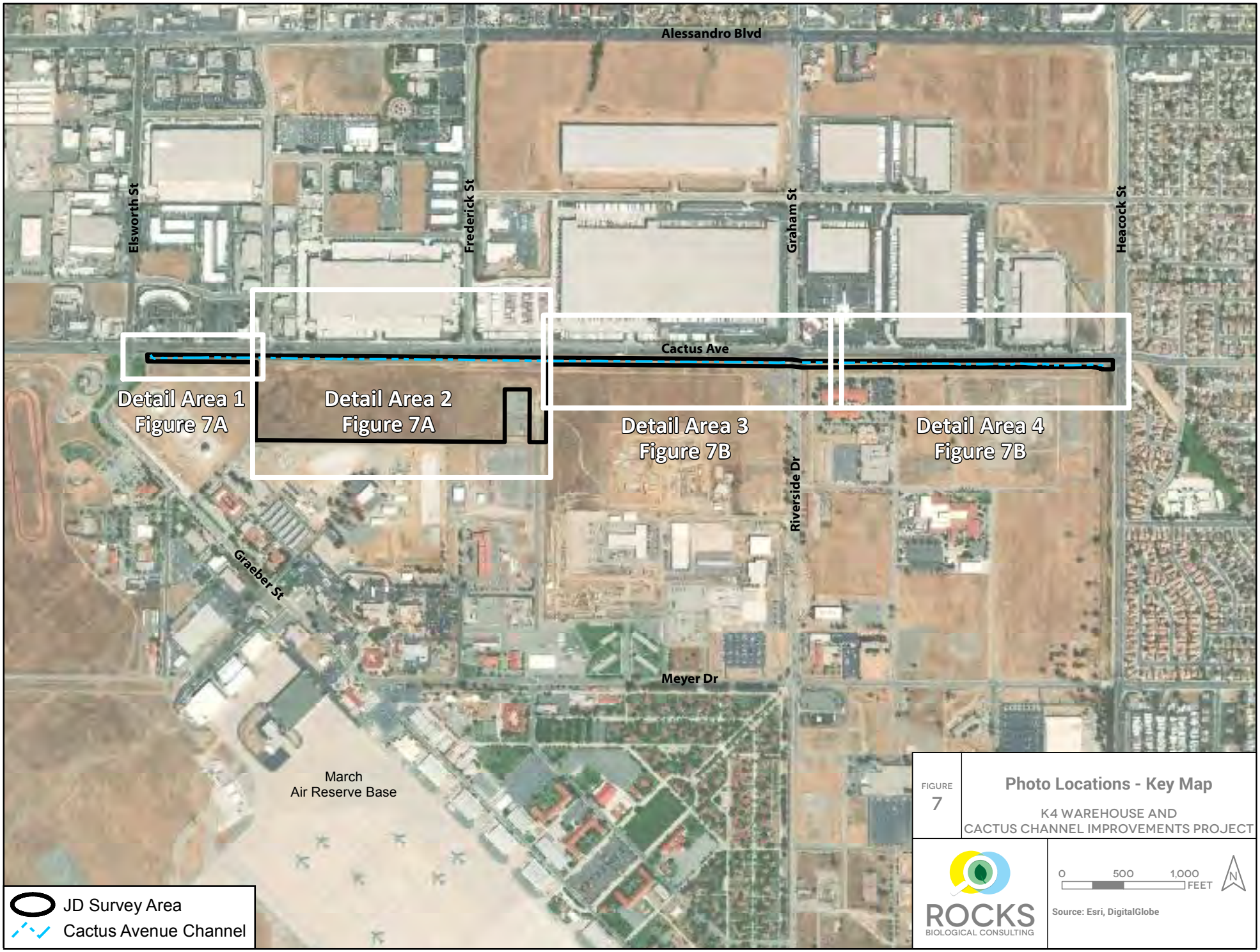


FIGURE 7

Photo Locations - Key Map

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe

Detail Area 1

Elsworth St

Cactus Ave

4'/4'

20'/25'

Key Map

Detail Area 1

Detail Area 2

Veterans Wy

Cactus Ave

Frederick St

35'

20'/25'

5'

10'/20'

Young *Salix gooddingii*

Salix exigua

5'

10'/20'

36

Detail Area 2

JD Survey Area

Photo Locations

Culvert

Corps/RWQCB/CDFW Jurisdictional Features

Ephemeral Stream

Wetland

CDFW Jurisdictional Features

Ephemeral Streambed

Riparian Vegetation

FIGURE 7A

Photo Locations

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

Key Map

Detail Area 3

Detail Area 4

Cactus Ave

10'/20'

22

11'/15'

23

15'/20'

25
24
27
26
29
28

15'/20'

10'/15'

Riverside Dr

Detail Area 3

Detail Area 4

Gilbert St

Young *Populus fremontii*

Cactus Ave

10'/15'

30

31

5'/10'

34
33
35

32

5'/10'

5'/10'

Heacock St

North Ave

Survey Area

Photo Locations

Culvert

Corps/RWQCB/CDFW Jurisdictional Features

Ephemeral Stream

Wetland

CDFW Jurisdictional Features

Ephemeral Streambed

Riparian Vegetation

FIGURE 7B

Photo Locations

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

APPENDIX A

CHECKLIST: MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS, LOS ANGELES DISTRICT REGULATORY DIVISION, CORPS

CHECKLIST: MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS, LOS ANGELES DISTRICT REGULATORY DIVISION, CORPS, MARCH 16, 2017

REPORT SECTION/ PAGE NUMBER	MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS	ADDITIONAL NOTES
Cover Letter	JD REQUEST AND FORMS: A cover letter indicating whether you are requesting a jurisdictional determination (JD). If you are requesting a JD, you must complete, sign, and return the Request for Corps Jurisdictional Determination (JD) sheet. For preliminary jurisdictional determinations the Preliminary Jurisdictional Determination Form must be signed and submitted.	
Section 1.4	CONTACT INFORMATION: Contact information for the applicant(s), property owner(s), and agent(s).	
N/A	SITE ACCESS: If the property owner or their representatives will not accompany the Corps to the site, a signed statement from the property owner(s) allowing Corps personnel to enter the property and to collect samples during normal business hours. If the property lacks direct access by public roads (in other words, access requires passage through private property not owned by the applicant), the owner or proponent must obtain permission from the adjacent property owner(s) to provide access for Corps personnel.	Property owner and/or representatives will accompany the Corps for a site visit upon request.
Section 1.1	LOCATION: Directions to the survey area, an address (if available) and one or more set of geographic coordinates expressed in decimal degrees.	
Section 2, Paragraphs 2 and 3	DELINEATION MANUAL CONFIRMATION: A statement confirming the delineation has been conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and applicable regional supplement(s). The regional supplement(s) used must be identified. For OHWM delineations, a statement must be included confirming the use of the OHWM field guide or that it is not applicable.	
Section 3.5	AQUATIC RESOURCE(S) DESCRIPTION: A narrative describing all aquatic resources on-site and an explanation of the mapped boundaries and any complex transition zones. If the site contains resources that only meet one or two of the three wetland criteria or do not exhibit a clear OHWM, describe the rationale for their inclusion or exclusion from the delineation. Also explain if any erosional features, upland swales, ditches and other potential aquatic features were considered but not included in the delineation.	
Figure 5, Tables 2 and 3	AQUATIC RESOURCE MAPPING AND ACREAGE: Map the outside survey boundary, total extent of aquatic and proposed non-aquatic features, type of feature(s) (waters of the United States or wetland), and include the total acreage for each polygon.	
Section 2, Paragraph 2	FIELD WORK DATES: Date(s) field work was completed.	
Tables 2 and 3	AQUATIC RESOURCE TABLE: A table listing all aquatic resources. The table must include the name of each aquatic resource (actual or arbitrary), its Cowardin type, acreage, summary of OHWM/wetland presence, dominant vegetation for each, and location (latitude/longitude in decimal degrees). For linear features, the table must show both acreage and linear feet as well as channel measurements (active channel width).	
Section 1.1 and 2	FIELD CONDITIONS: A description of existing field conditions, including current land use, normal conditions, flood/drought conditions, irrigation practices, past or recent manipulation to the site, and	

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	characteristics considered atypical (for criteria see OHWM and wetland supplement guides). Include WETS tables or pre-site visit precipitation data as appropriate: https://www.wcc.nrcs.usda.gov/climate/wets_doc.html.	
Section 3.3	HYDROLOGY: A discussion of the hydrology at the site, including all known surface or subsurface sources, drainage gradients, downstream connections to the nearest traditional navigable waterway or interstate water, and any influence from manmade water sources such as irrigation.	
N/A	REMOTE SENSING: If remote sensing was used in the delineation, provide an explanation of how it was used and include the name, date and source of the tools and data used and copies of the maps/photographs.	
Section 3.4; Figure 4; Appendix C	SOILS: Soil descriptions, soil map(s), soil photos, and a discussion of hydric soils (for wetland delineations only).	
Figure 2	USGS QUADRANGLE: A site location map on a 7.5-minute USGS quadrangle. The map must provide the name of the USGS quadrangle, Section, Township, Range, and the latitude and longitude in decimal degree format.	
N/A	BULK UPLOAD FORM: For sites with 3 or more separate aquatic features a completed copy of the ORM Bulk Upload Aquatic Resources or Consolidated Excel spreadsheet must be submitted.	
Figure 5	FIGURES: Map(s) of all delineated aquatic resources in accordance with the Final Map and Drawing Standards for the South Pacific Division Regulatory Program, available at: http://www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/651327/updated-map-and-drawing-standards/	
Figure 7 and Appendix C	SITE PHOTOGRAPHS: Ground photographs showing representative aquatic resource sites (or lack of), as well as an accompanying map of photo-points and table of photographic information (see Final Map and Drawing Standards for the South Pacific Division Regulatory Program item no. 8 a-c).	
Appendix B	DATA FORMS: Completed data forms including all essential information to make a jurisdictional determination [e.g. 2006 Wetland Determination Data Form -- Arid West Supplement; 2010 Arid West Ephemeral and Intermittent Streams OHWM Datasheet].	
Section 2	METHODS: A description of the methods used to survey the aquatic resource boundaries. If GPS data is used, the level of accuracy must be included. Ideally, the GPS equipment should have the capability of sub-meter (<=1 meter) level horizontal accuracy.	
Appendix E	GIS DATA: Digital data for the site, aquatic resource boundaries, and data point locations must be provided in a geographic information system (GIS) format, preferably either ESRI shapefiles or Geodatabase format, but GoogleEarth KMZ or KML files may be acceptable non-complex projects. Each GIS data file must be accompanied by a metadata file containing the appropriate geographic coordinate system, projection, datum, and labeling description. If GIS data is unavailable or otherwise cannot be produced and the Corps determines a site visit is necessary, the aquatic resource boundaries should be physically marked with numbered flags or stakes to facilitate verification by the Corps.	

APPENDIX B

ARID WEST WETLAND DELINEATION AND EPHEMERAL AND INTERMITTENT ORDINARY HIGH WATER MARK (OHWM) DATASHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 1

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): Concave Slope (%): 0%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.910000236 Long: -117.269678652 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Taken with Cactus Avenue Channel. Area is adjacent to culvert outlet at Cactus Avenue; contains standing water; vegetation is considered significantly disturbed as area was recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Potamogeton sp.	80	Y	OBL
2. Typha latifolia	10	N	OBL
3. Paspalum dilatatum	3	N	FAC
4. Ludwigia palustris	1	N	OBL
5.			
6.			
7.			
8.			
	94 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Vegetation recently mowed, identified vegetation where possible; Species of Potamogeton unidentifiable, all Potamogeton sp. within AW Indicator Plant List listed as OBL

SOIL

Sampling Point: WSP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
n/a								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

Hydric soils assumed within standing water and with dominance of OBL vegetation (per methodology in 1987 Corps Wetland Delineation Manual, p. 58).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✔ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No ___ Depth (inches): At surface

Water Table Present? Yes ___ No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ponded area by culvert which contained standing water. Presence of water table or saturation from water table unknown given presence of standing water (i.e., no soil pit dug).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 2

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909934544 Long: -117.269641985 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland pit next to WSP 1. Vegetation within the area is considered significantly disturbed as it appears to have be recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	20	Y	UPL
2. Cynodon dactylon	10	N	FACU
3. Paspalum distichum	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	20	x 5 =	100
Column Totals:	35 (A)		150 (B)

Prevalence Index = B/A = 4.29

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Vegetation mowed, but identifiable vegetation noted.

SOIL

Sampling Point: WSP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

Soils uniform throughout; no hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. Upland. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 3

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S15, S22, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909923962 Long: -117.266991980 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Taken with Cactus Avenue Channel. Vegetation is considered significantly disturbed as the area appears to be recently mowed; downstream is a large Typha latifolia area with standing water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Paspalum distichum	60	Y	FACW
2. Anthemis cotula	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	80 (A)		200 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Vegetation significantly disturbed, recently mowed; noted vegetation that could be identified.

SOIL

Sampling Point: WSP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2	94	7.5YR 4/6	6	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** _____

Remarks:

Thick woven organic matter throughout initial 5 inches; prominent and distinct redox features present throughout soil profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Visible drainage patterns present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 4

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 4-5%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909870456 Long: -117.267076603 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Sample point taken in uplands adjacent to wetland area (WSP 3); vegetation considered significantly disturbed as area appears to be recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	45	Y	UPL
2. Cynodon dactylon	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	45	x 5 =	225
Column Totals:	65 (A)		305 (B)

Prevalence Index = B/A = 4.69

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Portions of the area appear to be recently mowed; vegetation was noted where possible.

SOIL

Sampling Point: WSP 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/clay and rocks

Depth (inches): 10 inches

Hydric Soil Present? Yes ____ No ✔

Remarks:

Soil is uniform in texture and color throughout; pit only dug to 10 inches due to hard soils and rocks.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____

Water Table Present? Yes ____ No ✔ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 5

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909922081 Long: -117.263477126 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Sample point within dry portion of the Cactus Avenue Channel; upstream has Cyperus eragrostis and Typha latifolia dominating the channel and standing water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Cyperus eragrostis	45	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Area dominated by Cyperus eragrostis. Channel regularly mowed, disturbed vegetation.

SOIL

Sampling Point: WSP 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	60	5YR 4/6	40	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard clays

Depth (inches): 8 inches

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Prominent and distinct redox features present within top 8 inches observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Secondary indicators present. Surface water present approximately 240 ft. upstream near Cactus Avenue and Veterans Way intersection, but not at sample point location.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 6

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 4-5%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909891414 Long: -117.263579325 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Adjacent to Cyperus eragrostis-dominated area; upland pit to WSP 5.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	50	Y	UPL
2. Cynodon dactylon	25	Y	FACU
3. Hirschfeldia incana	5	N	UPL
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	55	x 5 =	275
Column Totals:	80 (A)		375 (B)

Prevalence Index = B/A = 4.69

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area primarily upland grasses; regular mowing along channel.

SOIL

Sampling Point: WSP 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/clay and rocks

Depth (inches): 10 inches

Hydric Soil Present? Yes ____ No ✔

Remarks:

Soil is uniform in texture and color throughout; pit only dug to 10 inches due to hard soils and rocks.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____

Water Table Present? Yes ____ No ✔ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 7

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909971261 Long: -117.252887029 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

Sample point taken at culvert outlet near the intersection of Graham St. and Cactus Ave. within Cactus Channel, drains into culvert immediately downstream; area is dominated by Cyperus

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Cyperus eragrostis	45	Y	FACW
2. Amaranthus blitoides	2	N	FACU
3. Paspalum dilatatum	1	N	FAC
4. Rumex crispus	1	N	FAC
5.			
6.			
7.			
8.			
	49 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Sample point vegetation did not appear mowed recently; however, vegetation within adjacent Cactus Ave. Channel had been recently mowed. Regular maintenance mowing occurs within channel.

SOIL

Sampling Point: WSP 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/1	100					SCL	Sandy clay loam
2-10	10YR 3/2	90	7.5YR 4/6	10	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard soils

Depth (inches): 10 inches

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Prominent and distinct redox features present at 2-10 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drift deposits include trash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 8

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 2-3%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909972678 Long: -117.252857630 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland pit adjacent to WSP 7; area is fed by culvert near Graham St. & Cactus Ave., drains into a culvert immediately downstream; vegetation is considered significantly disturbed due to mowing

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	20	Y	UPL
2. Paspalum dilatatum	3	N	FAC
3. Centromadia pungens ssp. laevis	3	N	FAC
4.			
5.			
6.			
7.			
8.			
	26 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 74 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	6	x 3 =	18
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	26 (A)		118 (B)

Prevalence Index = B/A = 4.54

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area in the uplands to wetland and appears to have been recently mowed.

SOIL

Sampling Point: WSP 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/3	100					SL	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard soils

Depth (inches): 5 inches

Hydric Soil Present? Yes _____ No ✔

Remarks:

Shovel refusal at 5 inches; uniform color and texture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley, Riverside Sampling Date: 7/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 9

Investigator(s): Lee Ripma, Shanti Santulli, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): None Slope (%): 1-2%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909919642 Long: -117.252695994 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Area fed by culvert at the intersection of Graham St. & Cactus Ave., drains into a culvert immediately downstream; adjacent to wetland area upstream

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Anthemis cotula	40	Y	FACU
2. Cynodon dactylon	15	Y	FACU
3. Cyperus eragrostis	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area dictates significant change in veg. from wetland area upstream that is dominated by Cyperus eragrostis; channel regularly mowed although no evidence of recent mowing observed in this section of the channel.

SOIL

Sampling Point: WSP 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10 YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal

Depth (inches): 10 inches

Hydric Soil Present? Yes ____ No ✔

Remarks:

Hard impenetrable soils past 10 inches; uniform color and texture. The area is more sloped than the downstream wetland area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____

Water Table Present? Yes ____ No ✔ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drainage patterns faintly visible. FAC-Neutral text not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley, Riverside Sampling Date: 7/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 10

Investigator(s): Lee Ripma Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): In drainage Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909941025 Long: -117.248824397 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Sample point within Cactus Channel, appears to have been recently cleared/mowed; fed by culvert at intersection of Graham St. and Cactus Ave. and drains east to Heacock St. then is diverted south.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus fremontii	20	Y	NL
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	= Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Sandy bare soil with litter and trash; NL (not listed plants treated as UPL plants per AW manual)

SOIL

Sampling Point: WSP 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 6/4	100					Sand	Lose sand
4-16	10 YR 4/3	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal

Depth (inches): 16 inches

Hydric Soil Present? Yes _____ No ✔

Remarks:

No hydric soils; two visible distinct layers.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drainage patterns visible within 2 to 3-foot channel.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: K4 Warehouse & Cactus Channel Improv. Project
Project Number: --
Stream: OHWM 1
Investigator(s): Shanti Santulli and Emily Trevino

Date: 07/17/2018
Town: Moreno Valley
Photo begin file#:

Time: 0930
State: California
Photo end file#:

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:
See Figure 5 and Appendix C (photo log)

Projection:
Datum: WGS 1894
Coordinates: See below

Potential anthropogenic influences on the channel system:
Channel runs along Cactus Avenue and is a artificially/manipulated channel, culverted at each intersection, contains trash/debris, and large portions of the channel appear to have been recently mowed

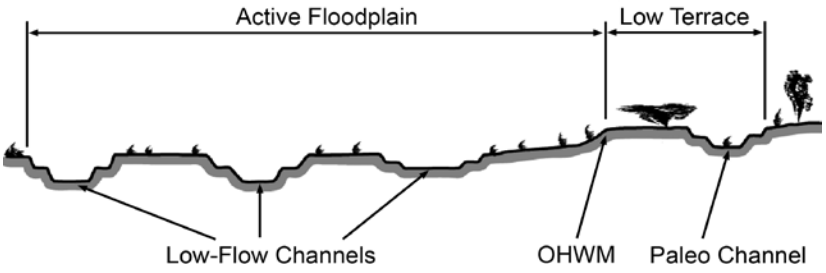
Brief site description:
Channel running along Cactus Avenue that is fed by multiple culverts, contains large wetland areas and flows through culverted intersections

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

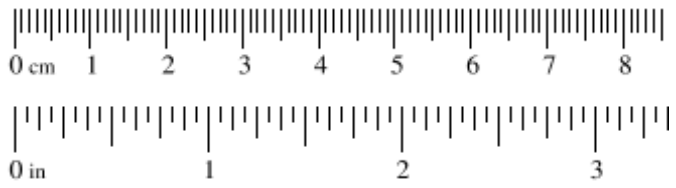


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

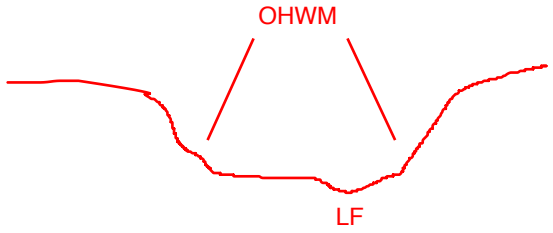
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	Gravel
2.56	64	Cobble	Gravel
0.157	4	Pebble	Gravel
0.079	2.00	Granule	Gravel
0.039	1.00	Very coarse sand	Sand
0.020	0.50	Coarse sand	Sand
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	Sand
1/8 0.0025	0.0625	Very fine sand	Sand
1/16 0.0012	0.031	Coarse silt	Silt
1/32 0.00061	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	Silt
1/128 0.00015	0.0039	Very fine silt	Silt
		Clay	Mud



Project ID: K4 Warehouse & **Cross section ID:** OHWM 1 **Date:** 07/17/2018 **Time:** 0939

Cross section drawing:



OHWM

GPS point: 33.909923908, -117.25278283

Indicators:

- ☑ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:
Non-wetland segment within earthen channel; vegetation composed primarily of Anthemis cotula

Floodplain unit:

☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: Within OHWM

Characteristics of the floodplain unit:

Average sediment texture: Coarse silt

Total veg cover: 20 % Tree: _____% Shrub: _____% Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:
2 ft wide LF channel with some Cyperus eragrostis individuals and sediment size slightly larger than active channel; area is very dry (typical July conditions)

Project ID: K4 Warehouse & **Cross section ID:** OHWM 1 **Date:** 07/17/2018 **Time:** 0930

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: 3 ft. Above south bank

Characteristics of the floodplain unit:

Average sediment texture: fine silt

Total veg cover: 40 % Tree: _____% Shrub: _____% Herb: 40 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☑ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Cyperus eragrostis sprinkled throughout LF and Anthemis cotula throughout the active floodplain

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Just above AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: very fine silt

Total veg cover: 80 % Tree: _____% Shrub: _____% Herb: 80 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☑ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

No low terrace, goes straight to upland; trapezoidal channel

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: K4 Warehouse & Cactus Channel Improv. Project
Project Number: --
Stream: OHWM 2
Investigator(s): Lee Ripma

Date: 7/17/2018
Town: Moreno Valley
Photo begin file#:

Time: 1540
State: California
Photo end file#:

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:
See Figure 5 and Appendix C (photo log)

Projection:
Datum: WGS 1984
Coordinates: See below

Potential anthropogenic influences on the channel system:
Channel runs along Cactus Avenue and is a artificially/manipulated channel, culverted at each intersection, contains some trash/debris

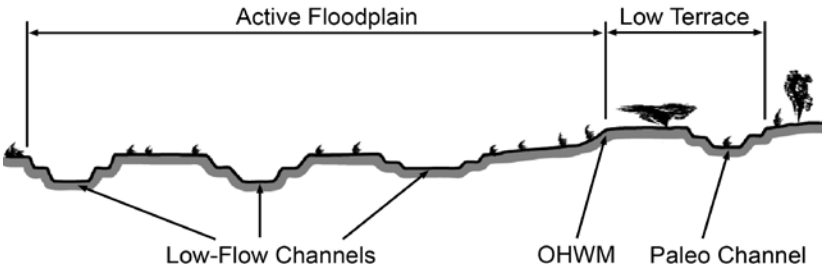
Brief site description:
Channel running along Cactus Avenue that is fed by multiple culverts, contains large wetland areas and flows through culverted intersections

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

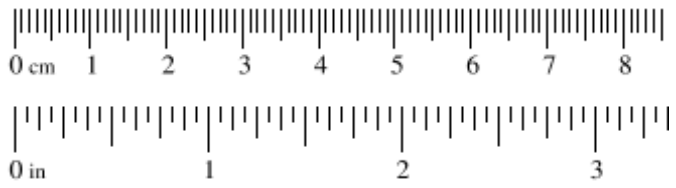


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

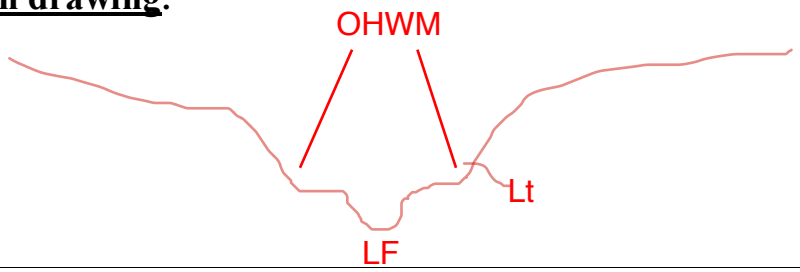
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	Gravel
2.56	64	Cobble	Gravel
0.157	4	Pebble	Gravel
0.079	2.00	Granule	Gravel
0.039	1.00	Very coarse sand	Sand
0.020	0.50	Coarse sand	Sand
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	Sand
1/8 0.0025	0.0625	Very fine sand	Sand
1/16 0.0012	0.031	Coarse silt	Silt
1/32 0.00061	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	Silt
1/128 0.00015	0.0039	Very fine silt	Silt
		Clay	Mud



Project ID: K4 Warehouse & **Cross section ID:** OHWM 2 **Date:** 7/17/18 **Time:** 1540

Cross section drawing:



OHWM

GPS point: 33.909937238, -117.24884056

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:
Very small drainage only 1 ft bw banks

Floodplain unit:

[x] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: Within OHWM

Characteristics of the floodplain unit:

Average sediment texture: Pebble

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 20 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:
Approx. 5-foot wide active floodplain (with 1-ft. low flow - same sediment texture), pebble.

Project ID: K4 Warehouse & **Cross section ID:** OHWM 2 **Date:** 7/17/18 **Time:** 1540

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Just above OHWM

Characteristics of the floodplain unit:

Average sediment texture: coarse silt

Total veg cover: 20 % Tree: 20 % Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☑ Benches
- ☑ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Primarily unvegetated banks. Small patch of cottonwood on bank.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

APPENDIX C

SITE PHOTOGRAPHS

Appendix C – Site Photographs*

K4 Warehouse & Cactus Channel Imprveoments Project Jurisdictional Delineation

July 18, 2018



Photo 1. View of Wetland Sample Point (WSP) 1, area contains standing water and appears to have been recently mowed. Photo taken facing northwest.



Photo 2. Upstream view of WSP 2, near WSP 1. WSP 2 did not show any indicators of wetland hydrology, hydrophytic vegetation or hydric soils. Photo taken facing north.

*See Corresponding Figure 7 for Photo Point Locations



Photo 3. Downstream view of area where WSP 1 and WSP 2 data was collected; WSP 2 in foreground. Area appears to have been recently mowed; Drainage patterns observed. Photo taken facing southeast.



Photo 4. Downstream view of area between the WSP 1 and 2 near Elsworth Street toward area dominated by *Typha latifolia-dominated* area at Veterans Way. Photo taken facing east.



Photo 5. WSP 3, taken within the mowed area adjacent to the *Typha latifolia*-dominated area by Veterans Way. The sample point met the hydrophytic vegetation, wetland hydrology, and hydric soil indicators.



Photo 6. Downstream view at WSP 3 showing extent of mowed area and taller hydrophytic vegetation (*Typha latifolia*) further downstream. Photo taken facing east.



Photo 7. View of WSP 3 soils showing presence of distinct and prominent redox features.



Photo 8. View of WSP 4, taken in the uplands, the sample point did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators.



Photo 9. Upstream view of area where WSP 3 and WSP 4 was taken; WSP 4 visible in foreground and determined extent/width of the wetland area. Photo taken facing west.



Photo 10. Upstream view of wetland area. The area appears to have been recently mowed and the abrupt end of *Typha latifolia* dictates where mowing stopped. Photo taken facing west.



Photo 11. Downstream view of wetland area where standing water was visible. Photo taken facing east towards the Cactus Avenue and Veterans Way culvert outlet.



Photo 12. Upstream view of large *Typha latifolia* dominated area. Photo taken near the crossing of Cactus Avenue and Veterans Way, where a large culvert feeds the area. Photo taken facing west.



Photo 13. Downstream view of large *Typha latifolia* dominated area.
Photo taken near the crossing of Cactus Avenue and Veterans Way, facing east.



Photo 14. Upstream view of wetland area where standing water was observed. These conditions continue upstream, eventually growing into a large *Typha latifolia* area. Photo taken facing west.



Photo 15. Upstream view of WSP 5, the same point met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters. Photo taken facing west.



Photo 16. View of WSP 5 soils, abundant redox features present.



Photo 17. View of WSP 6, taken in the uplands; the sample point did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils parameters.



Photo 18. Downstream view of area where WSP 5 and WSP 6 was taken; WSP 6 in foreground and determined the extent of the wetland area. Photo taken facing east.



Photo 19. Downstream view from a culvert outlet at Cactus Avenue and Frederick Street. Photo taken facing east.



Photo 20. View of culvert outlet at Cactus Avenue and Frederick Street. Vegetation within the area include *Rumex crispus* and *Salix exigua*. Photo taken facing north.



Photo 21. Upstream view of wetland area at the culvert outlet at Cactus Avenue and Frederick Street. Photo taken facing west.



Photo 22. Upstream view of continued wetland area. While vegetation was disturbed in this section of the channel, wetland hydrology and hydric soils remained present. Photo taken facing east.



Photo 23. View of area with visible soil cracks that displayed similar vegetation (albeit disturbed) and soil redox features as WSP 7, downstream. Photo taken facing east, downstream.



Photo 24. View of culvert that feeds into wetland area where WSP 7 and WSP 8 was taken. Photo taken facing north.



Photo 25. View of WSP 7. The sample point met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters.



Photo 26. WSP 8, taken in the uplands adjacent to WSP 7, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soil parameters. Photo taken facing north.



Photo 27. Downstream view at WSP 7 and WSP 8. Large amounts of *Cyperus eragrostic* located within the wetland area. Photo taken facing south.



Photo 28. Downstream view of the area where WSP 9 and Ordinary High Water Mark (OHWM) Data Point 1 was collected. WSP 9 met the hydrophytic vegetation parameter but not the wetland hydrology or hydric soils parameters. Photo taken east. OHWM determined to be present.



Photo 29. Upstream view of OHWM 1. OHWM 1 is defined by a break in slope, change in average sediment texture and vegetation species. Photo taken facing west.



Photo 30. Upstream view of ephemeral drainage from a road overpass. Photo taken facing east.



Photo 31. Downstream view of ephemeral drainage at a road overpass. Photo taken facing east.



Photo 32. Overview of ephemeral drainage, feature is visible and consistent along Cactus Avenue from Riverside Drive to Heacock Street. Photo taken facing east.



Photo 33. WSP 10. The sample point displayed wetland hydrology; however, hydrophytic vegetation and hydric soils were not observed.



Photo 34. Upstream view of WSP 10 and OHWM Data Point 2. Photo taken facing west.



Photo 35. OHWM Data Point 2 downstream. OHWM Data Point 2 is defined by a break in slope, change in sediment texture, vegetation species, and vegetation cover. Photo taken facing east.



Photo 36. View of potential ponding area observed by RBC field staff. Protocol fairy shrimp surveys are currently being undertaken to determine species presence/absence although the area appears to be a puddle in a disturbed asphalt/unvegetated area. Photo taken on October 4, 2018.

APPENDIX D

JD REQUEST FORMS

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Los Angeles District | File/ORM #: | PJD Date:

State: CA | City/County: Moreno Valley/Riverside

Nearest Waterbody: San Jacinto River

Location: TRS, LatLong or UTM: 33.909420, -117.263420

Name/ Address of Person Requesting PJD:
Jeff Gordon
Meridian Park K4, LLC
567 San Nicholas Drive, Suite 270
Newport Beach, CA 92660
San Diego, CA 92110
JGordon@waypointpg.com
949-200-6733

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 2876 linear ft | 5-15 width | 0.42 acres | Stream Flow: Ephemeral

Wetlands: 1.40 acre(s) | Cowardin Class: Palustrine, emergent

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: N/A | Non-Tidal: N/A

☐ Office (Desk) Determination
☐ Field Determination: Date of Field Trip:

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: 2018 JD Report, prepared by Rocks Biological Consult
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☑ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: USGS 7.5-minute Riverside East and Sunnymead
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: USDA NRCS 2005
- ☑ National wetlands inventory map(s). Cite name: USFWS and NWI 2017
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☑ Aerial (Name & Date): See attached figures, SanGIS 2017
  ☑ Other (Name & Date): See Appendix C, Site Photographs
- ☐ Previous determination(s). File no. and date of response letter:
- ☑ Other information (please specify): 2018 JD Report, prepared by Rocks Biological Consult

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and Date of Regulatory Project Manager (REQUIRED)

Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office: Los Angeles District | File/ORM #: | PJD Date:

State: CA | City/County: Moreno Valley/Riverside | Person Requestinq PJD: Jeff Gordon

Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
CACW	33.909944442	-117.26156467	Palustrine, emergent	1.40	Non-Section 10 wetland
CACNW	33.909960615	-117.25096585	Riverine	0.42	Non-Section 10 non-wetla

Notes:

The review area for this requested PJD includes the project survey area shown on the provided figures with the K4 Warehouse & Cactus Channel Improvements Project Jurisdictional Delineation Report (Rocks Biological Consulting 2018), incorporated here by reference. A majority of the Cactus Avenue Channel (CAC) displayed evidence of federally jurisdictional wetland waters of the U.S.; while the remaining portions displayed evidence of an OHWM as discussed in the provided Jurisdictional Delineation Report.

The delineated feature on site drains from west to east along Cactus Avenue until the intersection of Cactus Avenue and Heacock Street, where flows are diverted south to drain into the Perris Valley storm drain system. Flows continue into the San Jacinto River and ultimately into Lake Elsinore.

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: Cactus Ave. b/w Elsworth St. to Heacock St. (Street Address)
  City/Township/Parish: Moreno Valley County: Riverside State: CA
  Acreage of Parcel/Review Area for JD: 42.36 acres
  Section: S15, S22 Township: T03S Range: R04W
  Latitude (decimal degrees): 33.909420 Longitude (decimal degrees): -117.263420
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ✔ I currently own this property. ___ I plan to purchase this property.
  ___ I am an agent/consultant acting on behalf of the requestor.
  ___ Other (please explain): _____.
- Reason for request: (check as many as applicable)
  ___ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ___ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ___ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ✔ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ___ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ___ A Corps JD is required in order to obtain my local/state authorization.
  ___ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ___ I believe that the site may be comprised entirely of dry land.
  ___ Other: _____
- Type of determination being requested:
  ___ I am requesting an approved JD.
  ✔ I am requesting a preliminary JD.
  ___ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
  ___ I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: _____ Date: _____

- Typed or printed name: Jeff Gordon
  Company name: Meridian Park K4, LLC
  Address: 567 San Nicholas Drive, Suite 270
  Newport Beach, CA 92660
  Daytime phone no.: 949-200-6733
  Email address: JGordon@waypointpg.com

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

APPENDIX E

GIS DATA

APPENDIX G

STEPHENS' KANGAROO RAT PROTOCOL SURVEY RESULTS

January 10, 2019

Ms. Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Subject: Results of a trapping survey for the federally endangered Stephen's kangaroo rat (Dipodomys stephensi) on an approximately 42.4-acre site in March Joint Powers Authority, Riverside County, California.

Dear Ms. Love,

This report presents the results of a trapping survey for the federally threatened Stephen's kangaroo rat (SKR; Dipodomys stephensi) on the site of the proposed K4 warehouse project and proposed improvements to the existing Cactus drainage channel along the southern side of Cactus Ave. The survey area is located on the U.S. Geological Survey (USGS) Riverside East and Sunnymead 7.5-minute quadrangles (Township 3S, Range 4W, Sections 13 and 14). The UTM coordinates of the approximate center of the survey area are 11S 476230E/ 3752224N (NAD 83). The site is approximately 1,550 feet in elevation. Figure 1 shows the project site on a vicinity map. Appendix A contains site photos.

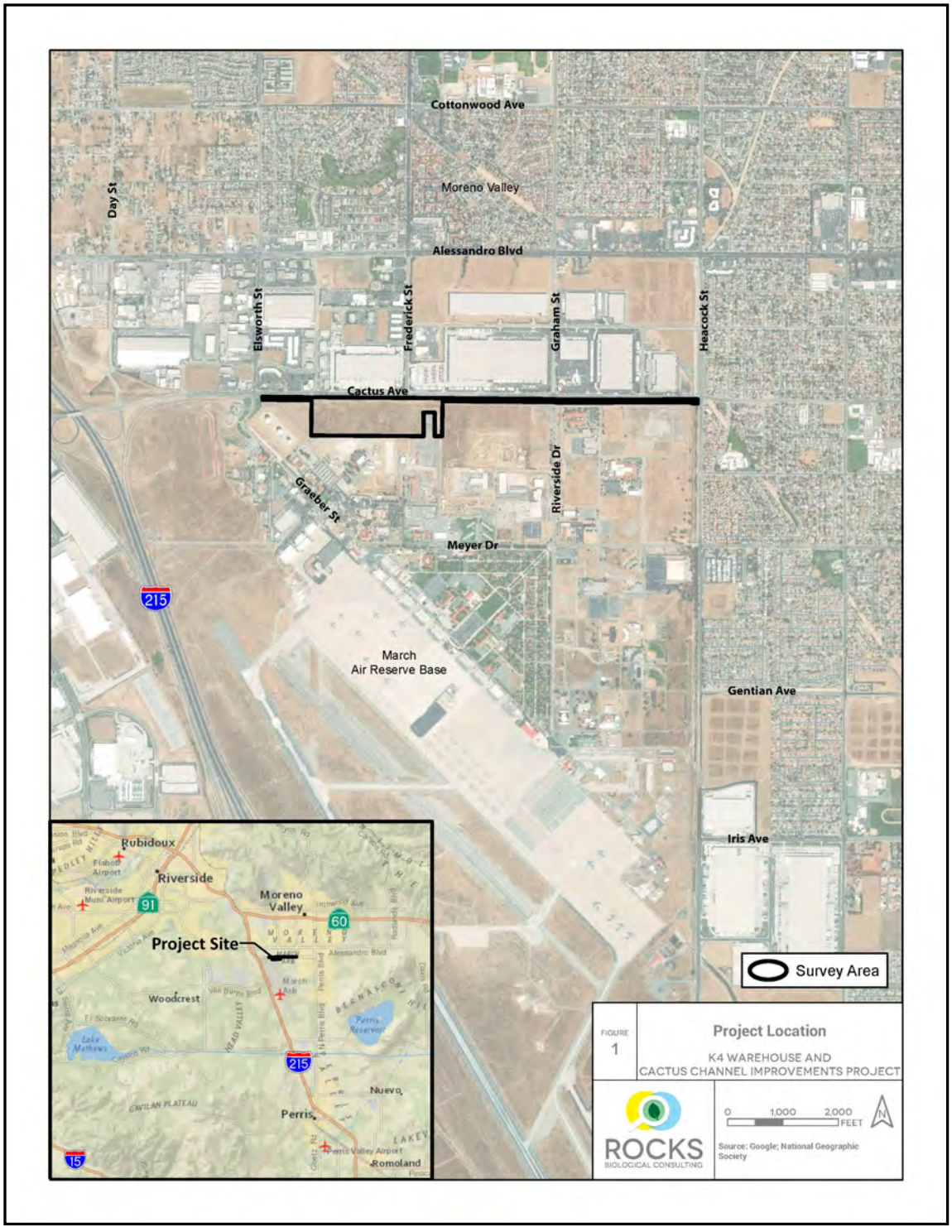
INTRODUCTION

The proposed project is for construction of a K4 warehouse and channelization of the existing Cactus Ave earthen drainage ditch along the southern side of Cactus Ave. The K4 warehouse project site is immediately south of Cactus Ave within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County. The drainage improvement project extends from the vicinity of the entrance to March Air Reserve Base (MARB) east to Heacock St. The K4 Warehouse site is on a 35.4-acre parcel; the Cactus Channel Improvements would occur over a 7.0-acre area immediately south of Cactus Avenue (Figure 1). Interstate 215 (I-215) is located approximately 0.75 mile west of the project site. The project site is comprised of five Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The natural history and habitat requirements of SKR are fairly well known. Habitats occupied by SKR typically occur on level to gently sloping terrain, although the species has occasionally been found on relatively steep slopes. SKR typically occupy lands described as disturbed annual grassland and characterized by a relatively sparse cover of both shrubs and herbaceous vegetation. Occupied SKR habitat commonly exhibits an abundance of bare (unvegetated) ground during much of the year. When grasslands develop extremely high densities of herb cover following periods of rainfall, SKR usually occur only along dirt roads that traverse such dense habitats. Similarly, SKR often will be found along truck or cow trails that traverse dense grasslands. Soils in habitats harboring SKR are typically loamy in nature, while soils dominated by clay or sand very rarely support this species (O'Farrell and Uptain 1989, O'Farrell 1990, Price and Endo 1989, USFWS 1997).

Stephens' kangaroo rat is known to occur widely in Riverside County, and in a few localities in southwestern San Bernardino County (O'Farrell and Uptain 1989; RCHCA 1995; USFWS 1997, 1993). The species has long been known to occur in the March Air Base area along Interstate 215 (Montgomery 2000, 2002, 2010).

Figure 1. Vicinity map of project site.



METHODS

A live-trapping survey was carried out over five consecutive nights from October 22-26, 2018. The live-trapping effort used large (3 x 3.75 x 12") Sherman live-traps with doors shortened to avoid tail damage. Traps were set in areas that showed potential for SKR occurrence. The disced field that comprises much of the K4 warehouse site showed no potential for SKR occurrence. Traps were opened and baited with bird seed within one hour of sunset and checked at night and in the morning. Animals were identified and released immediately at the point of capture. A total of 725 trap-nights were accrued during the field survey. Trapping was conducted by Dr. Phil Brylski (USFWS permit TE148555-2 and CDFG MOU).

Figures 2A and 2B show the survey area on an aerial photo and the locations of the four survey transects: A, B, C, and D.

RESULTS

Site Description

The project site lies on flat land bordered by Cactus Ave to the north and by vacant land to the south. To the south are developed land uses within March Air Reserve Base. To the north across Cactus Ave are light industrial and commercial land uses.

The plant communities in the survey area site include disturbed golden bush scrub/non-native grassland and developed/disturbed. The vacant parcels that occur along Transects B, C, and D were recently disced, and have been regularly mowed or disced in recent years. The disturbed golden bush scrub/non-native grassland occurs along the fence lines and in several areas that have not been disced. The soils on the site are predominantly Monserate sandy loams (NRCS 2018), which are suitable for SKR.

Project Site in Relation to SKR Historical Range and Habitat

The project site is within the historical range for SKR. The disturbed golden bush scrub/non-native grassland are potentially suitable habitat for SKR, however, no kangaroo rat sign (burrows, tail drag, scat) was observed in the survey area.

The California Natural Diversity Database (CNDDB; CDFWG 2018) contains a number of SKR records for the project vicinity – mainly in the sparse grasslands located west of I-215. The nearest records are located from 1 to 1.3 miles to the west and southwest of the survey area. Many of these SKR occurrences are from the years before residential and light industrial development of the area. One SKR locality on the eastern side of I-215 is within March Air Based, approximately 2.2 miles south of the project site (south of in the vicinity of the MARB museum facility). SKR were observed there during a live-trapping survey in 2000 (Montgomery 2000), but it is not known whether the species still occurs there (S. Montgomery, pers. comm.).

Figure 2A. SKR transect locations, western part of survey area.

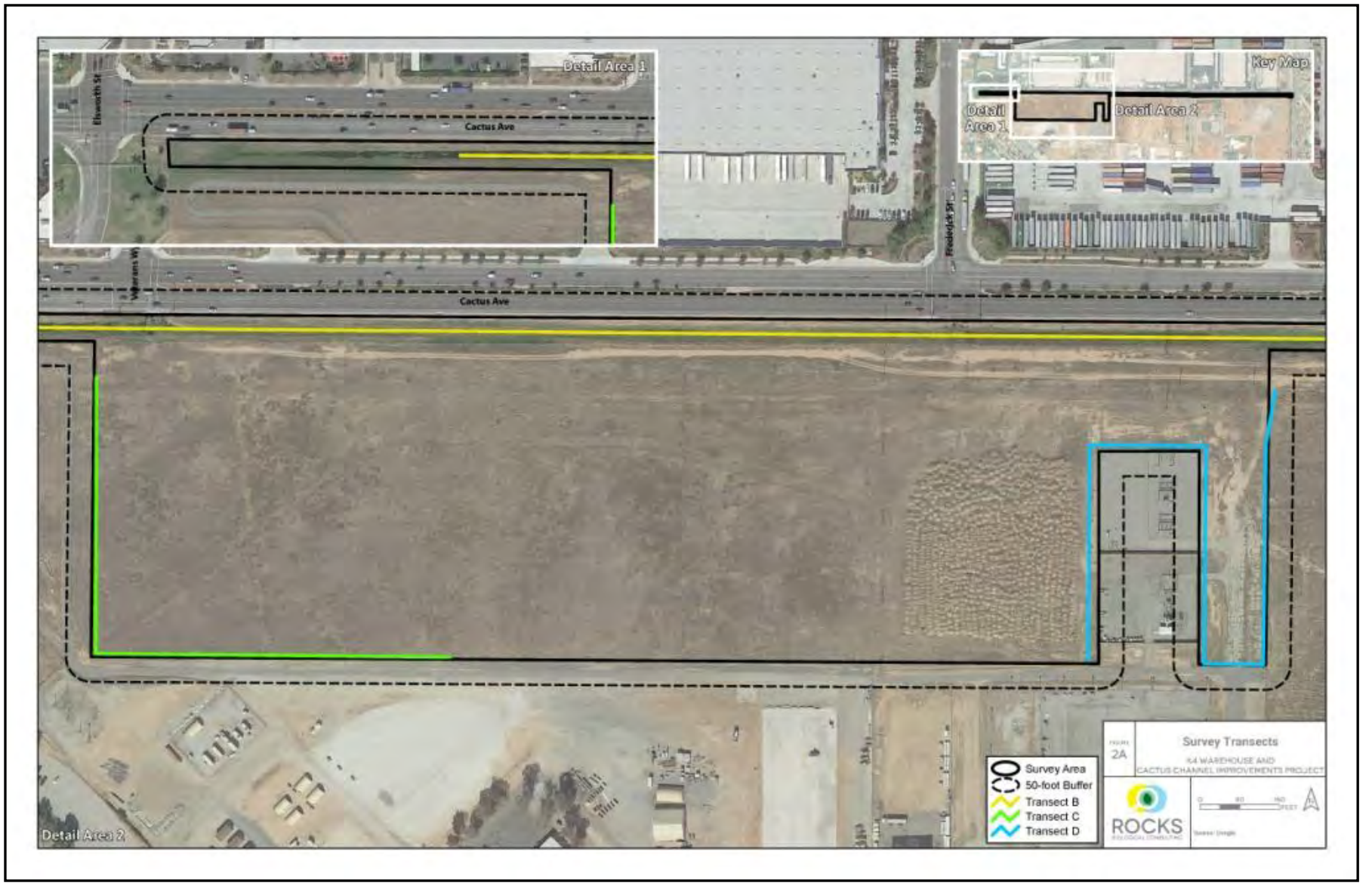


Figure 2B. SKR transect locations, eastern part of survey area.



SKR Survey Results

Weather conditions during the survey were mild, with mostly clear skies, low wind, and temperatures of 55-63°F. Weather conditions during the survey are summarized in Table 1.

Table 1. Weather Conditions			
Date	Temperature (F)	Cloud Cover (%)	Wind (mph)
10-22	55/62	0-3	0-2
10-23	57/62	5-15	0-1
10-24	59/63	0	0
10-25	57/56	0	0
10-26	57/61	0	0-3

The survey yielded captures of one small mammal species: the deer mouse (Peromyscus maniculatus). Table 2 summarizes the captures.

Table 2. Summary of Small Mammal Captures		
Date	Transect	Species
		PMAN
10-22	A	
	B	
	C	
	D	
10-23	A	
	B	
	C	1
	D	
10-24	A	
	B	
	C	1
	D	
10-25	A	
	B	
	C	1
	D	
10-26	A	
	B	
	C	
	D	
	Total	3
PMAN: deer mouse, Peromyscus maniculatus		

CONCLUSION

No SKR were captured on the project site. The site contains potentially suitable habitat for SKR, but no sign (potential burrows, tail drag marks, scat) was observed there. The absence of SKR in the current trapping survey indicates that there would be no impacts to SKR as a result of the proposed project.

Please contact me if you have any questions regarding this survey report.

Sincerely,

Phil Brylski
31 Tahoe, Irvine, CA 92612
(949) 870-8878

Permit 148555-2
Email – pbrylski@gmail.com

REFERENCES

California Department of Fish and Wildlife (CDFW) Natural Diversity Database. 2018. California Natural Diversity Database, Element reports for Stephens' kangaroo rat. California Department of Fish and Game, Natural Heritage Division, Sacramento, California.

Montgomery, S.J. 2000. Results of a field check for the federally endangered Stephens' kangaroo rat (Dipodomys stephensi) (SKR) at three sites located on the March Air Reserve Base property, east of Interstate 215, in Riverside County, California. Prepared for Dr. Larry Watson, Cultural and Natural Resource Manager, Dept. of the Air Force. March Air Reserve Base, California.

___. 2003. Assessment of potential Stephens' kangaroo rat and Los Angeles pocket mouse habitat at existing U.S. Army Reserve Facilities and possible areas of expansion of the former March Air Force Base, Riverside County, California.

___. 2010. Results of a Live-Trapping Survey for Stephens' Kangaroo rat (Dipodomys stephensi) at the Center for Natural Land Management March SKR Preserve, March Air Force Base Annex Riverside County, California November-December 2009.

___. 2017. Results of a trapping survey for the federally endangered Stephen's kangaroo rat (Dipodomys stephensi): SKR) in an approximately 39-acre proposed Freeway Business Center Project in Moreno Valley, Riverside County, California

NRCS (Natural Resources Conservation Service). 2018. Custom soil resource report for Western Riverside area, California. (http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx).

O'Farrell, M.J. 1990. Stephens' kangaroo rat: natural history, distribution, and current status. Pp 78-84, In P.J. Brant and J. Remington (eds.), Memoirs of the Natural History Foundation of Orange County; Vol. 3, Publ. By Nat. Hist. Found. Of Orange County.

O'Farrell, M.J. and C.E. Uptain. 1989. Assessment of population and habitat status of the Stephens' kangaroo rat (Dipodomys stephensi). Calif. Dept. Fish and Game, Non-game Bird and Mammal Section Report (July 1989).

RCHCA (Riverside County Habitat Conservation Agency). 1995. Habitat conservation plan for the Stephens' kangaroo rat in western Riverside County, California. (February 1995)

U.S. Fish and Wildlife Service. 1997. Draft Recovery plan for the Stephens' kangaroo rat (Dipodomys stephensi). Prepared by Region 1, USFWS. Portland, OR.

Appendix A. Site Photos

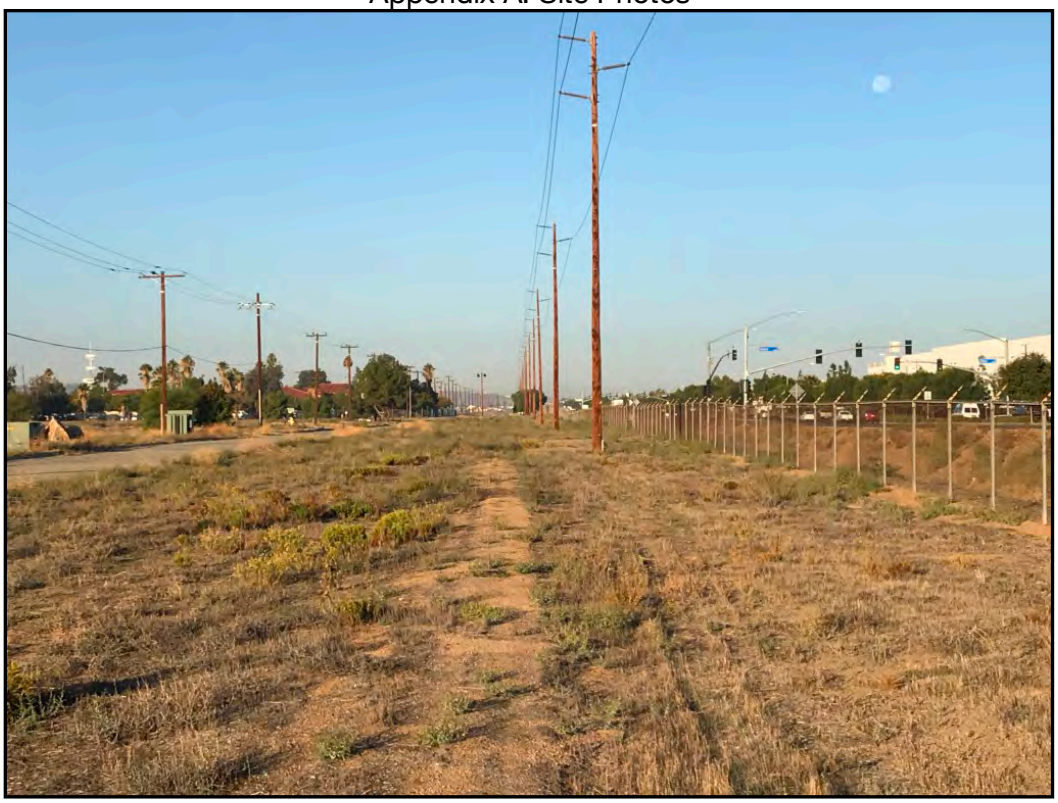


Photo 1. Disturbed golden bush scrub/non-native grassland habitat in eastern part of Transect A, view looking west



Photo 2. Disturbed golden bush scrub/non-native grassland habitat on Transect B, along fence line south of Cactus Ave drainage ditch, view looking west



Photo 3. Non-native grassland along Cactus Ave drainage ditch at west end of Transect B, view looking west



Photo 4. Disced field with patches of non-native grassland in Transect C area, view looking southwest



Photo 5. Disturbed habitat around existing substation
in Transect D area, view looking southwest

ROCKS
BIOLOGICAL CONSULTING





K4 WAREHOUSE & CACTUS CHANNEL IMPROVEMENTS PROJECT JURISDICTIONAL DELINEATION REPORT

Riverside County, California

February 20, 2019

Prepared for:
Meridian Park K4, LLC
567 San Nicholas Drive, Suite 270
Newport Beach, CA 92660

Prepared by:
Rocks Biological Consulting
2621 Denver Street, Ste. B
San Diego, CA 92110
(619) 701-6798

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APPENDICES

Appendix A. Checklist: Minimum Standards for Acceptance of Aquatic Resources Delineation Reports, Los Angeles District Regulatory Division, Corps

Appendix B. Arid West Wetland Delineation and Ephemeral and Intermittent Streams OHWM Datasheets

Appendix C. Site Photographs

Appendix D. JD Request Forms

Appendix E. GIS Data

1 INTRODUCTION

Rocks Biological Consulting (RBC) conducted a formal jurisdictional delineation for the K4 Warehouse and Cactus Channel Improvements Project (project) to identify areas potentially jurisdictional under the U.S. Army Corps of Engineers (Corps) pursuant to Section 404 of the Clean Water Act; the Regional Water Quality Control Board (RWQCB) pursuant to Section 401 of the Clean Water Act and the Porter-Cologne Act; and streambed and riparian habitats under California Department of Fish and Wildlife (CDFW) pursuant to California Fish and Game Code (§1602). This information is necessary to evaluate potential jurisdictional impacts and permit requirements associated with the project, can be used by the agencies to assess project conformance with state and federal regulations, and serves as a request for the Corps to complete a Preliminary Jurisdictional Determination (PJD) based on the information provided in this report. Furthermore, Appendix A provides a checklist of the information contained in this report in compliance with the Corps Los Angeles District's *Minimum Standards for Acceptance of Aquatic Resources Delineation Reports* (Corps 2017).

1.1 PROJECT LOCATION

The approximately 35.4-acre project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California (Figure 1). Interstate 215 (I-215) is located approximately 0.8 mile east of the Project site. The Project site is comprised of five parcels designated as Assessor's Parcel Numbers (APNs) 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0.

The latitude and longitude of the approximate center of the site is 33.909420, -117.263420. The Project site sits on Township 3 South, Range 4 West, including Sections 13 and 14 within the Riverside East 7.5-minute quadrangle, as mapped by the U.S. Geological Survey (USGS; Figure 2).

1.2 PROJECT DESCRIPTION

The proposed K4 Warehouse project includes the construction of a 718,000-square-foot warehouse building on the 34.5-acre parcel. Access to the Project is across the Cactus Avenue Channel (discussed further in this report) that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the project frontage, and further to the east ending at the Heacock Channel at Heacock Street. Additionally, the Riverside County Flood Control District and Water Conservation District are proposing to underground the current drainage ditch in a box culvert, e.g., the Cactus Channel improvements. The culvert would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width total). The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District, and it would function as part of the District's Master Plan. If the channel improvements are not complete prior to warehouse development, the K4 Warehouse development will be constructed with two access driveways that cross the Cactus Avenue Channel.

1.3 REGULATORY BACKGROUND

Several regulations have been established by federal, state, and local agencies to protect and conserve aquatic resources. The descriptions below provide a brief overview of agency regulations that may be applicable to the project. Regulatory agencies make the final determination of whether a project requires authorization pursuant to these regulations.

1.3.1 APPLICABLE AQUATIC RESOURCE PROTECTION REGULATIONS

Clean Water Act

Pursuant to Section 404 of the Clean Water Act (33 USC § 1251 et seq.; CWA), the Corps is authorized to regulate any activity that would result in the discharge of dredged or fill material into waters of the U.S. (including wetlands), which include those waters listed in 33 Code of Federal Regulations (CFR) 328.3 (as amended at 80 Federal Register (FR) 37104, June 29, 2015). The Corps, with oversight from the U.S. Environmental Protection Agency (USEPA), has the principal authority to issue CWA Section 404 permits. The Corps would require a Standard Individual Permit (SIP) for more than minimal impacts to waters of the U.S. as determined by the Corps. Projects with minimal individual and cumulative adverse effects on the environment may meet the conditions of an existing Nationwide Permit (NWP).

A water quality certification or waiver pursuant to Section 401 of the CWA is required for all Section 404 permitted actions. The RWQCB, a division of the State Water Resources Control Board, provides oversight of the 401-certification process in California. The RWQCB is required to provide "certification that there is reasonable assurance that an activity that may result in the discharge to waters of the United States will not violate water quality standards." Water Quality Certification must be based on the finding that proposed discharge will comply with applicable water quality standards.

The National Pollutant Discharge Elimination System (NPDES) is the permitting program for discharge of pollutants into surface waters of the U.S. under Section 402 of the CWA.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Water Code § 13000 et seq.) provides for statewide coordination of water quality regulations. The State Water Resources Control Board was established as the statewide authority and nine separate RWQCBs were developed to oversee water quality on a day-to-day basis. The RWQCB is the primary agency responsible for protecting water quality in California. As discussed above, the RWQCB regulates discharges to surface waters under the federal CWA. In addition, the RWQCB is responsible for administering the California Porter-Cologne Water Quality Control Act.

Pursuant to the Porter-Cologne Water Quality Control Act, the state is given authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. As such, any person proposing to discharge waste into a water body that could affect its water quality must first file a Report of Waste Discharge if Section 404 is not required for the activity. "Waste" is partially defined as any waste substance associated with human habitation, including fill material discharged into water bodies.

California Fish and Game Code Section 1600-1602

Pursuant to Division 2, Chapter 6, Section 1602 of the California Fish and Game Code (CFGC), CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream or lake that supports fish or wildlife. A Notification of Lake or Streambed Alteration must be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." CDFW has jurisdiction over riparian habitats associated with watercourses. Jurisdictional waters are delineated by the outer edge of riparian vegetation (i.e., drip line) or at the top of the bank of streams or lakes, whichever is wider. CDFW jurisdiction does not include tidal areas or isolated resources. CDFW reviews the proposed actions and, if necessary, submits (to the applicant) a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and applicant is the Lake or Streambed Alteration Agreement.

1.4 CONTACT INFORMATION

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Agency access to the project site can be coordinated with the applicant and/or agent upon request.

2 METHODS

Prior to the on-site delineation, field maps were created using a Geographic Information System (GIS) and a color aerial photograph at a 1:100 scale. RBC staff also reviewed U.S. Geological Survey (USGS) National Hydrography Dataset (NHD) and topography data (Figure 2) and U.S.

Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) soils map data and U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data (Figure 4) to further determine the potential locations of jurisdictional aquatic resources. Google Earth, NetrOnline Historic Aerials, and University of California-Santa Barbara database was also utilized to assess historic presence or absence of flow in the project area.

Shanti Santulli, Lee Ripma, and Emily Trevino of Rocks Biological Consulting (RBC) conducted the jurisdictional delineation field visit on July 17, 2018. Areas with depressions, drainage patterns, and/or wetland vegetation within the project impact area were evaluated for potential jurisdictional status, with focus on the presence of defined channels and/or wetland vegetation, soils and hydrology. Field staff examined potential jurisdictional wetland areas using the methods set forth in the Corps 1987 *Wetland Delineation Manual* (Wetland Manual) (Environmental Laboratory 1987) and the 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region Version 2.0* (Arid West Supplement) (Corps 2008a). Wetland plant indicator status was determined using the *National Wetland Plant List* (NWPL; Corps 2016) and hydric soils indicators on *Field Indicators of Hydric Soils in the United States, Version 8.1* (NRCS 2017). Soil chromas were identified in the field according to *Munsell's Soil Color Charts* (Kollmorgen 2000).

Lateral limits of potential non-wetland waters of the U.S./State for the Corps and RWQCB were identified using field indicators of an ordinary high-water mark (OHWM) as described in *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (Corps 2008b). For each feature exhibiting the potential presence of an OHMW, RBC completed a 2010 Arid West Ephemeral and Intermittent Streams OHWM Datasheet (OHWM Datasheet) following the guidance provided in the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Corps 2010).

CDFW potential jurisdictional boundaries were determined based on the presence of riparian habitat and/or streambed. Streambeds considered within CDFW jurisdiction were delineated based on the definition of streambed as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supporting fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports riparian vegetation" (Title 14, Section 1.72). Riparian habitat refers to vegetation and habitat associated with a stream. The CDFW jurisdictional habitat includes all riparian shrub or tree canopy that may extend beyond the banks of a stream.

While in the field, potentially jurisdictional features were recorded using a hand-held Global Positioning System (GPS) unit with a level of accuracy ranging from four to 12 feet. RBC staff refined the data using aerial photographs and topo maps with two-foot contours to ensure accuracy. Off-site portions of drainages were visited to confirm the presence of the indicators above, if appropriate, and general flow path. Plants were identified according to The Jepson Manual 2nd edition (Baldwin et al. 2012). Vegetation community classifications follow Holland (1986) and nomenclature follows Jepson eFlora (2018).

All figures generated for this jurisdictional delineation report follow the Corps' Updated Map and Drawing Standards for the South Pacific Division Regulatory Program (Corps, 2016).

3 RESULTS

3.1 TOPOGRAPHY

The site is primarily flat with elevations around 1,550 feet. The only shift in topography observed on site occurred within a west-east trending drainage that runs parallel to Cactus Avenue from just east of Elsworth Street to Heacock Steet (Cactus Avenue Channel, discussed further below; Figure 5).

3.2 WATERSHED

The proposed project area is within the San Jacinto Hydrologic Unit Code [HUC] 8 (18070202), Lower San Jacinto River Hydrologic Unit Code [HUC] 10 (1807020203), Perris Reservoir Hydrologic Unit Code [HUC] 12 (180702020305) (Figure 2).

3.3 HYDROLOGY

USGS NHD maps a "blue-line stream" along the northern boundary of the project area, which flows south along Heacock Street into the Perris Valley storm drain system (Figure 2). USFWS NWI also map Riverine designations within the projects northern boundary, draining east until diverting south along Heacock Street (Figure 4).

Known hydrologic sources for the observed on-site drainages, discussed further below, are several culverted storm-drain outlets (which collect and convey runoff from the commercial area north of the channel), sheet flows from the adjacent March Air Force Base, and direct precipitation. Flows generally drain from west to east until the intersection of Cactus Avenue and Heacock Street, where flows are diverted south into a drainage ditch along Heacock Street which drains into the Perris Valley storm drain system. Flows continue into the San Jacinto River and ultimately into Lake Elsinore.

Table 1 describes the estimated monthly total and average precipitation for the project area between 2007 and 2018 to provide the pertinent pre-site visit precipitation data. RBC staff accessed precipitation data through the NRCS Agricultural Applied Climate Information System (AgACIS) database from the March AFB station in Riverside County on July 17, 2018.

Table 1. Precipitation Data

Monthly Total Precipitation (inches) for March AFB, CA (NOAA)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2007	M	M	M	M	M	M	M	M	M	M	M	M	M
2008	M	M	M	M	M	M	M	M	M	M	M	M	M
2009	M	M	M	M	M	M	M	T	0.42	T	0.07	1.43	M
2010	5.78	1.95	0.16	0.39	0.02	0	T	T	0.06	0.61	0.53	7.7	17.2
2011	0.33	2.6	1.51	0.37	0.26	0	0.19	0.01	0.03	0.15	1.29	0.34	7.08
2012	0.31	0.46	0.95	0.79	0.01	0	0.07	2.32	0.1	0.03	0.26	1.99	7.29
2013	0.57	0.78	0.72	T	0.28	0	0.02	0.4	T	0.43	0.46	0.36	4.02
2014	T	1.19	0.68	0.49	0	0	T	0.57	0.05	T	0.18	2.91	6.07
2015	0.6	0.33	0.13	0.14	0.61	T	1.39	T	0.45	0.31	0.05	0.3	4.31
2016	2.24	0.12	0.56	0.96	0.28	T	T	0	0.06	0.32	0.7	3.11	8.35
2017	3.78	1.91	0.01	T	0.02	T	0.01	0.59	T	T	T	T	6.32
2018	1.44	0.23	M	T	0.08	0	T	M	M	M	M	M	M
Mean	**1.67**	**1.06**	**0.59**	**0.35**	**0.17**	**T**	**0.19**	**0.43**	**0.13**	**0.21**	**0.39**	**2.02**	**7.58**

*Per AgACIS database: "Monthly summarized data - means, sums, daily extremes or frequencies for the selected variable for each month of the year for the selected range of years. HDD, CDD and GDD are heating, cooling and growing degree days, respectively. Note: trace precipitation/snowfall/snow depth amounts are treated as zero in sums, means, and frequency counts. Annual average temperatures are the average of the twelve-monthly values. Values of 'M' indicate missing data and 'T' indicates a trace."

Table 1 indicates that the field survey date of July 17, 2018 occurred during below-average historic precipitation (trace precipitation treated as 0.0 inches) for the month of July, which averaged 0.19 inches between 2010-2018. The 2017 average precipitation of 6.32 inches was 1.26 inches below the average annual precipitation of 7.58 inches from 2010-2017.

3.4 SOILS

Based on the NRCS map of the project area (Figure 4), the following soil occurs within the project site boundary and is described below per the USDA's Official Soil Series Description and Series Classification database:

Monserate sandy loam, 0 to 5 percent slopes

The Monserate series consist of well to well drained and moderately slow permeable soils. These soils are found primarily on nearly level to moderately steep terraces and fans in southern California and are primarily used for growing grain or pasture. The NRCS does not list this soil as hydric.

Greenfield sandy loam, 0 to 2 percent slopes

The Greenfield series consist of well drained soils moderately permeable soils. These soils form in moderately coarse and coarse textured alluvium, found on alluvial fans and terraces, and are primarily used for the production of irrigated field, forage and fruit crops. The NRCS does not list this soil as hydric.

3.5 FEATURES OBSERVED

A west-east, earthen-lined and vegetated drainage ditch, hearby referred to as the Cactus Avenue Channel, runs parallel to Cactus Avenue from just east of Elsworth Street to Heacock Street and was the only observed aquatic resource within the project area.

RBC investigated ten wetland delineation sampling points within the Cactus Avenue Channel in the survey area boundaries to determine the presence or absence of federally jurisdictional wetlands within the channel (Figure 5; Appendix B). RBC also completed two Arid West Ephemeral and Intermittent Streams OHWM Datasheets (OHWM Datasheets) in the project survey boundary (Figure 5; Appendix B). The descriptions provided below detail the existing characteristics of each feature determined in the field. Appendix C provides site photographs of the features, and Figure 7 displays representative photo points also discussed below.

Cactus Avenue Channel

The Cactus Avenue Channel receives flows from several culverts along Cactus Avenue, as noted on Figure 5. The feature originates on the project survey area from a culvert along Cactus Avenue, east of the intersection of Elsworth Street and flows east approximately 1.5-miles until being diverted south into a drainage ditch along Heacock Street. RBC staff observed both wetland and non-wetland features within the Cactus Avenue Channel, as further described below.

Wetland Sample Point (WSP) 1 was taken adjacent to the initial, westernmost culvert outlet along the channel. WSP 1 was dominated by *Potamogeton sp.* (OBL) and contained standing water at the time of the jurisdictional delineation; as such, WSP 1 met the parameters for hydrophytic vegetation and wetland hydrology based on field observation of the applicable indicators for both (Appendix B, WSP 1). Additionally, RBC assumed the presence of hydric soils at WSP 1 per the 1987 Wetland Manual, which states that hydric soils can be assumed present if the sample point is located “within a plant community type where all dominant species have an indicator status of OBL” (Environmental Laboratory 1987). WSP 1 showed standing water/ponding within a well-defined, depressional area by a culvert outlet as well as the presence of a dominant OBL plant species (*Potamogeton sp.*). As such, WSP 1 met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters. WSP 2, taken approximately 25 feet downstream of WSP 1, did not meet parameters for wetland hydrology, hydric soils, or hydrophytic vegetation (Appendix B, WSP 2). Vegetation observed at WSP 2 included common brome (*Bromus madritensis ssp. rubens*; UPL) and bermuda grass (*Cynodon dactylon*; FACU). A small disturbed (i.e., mowed), 4-foot wide drainage/streambed was observed between WSP 1 and WSP 3 (Appendix C, Photo 4).

WSP 3, taken within a large section of the channel that had been recently mowed, met the parameters for hydrophytic vegetation, wetland hydrology, and hydric soils (Appendix B, WSP 3). Hydrophytic vegetation at WSP 3 included common knotgrass (*Paspalum distichum*; FACW) and mayweed (*Anthemis cotula*; FACU). The wetland boundary observed was approximately 20 feet wide with a bed and bank (including the delineated wetland area) of approximatedly 25 feet wide at this portion of the channel. WSP 4, taken in the adjacent uplands of WSP 3 to help determine the wetland boundary, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators (Appendix B, WSP 4). Downstream of WSP 3/4, RBC staff observed an approximate 800-foot long stretch of the channel containing cattail (*Typha latifolia*; OBL), tall flat sedge (*Cyperus* eragrostis; FACW), and visible standing water. A large, 35-foot wide culvert at the intersection of Cactus Avenue and Veterans Way appeared to be the primary hydrologic input into this area, causing standing water/saturation both upstream and downstream of the culvert (Appendix C, Photo 12).

WSP 5 was taken approximately 230 feet downstream from the end of the standing water observed downstream of the Cactus Avenue and Veterans Way culvert, where the bed of the channel narrows to approximately 10 feet wide with 20-foot wide banks; WSP 5 met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters (Appendix B, WSP 5). The hydrophytic vegetation observed within the sample point included tall flat sedge (FACW); prominent redox features were also observed (Appendix C, Photo 16). WSP 6, taken in the adjacent uplands, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soil indicators (Appendix B, WSP 6). The feature continues downstream towards the intersection of Cactus Avenue and Riverside Drive. WSP 7, taken near a culvert outlet at the Riverside Drive intersection, met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters (Appendix B, WSP 7). Hydrophytic vegetation observed at WSP 7 included tall flat sedge (FACW), prostrate amaranth (*Amaranthus blitoides*; FACU), dallis grass (*Paspalum dilatatum*; FAC), and curly dock (*Rumex crispus*; FAC). WSP 8, taken in the adjacent uplands of WSP 7, and WSP 9, taken downstream from the tall flat sedge-dominated area, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators (Appendix B, WSP 8 and WSP 9).

Although wetland parameters were not present at WSP 9, RBC staff observed a 15-foot wide OHWM within 20-foot wide banks just west of the Riverside Drive and Cactus Avenue intersection within the channel based on the presence of a break in slope, change in sediment texture, and change in vegetation species (Figure 5; Appendix B, OHWM 1). The ephemeral feature flows east and narrows from a ten- to five-foot wide OHWM within 15- to ten-foot wide banks before reaching the intersection of Cactus Avenue and Heacock Street (Figure 5; Appendix B, OHWM 2). WSP 10, taken within the channel, adjacent to a small cluster of young Fremont's cottonwood (*Populus fremontii*; NL), met the wetland hydrology parameter; however, the sample point did not show evidence of hydrophytic vegetation or hydric soils (Appendix B, WSP 10).

Ponding Area

RBC field staff observed a small area of potential ponding with some minor soil cracking along the eastern boundary of the K4 Warehouse portion of the project site, approximately 400 feet south of the Cactus Avenue Channel, at the end of a driveway. The area appeared to be a road rut/puddle in a disturbed asphalt and otherwise bare ground area. During the time of the jurisdictional delineation site visit, the area was dry, unvegetated, and lacked any indicators of an OHWM. An RBC biologist conducted an additional field survey on October 4, 2018 and noted ponding in the area. As such, protocol fairy shrimp surveys are underway to determine the presence/absence of the federally endangered Riverside fairy shrimp (*Streptocephalus wootton)* given the moderate potential for this species to occur on site. RBC staff did not dig a soil pit to check for hydric soil indicators in case the area may be inhabited by Riverside fairy shrimp.

3.6 JURISDICTIONAL RESOURCES AND ANALYSES

A majority of the Cactus Avenue Channel within the survey area met all three parameters per the Arid West Supplement and would therefore be considered potentially jurisdictional wetlands per the Corps and RWQCB. These wetland areas were disturbed by regular mowing of the channel. As such, the presence or absence of wetland boundaries was largely defined by observation of hydric soil indicators (i.e., presence and prominence/abundance of redox features. These wetland areas occur within the bed and banks of potentially jurisdictional CDFW streambed, as shown on Figure 5.

RBC determined the presence of an OHWM and bed and bank, without wetland, throughout the channel from just west of Riverside Drive to Heacock Street and considers this area potential non-wetland, ephemeral waters of the U.S./State jurisdictional by the Corps and RWQCB and ephemeral streambed jurisdictional by the CDFW. Furthermore, there were some areas with small patches of riparian vegetation (i.e., sandbar willow [*Salix exigua*], Fremont's cottonwood, and Goodding's Black Willow [*Salix gooddingii*]) that occur along the streambed and would be considered potentially jurisdictional CDFW riparian habitat; these riparian areas did not meet the federal wetland parameters. The trapezoidal nature of the channel and associated wide banks account for the increase in CDFW estimated jurisdiction, which extends beyond the delineated Corps/RWQCB/CDFW wetland and non-wetland areas in most areas within the channel.

The small ponding area noted in Section 3.5 was not considered potentially jurisdictional as it lacked indicators of an OHWM and would not meet the three required parameters of federally jurisdictional wetland absent vegetation (Picture 36) even if hydric soils were assumed for the area.

Tables 2 and 3 provide approximate acreages of potential jurisdictional resources, per applicable regulatory agency, delineated within the project survey area and related information. Table 4 provides vegetation community acreages within the project area (Figure 6). Please note, some areas that met federal wetland parameters are mapped as non-native grassland on Figure

6 given the presence of non-native grassland species (many of which had a FAC or higher indicator status).

Table 2. Potential Jurisdictional Resources within the Project Area: Corps and RWQCB

Feature Name	Acreage	Linear Feet	Cowardin Code	Presence of OHWM	Wetland Presence	Dominant Vegetation	Location (lat/long)
Cactus Avenue Channel Wetland	1.39	4790	PEM	No	Yes	Freshwater marsh	33.909944442, -117.2615647
Cactus Avenue Channel Non-Wetland	0.42	2876	R6	Yes	No	Unvegetated; Non-native grassland	33.909960615, -117.2509659
Total	1.81	7666					

Table 3. Potential Jurisdictional Resources within the Project Area: CDFW

Feature Name	Acreage	Linear Feet	Cowardin Code	Presence of OHWM	Wetland Presence	Dominant Vegetation	Location (lat/long)
Cactus Avenue Channel Wetland	1.39	4790	PEM	No	Yes	Freshwater marsh	33.909944442, -117.2615647
Cactus Avenue Channel Non-Wetland	1.60	2876	R6	Yes	No	Unvegetated; Non-native grassland	33.909960615, -117.2509659
Total	2.99	7666					

Table 4. Vegetation Communities within Project Survey Area

Vegetation Community	Project Site (acres)
Golden Bush Scrub/Non-native Grassland Disturbed	22.16
Developed/Disturbed	11.01
Non-native Grassland	8.66
Freshwater Marsh	0.41
Ornamental	0.05
Southern Willow Scrub	0.04

Fremont's Cottonwood	0.02
Total	42.35

3.7 PROPOSED JURISDICTIONAL IMPACTS

The project consists of both the construction of the K4 Warehouse and construction of a box culvert along the Cactus Avenue Channel. The proposed project with both project components would permanently impact approximately 1.81 acres (7666 linear feet) of potential Corps and RWQCB disturbed waters of the U.S./State (wetland and non-wetland), of which, 0.06 acre (131 linear feet) of impacts are associated with the K4 Warehouse site and 1.76 acres (7535 linear feet) are associated with the Cactus Avenue Channel culvert project.

The proposed project with both project components would impact approximately 2.99 acres (7666 linear feet) of potentially jurisdictional CDFW streambed (wetland and non-wetland) and/or associated riparian habitat, of which, 0.08 acre (131 linear feet) are associated with the K4 Warehouse and 2.9 acre (7535 linear feet) are associated with the culvert along the Cactus Avenue Channel.

4 CONCLUSION

The K4 Warehouse and Cactus Channel Improvements Project area supports a drainage ditch, Cactus Avenue Channel, containing disturbed wetland and non-wetland aquatic resources potentially jurisdictional by the Corps, RWQCB, and CDFW as shown in Tables 2 and 3.

Assuming concurrence with the provided jurisdictional delineation and estimated impact calculations, both portions of the proposed project, the K4 Warehouse and Cactus Avenue Channel culvert, would each require Section 404 authorization from the Corps, a Section 401 water quality certification from the RWQCB, and a Streambed Alteration Agreement from CDFW. The K4 Warehouse project alone could meet the required acreage threshold for authorization under the Corps' streamlined Nationwide Permit (NWP) process, while RBC expects the Corps to evaluate the Cactus Avenue Channel culvert project under a Standard Individual Permit (SIP) which will require an analysis of alternatives pursuant to the Section 404(b)(1) Guidelines. Additionally, the Corps, RWQCB, and/or CDFW may require a functional assessment (e.g., California Rapid Assessment Method [CRAM]) to quantitatively estimate the stream/wetland condition for the evaluation of the proposed project.

Please note that the applicable agencies will make final jurisdictional determinations. RBC recommends early coordination with the resource agencies to determine the final jurisdictional boundaries, applicable permitting processes, compensatory mitigation requirements, and other potential permitting issues specific to the proposed project. Agency representatives may request access to the site to field-verify the results of this jurisdictional delineation report with the project applicant, or a designated representative.

The information provided in this report should remain valid for up to five years from the date of the field effort for the jurisdictional delineation unless site conditions change substantially, or a regulatory agency requires an updated report.

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FIGURE 1

Project Location

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 1,000 2,000 FEET

N

Source: Google; National Geographic Society

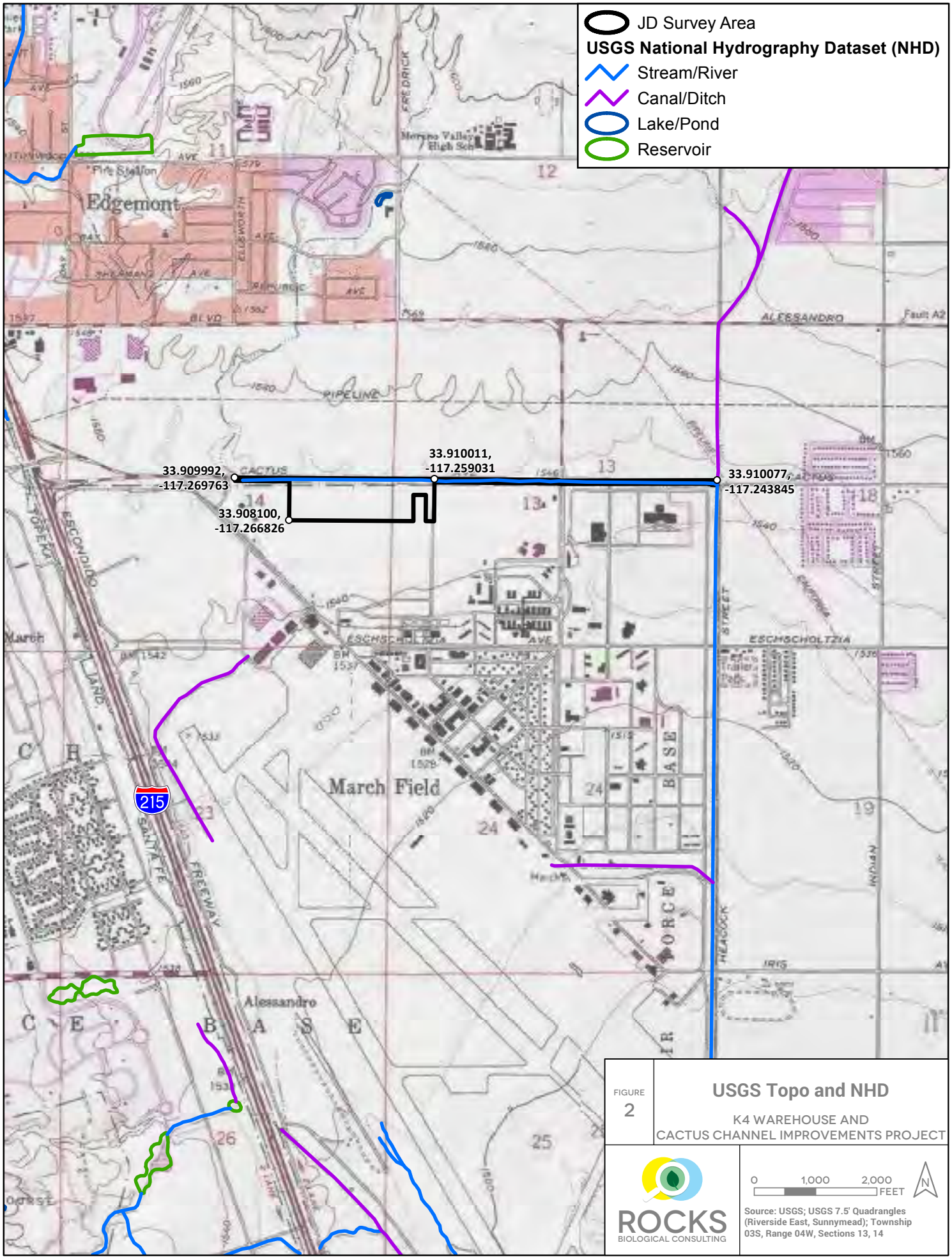


FIGURE 2

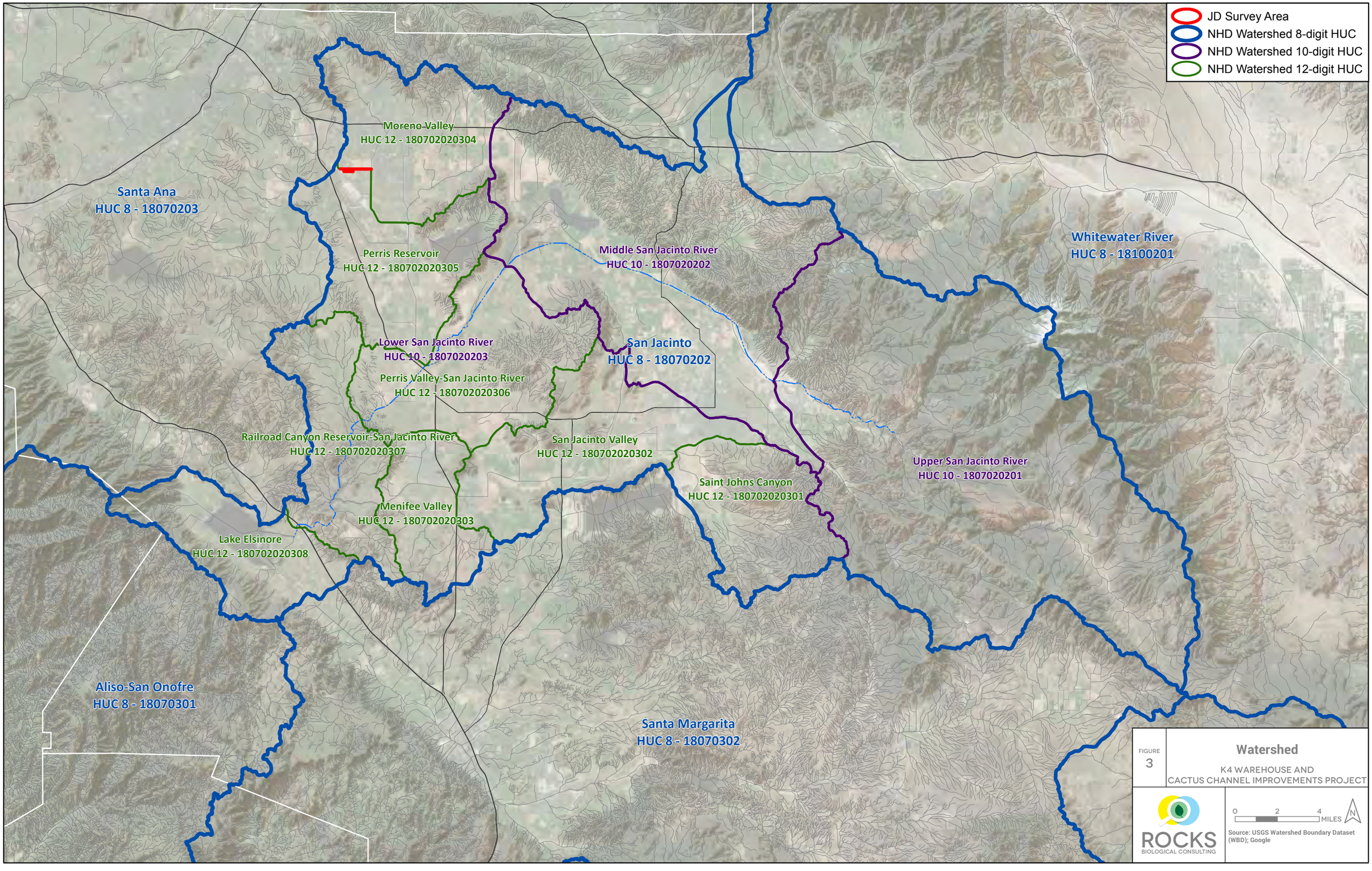
USGS Topo and NHD

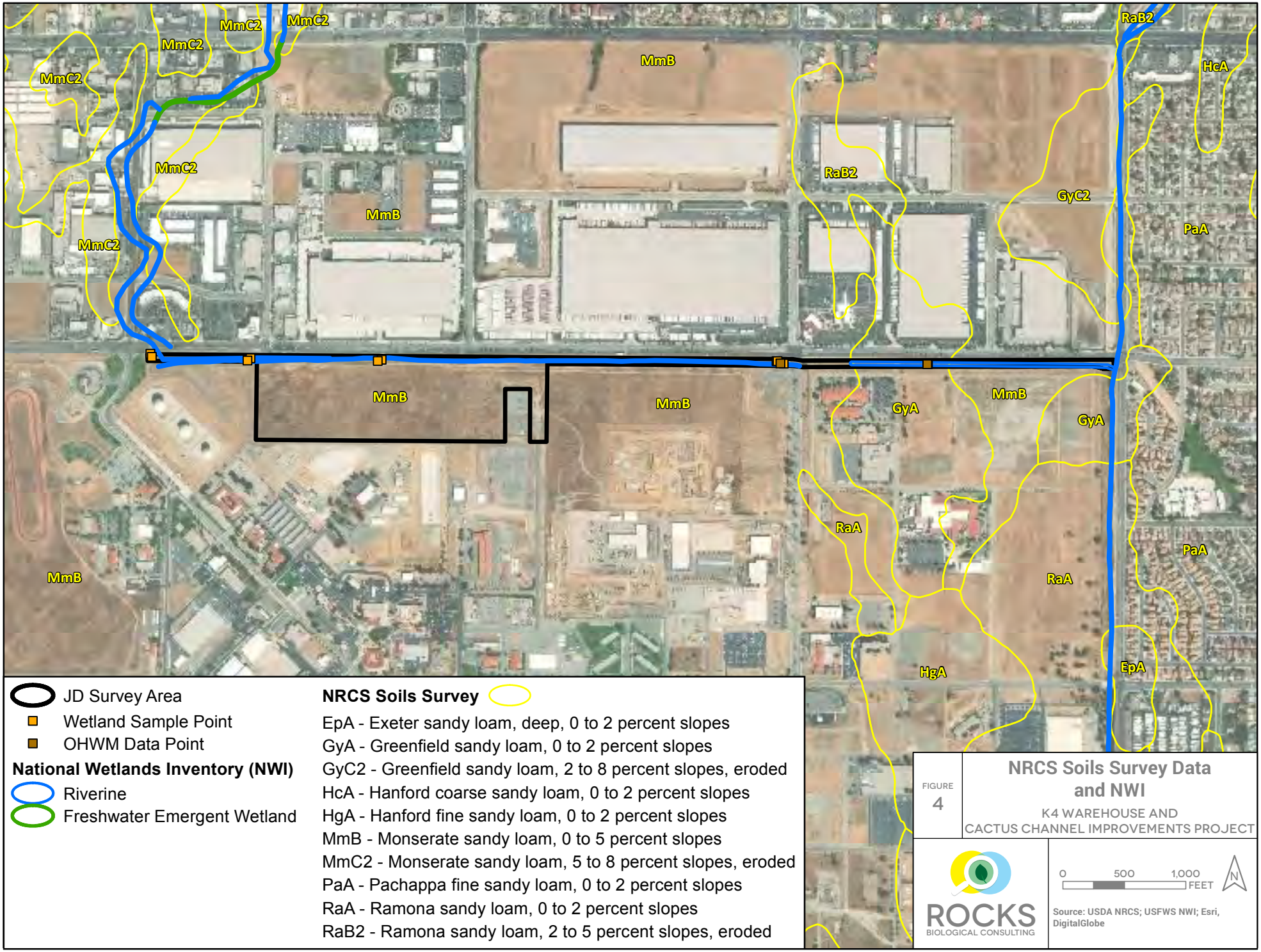
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 1,000 2,000 FEET

Source: USGS; USGS 7.5' Quadrangles (Riverside East, Sunnymead); Township 03S, Range 04W, Sections 13, 14


JD Survey Area
NHD Watershed 8-digit HUC
NHD Watershed 10-digit HUC
NHD Watershed 12-digit HUC
Moreno Valley
HUC 12 - 180702020304
Santa Ana
HUC 8 - 18070203
Perris Reservoir
HUC 12 - 180702020305
Middle San Jacinto River
HUC 10 - 1807020202
Whitewater River
HUC 8 - 18100201
Lower San Jacinto River
HUC 10 - 1807020203
San Jacinto
HUC 8 - 18070202
Perris Valley-San Jacinto River
HUC 12 - 180702020306
Railroad Canyon Reservoir-San Jacinto River
HUC 12 - 180702020307
San Jacinto Valley
HUC 12 - 180702020302
Upper San Jacinto River
HUC 10 - 1807020201
Saint Johns Canyon
HUC 12 - 180702020301
Menifee Valley
HUC 12 - 180702020303
Lake Elsinore
HUC 12 - 180702020308
Aliso-San Onofre
HUC 8 - 18070301
Santa Margarita
HUC 8 - 18070302
FIGURE
3
Watershed
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS
BIOLOGICAL CONSULTING
0
2
4
MILES
N
Source: USGS Watershed Boundary Dataset (WBD); Google


MmC2
MmC2
MmC2
MmC2
MmC2
MmC2
MmB
MmB
MmB
MmB
MmB
RaB2
RaB2
HcA
GyC2
PaA
GyA
GyA
MmB
RaA
RaA
PaA
HgA
EpA
JD Survey Area
Wetland Sample Point
OHWM Data Point
National Wetlands Inventory (NWI)
Riverine
Freshwater Emergent Wetland
NRCS Soils Survey
EpA - Exeter sandy loam, deep, 0 to 2 percent slopes
GyA - Greenfield sandy loam, 0 to 2 percent slopes
GyC2 - Greenfield sandy loam, 2 to 8 percent slopes, eroded
HcA - Hanford coarse sandy loam, 0 to 2 percent slopes
HgA - Hanford fine sandy loam, 0 to 2 percent slopes
MmB - Monserate sandy loam, 0 to 5 percent slopes
MmC2 - Monserate sandy loam, 5 to 8 percent slopes, eroded
PaA - Pachappa fine sandy loam, 0 to 2 percent slopes
RaA - Ramona sandy loam, 0 to 2 percent slopes
RaB2 - Ramona sandy loam, 2 to 5 percent slopes, eroded
FIGURE 4
NRCS Soils Survey Data and NWI
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS BIOLOGICAL CONSULTING
0 500 1,000 FEET
N
Source: USDA NRCS; USFWS NWI; Esri, DigitalGlobe

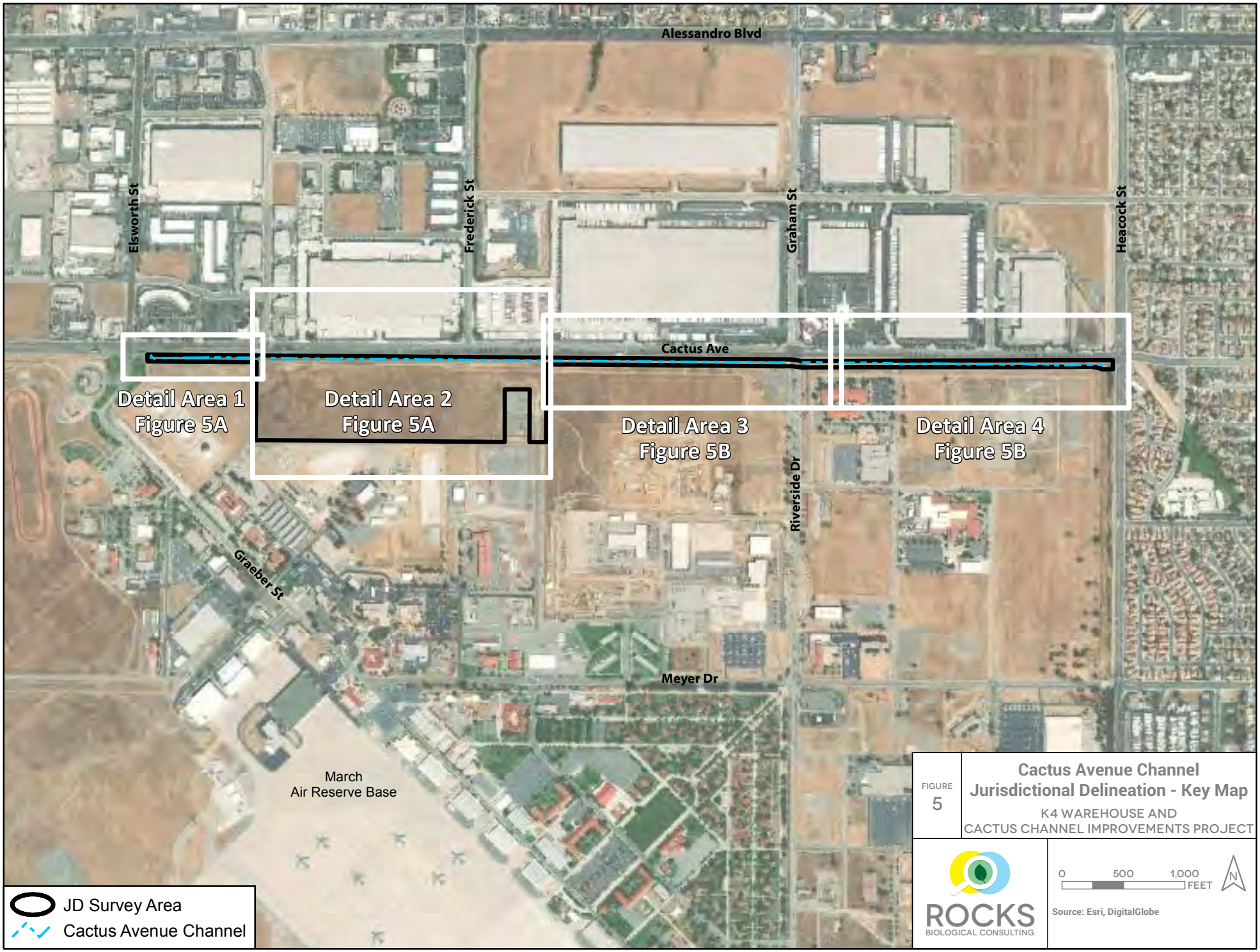


FIGURE 5

Cactus Avenue Channel Jurisdictional Delineation - Key Map

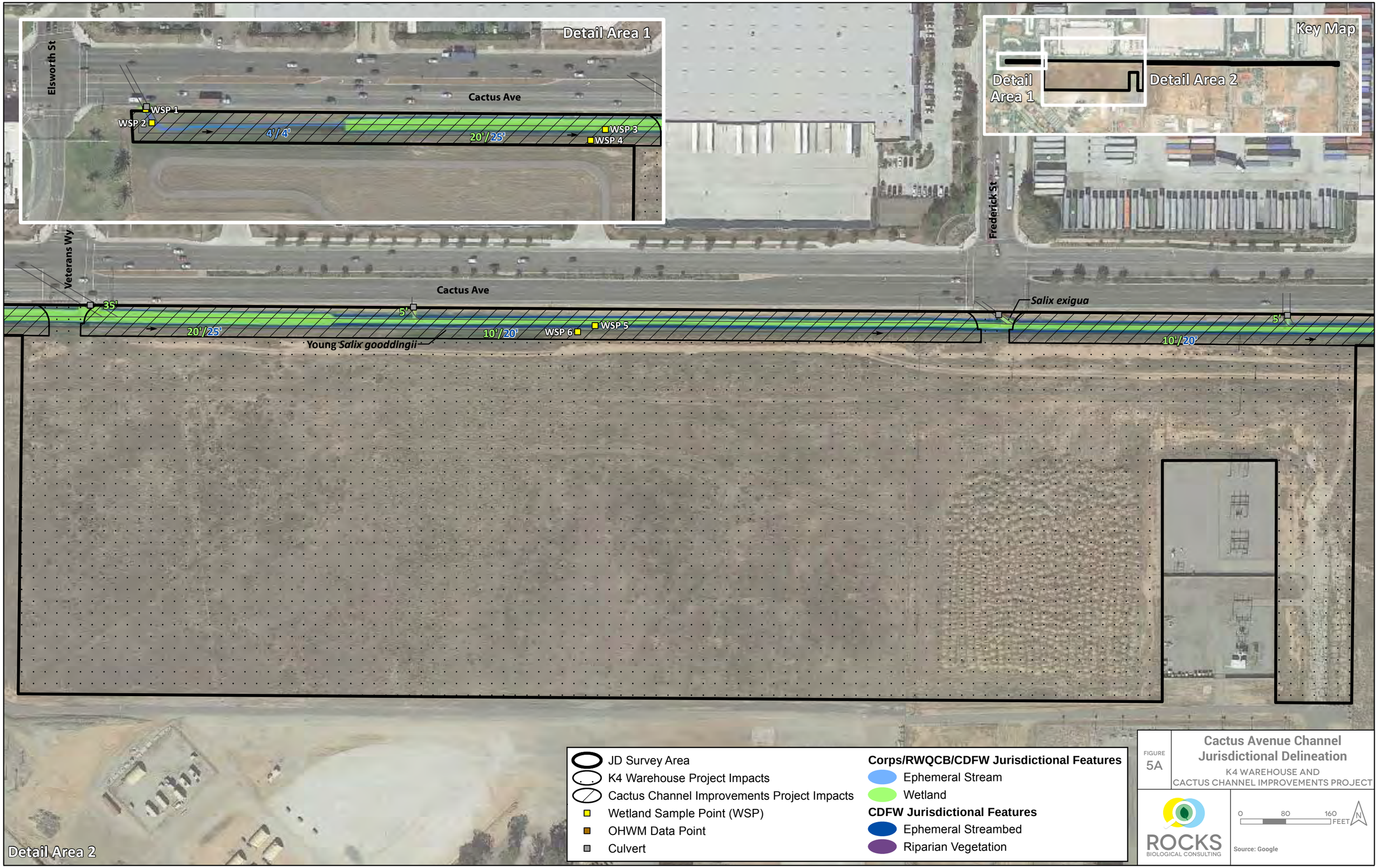
K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe


Detail Area 1
Elsworth St
Cactus Ave
WSP 1
WSP 2
4'/4'
20'/25'
WSP 3
WSP 4
Key Map
Detail Area 1
Detail Area 2
Veterans Wy
Frederick St
Cactus Ave
35'
5'
20'/25'
10'/20'
WSP 6
WSP 5
Young Salix gooddingii
Salix exigua
5'
10'/20'
Detail Area 2
JD Survey Area
K4 Warehouse Project Impacts
Cactus Channel Improvements Project Impacts
Wetland Sample Point (WSP)
OHWM Data Point
Culvert
Corps/RWQCB/CDFW Jurisdictional Features
Ephemeral Stream
Wetland
CDFW Jurisdictional Features
Ephemeral Streambed
Riparian Vegetation
FIGURE
5A
Cactus Avenue Channel
Jurisdictional Delineation
K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT
ROCKS
BIOLOGICAL CONSULTING
0
80
160
FEET
N
Source: Google

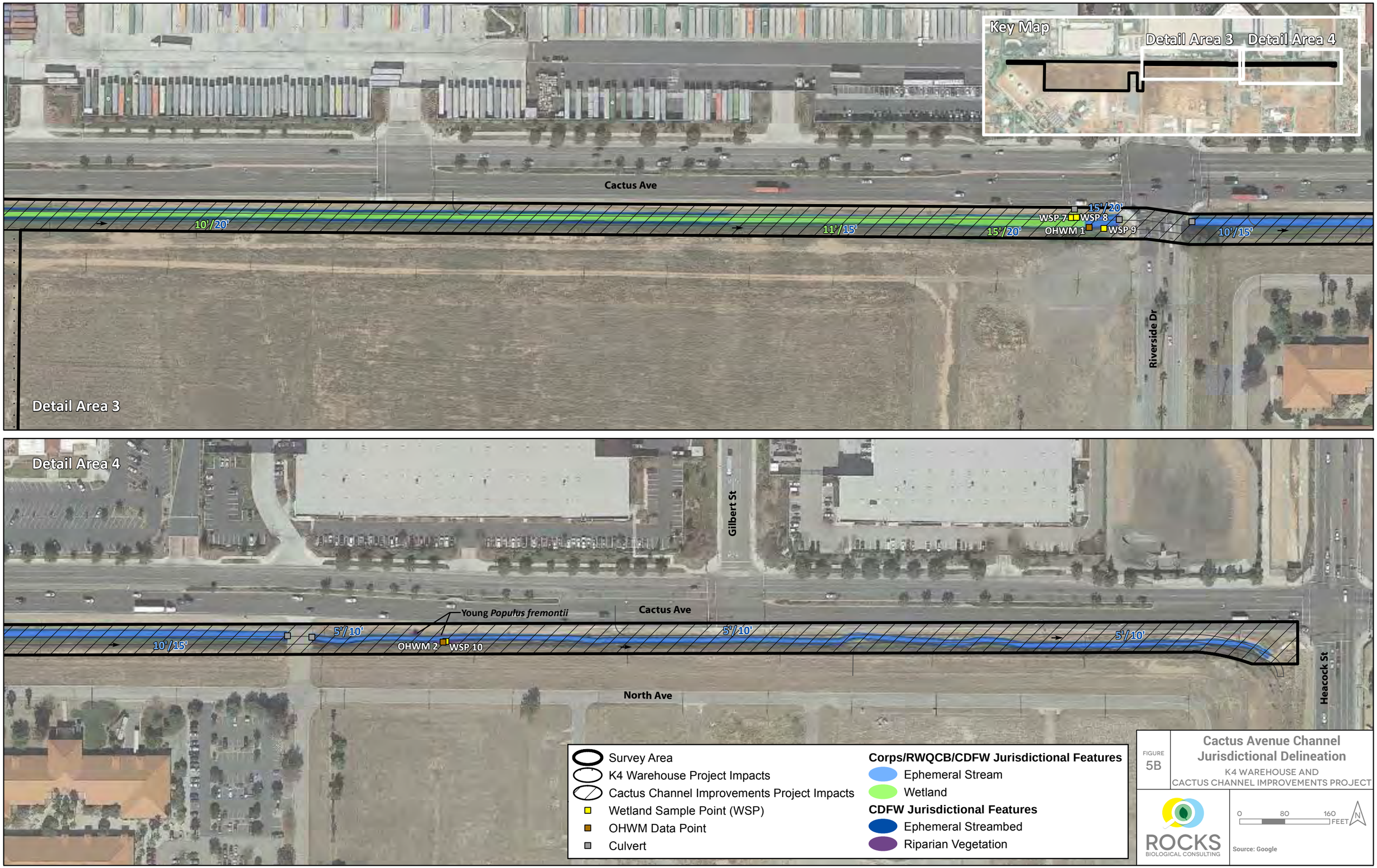


FIGURE 5B

Cactus Avenue Channel Jurisdictional Delineation

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

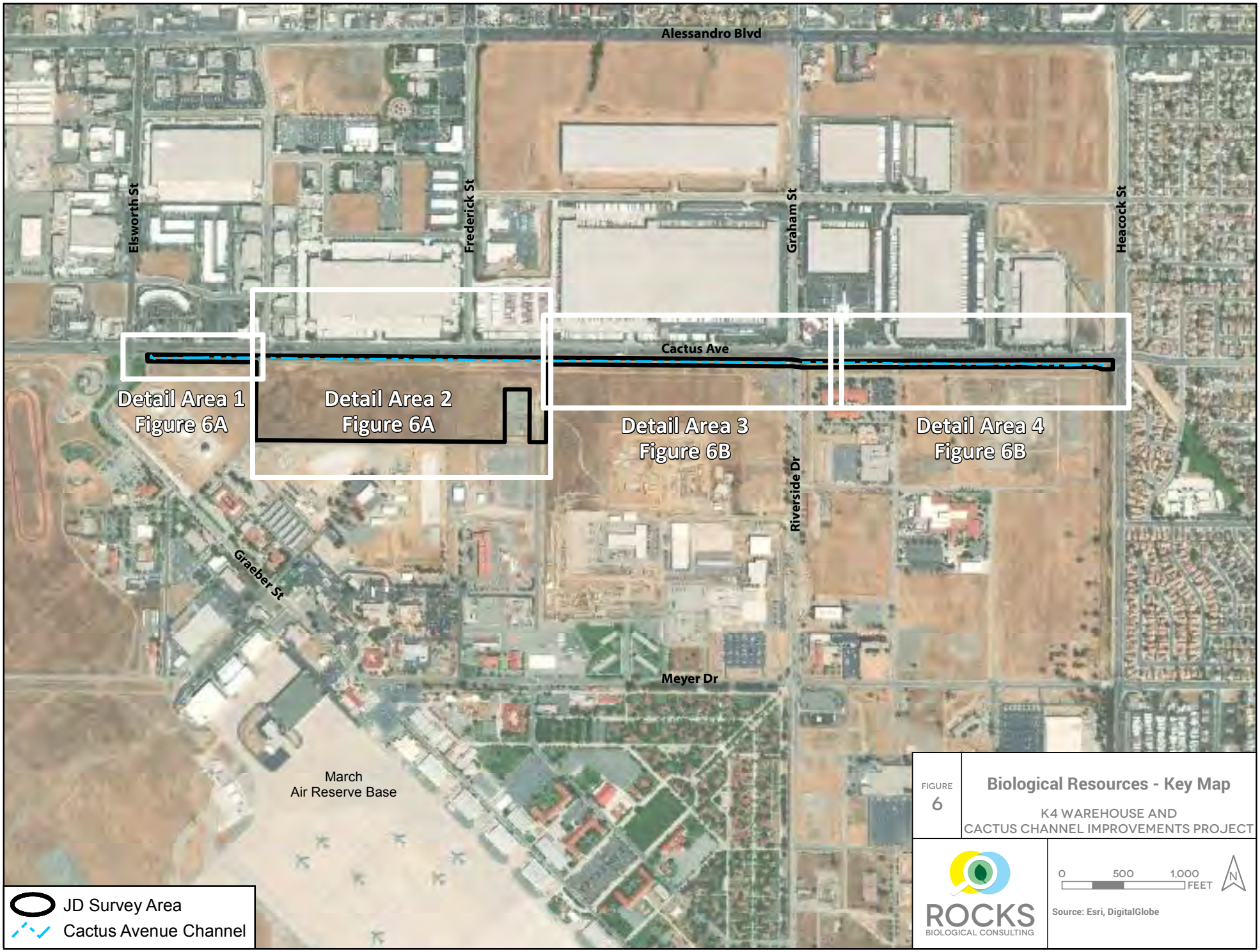


FIGURE 6

Biological Resources - Key Map

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe

Detail Area 1

Elsworth St

FWM

Cactus Ave

D/D

NNG

FWM

GBS/
NNGd

Key Map

Detail
Area 1

Detail Area 2

Veterans Wy

Frederick St

Cactus Ave

D/D

FWM

FWM

NNG

SWS

ORN

NNG

FWM

SWS

NNG

D/D

1

GBS/NNGd

D/D

50

1

20

1

400

10

15

10

3

20

3

Detail Area 2

JD Survey Area

50-foot Buffer

Special Status Species

Black-tailed Jackrabbit (*Lepus californicus*)

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Vegetation

D/D - Developed/Disturbed

FWM - Freshwater Marsh

GBS/NNGd - Golden Bush Scrub/Non-native Grassland Disturbed

NNG - Non-native Grassland

ORN - Ornamental

SWS - Southern Willow Scrub

FIGURE
6A

Biological Resources

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

Key Map

Detail Area 3

Detail Area 4

Cactus Ave

NNG

1

2

3

D/D

ORN

ORN

ORN

NNG

Riverside Dr

Detail Area 3

Detail Area 4

Gilbert St

Cactus Ave

NNG

D/D

5

PF

D/D

NNG

North Ave

Heacock St

JD Survey Area

50-foot Buffer

Special Status Species

Smooth tarplant (*Centromadia pungens* ssp. *laevis*)

Vegetation

D/D - Developed/Disturbed

NNG - Non-native Grassland

ORN - Ornamental

PF - *Populus fremontii*

FIGURE 6B

Biological Resources

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

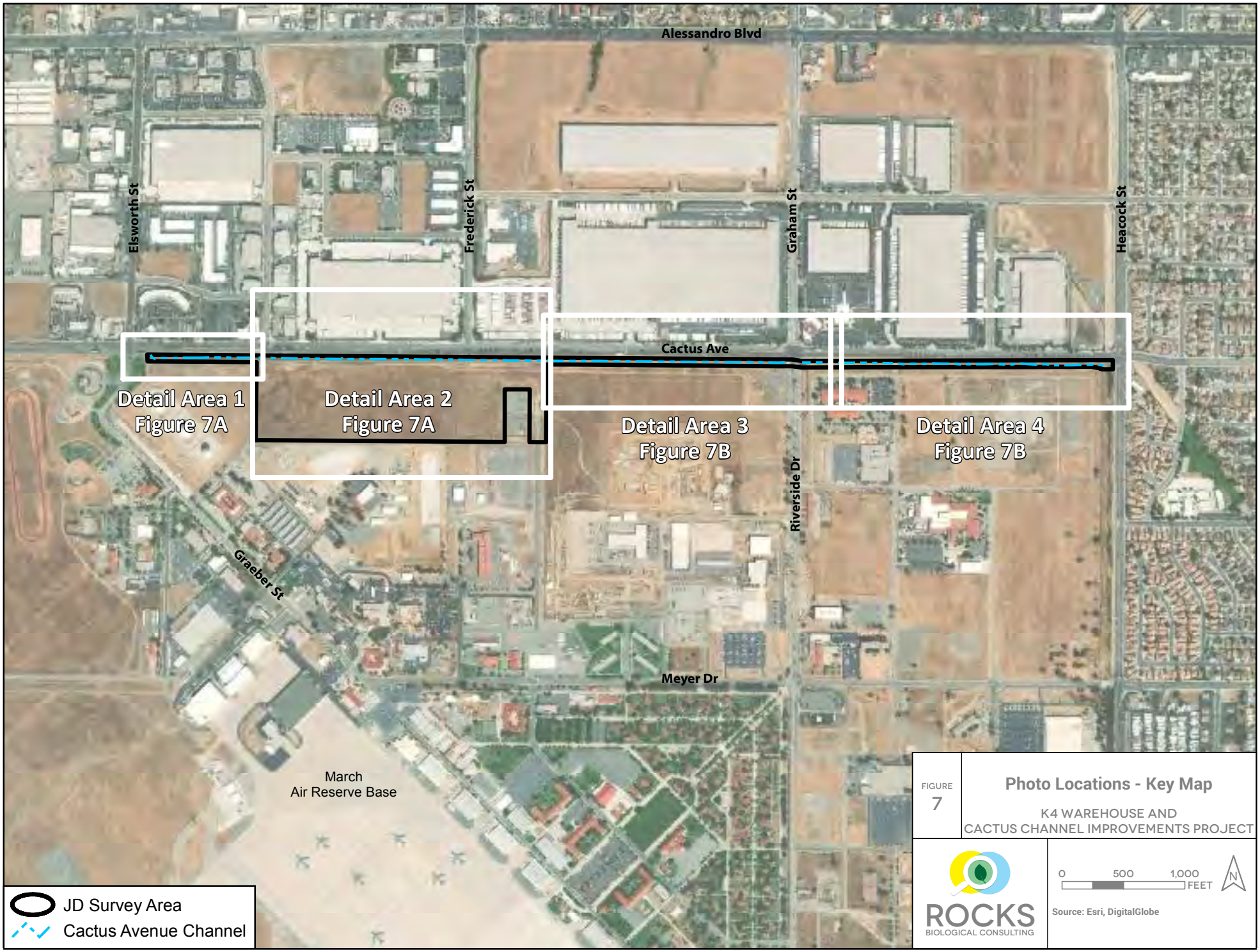


FIGURE 7

Photo Locations - Key Map

K4 WAREHOUSE AND
CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS
BIOLOGICAL CONSULTING

0 500 1,000 FEET

N

Source: Esri, DigitalGlobe

Detail Area 1

Elsworth St

Cactus Ave

4'/4'

20'/25'

Key Map

Detail Area 1

Detail Area 2

Veterans Wy

Cactus Ave

Frederick St

35'

20'/25'

5'

10'/20'

Young *Salix gooddingii*

Salix exigua

5'

10'/20'

36

Detail Area 2

JD Survey Area

Photo Locations

Culvert

Corps/RWQCB/CDFW Jurisdictional Features

Ephemeral Stream

Wetland

CDFW Jurisdictional Features

Ephemeral Streambed

Riparian Vegetation

FIGURE 7A

Photo Locations

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

Key Map

Detail Area 3

Detail Area 4

Cactus Ave

10'/20'

22

11'/15'

23

15'/20'

25
24
27
26
29
28

15'/20'

10'/15'

Riverside Dr

Detail Area 3

Detail Area 4

Gilbert St

Young *Populus fremontii*

Cactus Ave

10'/15'

30

31

5'/10'

34
33
35

32

5'/10'

5'/10'

Heacock St

North Ave

Survey Area

Photo Locations

Culvert

Corps/RWQCB/CDFW Jurisdictional Features

Ephemeral Stream

Wetland

CDFW Jurisdictional Features

Ephemeral Streambed

Riparian Vegetation

FIGURE 7B

Photo Locations

K4 WAREHOUSE AND CACTUS CHANNEL IMPROVEMENTS PROJECT

ROCKS BIOLOGICAL CONSULTING

0 80 160 FEET

N

Source: Google

APPENDIX A

CHECKLIST: MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS, LOS ANGELES DISTRICT REGULATORY DIVISION, CORPS

CHECKLIST: MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS, LOS ANGELES DISTRICT REGULATORY DIVISION, CORPS, MARCH 16, 2017

REPORT SECTION/ PAGE NUMBER	MINIMUM STANDARDS FOR ACCEPTANCE OF AQUATIC RESOURCES DELINEATION REPORTS	ADDITIONAL NOTES
Cover Letter	JD REQUEST AND FORMS: A cover letter indicating whether you are requesting a jurisdictional determination (JD). If you are requesting a JD, you must complete, sign, and return the Request for Corps Jurisdictional Determination (JD) sheet. For preliminary jurisdictional determinations the Preliminary Jurisdictional Determination Form must be signed and submitted.	
Section 1.4	CONTACT INFORMATION: Contact information for the applicant(s), property owner(s), and agent(s).	
N/A	SITE ACCESS: If the property owner or their representatives will not accompany the Corps to the site, a signed statement from the property owner(s) allowing Corps personnel to enter the property and to collect samples during normal business hours. If the property lacks direct access by public roads (in other words, access requires passage through private property not owned by the applicant), the owner or proponent must obtain permission from the adjacent property owner(s) to provide access for Corps personnel.	Property owner and/or representatives will accompany the Corps for a site visit upon request.
Section 1.1	LOCATION: Directions to the survey area, an address (if available) and one or more set of geographic coordinates expressed in decimal degrees.	
Section 2, Paragraphs 2 and 3	DELINEATION MANUAL CONFIRMATION: A statement confirming the delineation has been conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual and applicable regional supplement(s). The regional supplement(s) used must be identified. For OHWM delineations, a statement must be included confirming the use of the OHWM field guide or that it is not applicable.	
Section 3.5	AQUATIC RESOURCE(S) DESCRIPTION: A narrative describing all aquatic resources on-site and an explanation of the mapped boundaries and any complex transition zones. If the site contains resources that only meet one or two of the three wetland criteria or do not exhibit a clear OHWM, describe the rationale for their inclusion or exclusion from the delineation. Also explain if any erosional features, upland swales, ditches and other potential aquatic features were considered but not included in the delineation.	
Figure 5, Tables 2 and 3	AQUATIC RESOURCE MAPPING AND ACREAGE: Map the outside survey boundary, total extent of aquatic and proposed non-aquatic features, type of feature(s) (waters of the United States or wetland), and include the total acreage for each polygon.	
Section 2, Paragraph 2	FIELD WORK DATES: Date(s) field work was completed.	
Tables 2 and 3	AQUATIC RESOURCE TABLE: A table listing all aquatic resources. The table must include the name of each aquatic resource (actual or arbitrary), its Cowardin type, acreage, summary of OHWM/wetland presence, dominant vegetation for each, and location (latitude/longitude in decimal degrees). For linear features, the table must show both acreage and linear feet as well as channel measurements (active channel width).	
Section 1.1 and 2	FIELD CONDITIONS: A description of existing field conditions, including current land use, normal conditions, flood/drought conditions, irrigation practices, past or recent manipulation to the site, and	

	characteristics considered atypical (for criteria see OHWM and wetland supplement guides). Include WETS tables or pre-site visit precipitation data as appropriate: https://www.wcc.nrcs.usda.gov/climate/wets_doc.html.	
Section 3.3	HYDROLOGY: A discussion of the hydrology at the site, including all known surface or subsurface sources, drainage gradients, downstream connections to the nearest traditional navigable waterway or interstate water, and any influence from manmade water sources such as irrigation.	
N/A	REMOTE SENSING: If remote sensing was used in the delineation, provide an explanation of how it was used and include the name, date and source of the tools and data used and copies of the maps/photographs.	
Section 3.4; Figure 4; Appendix C	SOILS: Soil descriptions, soil map(s), soil photos, and a discussion of hydric soils (for wetland delineations only).	
Figure 2	USGS QUADRANGLE: A site location map on a 7.5-minute USGS quadrangle. The map must provide the name of the USGS quadrangle, Section, Township, Range, and the latitude and longitude in decimal degree format.	
N/A	BULK UPLOAD FORM: For sites with 3 or more separate aquatic features a completed copy of the ORM Bulk Upload Aquatic Resources or Consolidated Excel spreadsheet must be submitted.	
Figure 5	FIGURES: Map(s) of all delineated aquatic resources in accordance with the Final Map and Drawing Standards for the South Pacific Division Regulatory Program, available at: http://www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/651327/updated-map-and-drawing-standards/	
Figure 7 and Appendix C	SITE PHOTOGRAPHS: Ground photographs showing representative aquatic resource sites (or lack of), as well as an accompanying map of photo-points and table of photographic information (see Final Map and Drawing Standards for the South Pacific Division Regulatory Program item no. 8 a-c).	
Appendix B	DATA FORMS: Completed data forms including all essential information to make a jurisdictional determination [e.g. 2006 Wetland Determination Data Form -- Arid West Supplement; 2010 Arid West Ephemeral and Intermittent Streams OHWM Datasheet].	
Section 2	METHODS: A description of the methods used to survey the aquatic resource boundaries. If GPS data is used, the level of accuracy must be included. Ideally, the GPS equipment should have the capability of sub-meter (<=1 meter) level horizontal accuracy.	
Appendix E	GIS DATA: Digital data for the site, aquatic resource boundaries, and data point locations must be provided in a geographic information system (GIS) format, preferably either ESRI shapefiles or Geodatabase format, but GoogleEarth KMZ or KML files may be acceptable non-complex projects. Each GIS data file must be accompanied by a metadata file containing the appropriate geographic coordinate system, projection, datum, and labeling description. If GIS data is unavailable or otherwise cannot be produced and the Corps determines a site visit is necessary, the aquatic resource boundaries should be physically marked with numbered flags or stakes to facilitate verification by the Corps.	

APPENDIX B

ARID WEST WETLAND DELINEATION AND EPHEMERAL AND INTERMITTENT ORDINARY HIGH WATER MARK (OHWM) DATASHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 1

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): Concave Slope (%): 0%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.910000236 Long: -117.269678652 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

Taken with Cactus Avenue Channel. Area is adjacent to culvert outlet at Cactus Avenue; contains standing water; vegetation is considered significantly disturbed as area was recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Potamogeton sp.	80	Y	OBL
2. Typha latifolia	10	N	OBL
3. Paspalum dilatatum	3	N	FAC
4. Ludwigia palustris	1	N	OBL
5.			
6.			
7.			
8.			
	94 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Vegetation recently mowed, identified vegetation where possible; Species of Potamogeton unidentifiable, all Potamogeton sp. within AW Indicator Plant List listed as OBL

SOIL

Sampling Point: WSP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
n/a								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

Hydric soils assumed within standing water and with dominance of OBL vegetation (per methodology in 1987 Corps Wetland Delineation Manual, p. 58).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✔ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No ___ Depth (inches): At surface

Water Table Present? Yes ___ No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Ponded area by culvert which contained standing water. Presence of water table or saturation from water table unknown given presence of standing water (i.e., no soil pit dug).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 2

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909934544 Long: -117.269641985 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland pit next to WSP 1. Vegetation within the area is considered significantly disturbed as it appears to have be recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	20	Y	UPL
2. Cynodon dactylon	10	N	FACU
3. Paspalum distichum	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	35 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	20	x 5 =	100
Column Totals:	35 (A)		150 (B)

Prevalence Index = B/A = 4.29

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Vegetation mowed, but identifiable vegetation noted.

SOIL

Sampling Point: WSP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

Soils uniform throughout; no hydric soil indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. Upland. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 3

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S15, S22, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909923962 Long: -117.266991980 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Taken with Cactus Avenue Channel. Vegetation is considered significantly disturbed as the area appears to be recently mowed; downstream is a large Typha latifolia area with standing water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Paspalum distichum	60	Y	FACW
2. Anthemis cotula	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	80 (A)		200 (B)

Prevalence Index = B/A = 2.5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Vegetation significantly disturbed, recently mowed; noted vegetation that could be identified.

SOIL

Sampling Point: WSP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2	94	7.5YR 4/6	6	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** _____

Remarks:

Thick woven organic matter throughout initial 5 inches; prominent and distinct redox features present throughout soil profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Visible drainage patterns present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 4

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 4-5%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909870456 Long: -117.267076603 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Sample point taken in uplands adjacent to wetland area (WSP 3); vegetation considered significantly disturbed as area appears to be recently mowed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	45	Y	UPL
2. Cynodon dactylon	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	45	x 5 =	225
Column Totals:	65 (A)		305 (B)

Prevalence Index = B/A = 4.69

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Portions of the area appear to be recently mowed; vegetation was noted where possible.

SOIL

Sampling Point: WSP 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/clay and rocks

Depth (inches): 10 inches

Hydric Soil Present? Yes _____ No ✔

Remarks:

Soil is uniform in texture and color throughout; pit only dug to 10 inches due to hard soils and rocks.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 5

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909922081 Long: -117.263477126 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Sample point within dry portion of the Cactus Avenue Channel; upstream has Cyperus eragrostis and Typha latifolia dominating the channel and standing water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Cyperus eragrostis	45	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Area dominated by Cyperus eragrostis. Channel regularly mowed, disturbed vegetation.

SOIL

Sampling Point: WSP 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	60	5YR 4/6	40	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard clays

Depth (inches): 8 inches

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Prominent and distinct redox features present within top 8 inches observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✔ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Secondary indicators present. Surface water present approximately 240 ft. upstream near Cactus Avenue and Veterans Way intersection, but not at sample point location.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 6

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S14, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 4-5%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909891414 Long: -117.263579325 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Adjacent to Cyperus eragrostis-dominated area; upland pit to WSP 5.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	50	Y	UPL
2. Cynodon dactylon	25	Y	FACU
3. Hirschfeldia incana	5	N	UPL
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	55	x 5 =	275
Column Totals:	80 (A)		375 (B)

Prevalence Index = B/A = 4.69

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area primarily upland grasses; regular mowing along channel.

SOIL

Sampling Point: WSP 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/clay and rocks

Depth (inches): 10 inches

Hydric Soil Present? Yes _____ **No** ✔

Remarks:

Soil is uniform in texture and color throughout; pit only dug to 10 inches due to hard soils and rocks.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present. FAC-neutral test not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 7

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none): Concave Slope (%): 0-1%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909971261 Long: -117.252887029 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

Sample point taken at culvert outlet near the intersection of Graham St. and Cactus Ave. within Cactus Channel, drains into culvert immediately downstream; area is dominated by Cyperus

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Cyperus eragrostis	45	Y	FACW
2. Amaranthus blitoides	2	N	FACU
3. Paspalum dilatatum	1	N	FAC
4. Rumex crispus	1	N	FAC
5.			
6.			
7.			
8.			
	49 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Sample point vegetation did not appear mowed recently; however, vegetation within adjacent Cactus Ave. Channel had been recently mowed. Regular maintenance mowing occurs within channel.

SOIL

Sampling Point: WSP 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 2/1	100					SCL	Sandy clay loam
2-10	10YR 3/2	90	7.5YR 4/6	10	C	PL	SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard soils

Depth (inches): 10 inches

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Prominent and distinct redox features present at 2-10 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ✔ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drift deposits include trash.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pro City/County: Moreno Valley/Riverside Sampling Date: 07/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 8

Investigator(s): Shanti Santulli, Lee Ripma, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): Terrace Local relief (concave, convex, none): Sloped Slope (%): 2-3%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909972678 Long: -117.252857630 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Upland pit adjacent to WSP 7; area is fed by culvert near Graham St. & Cactus Ave., drains into a culvert immediately downstream; vegetation is considered significantly disturbed due to mowing

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Bromus madritensis ssp. rubens	20	Y	UPL
2. Paspalum dilatatum	3	N	FAC
3. Centromadia pungens ssp. laevis	3	N	FAC
4.			
5.			
6.			
7.			
8.			
	26 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 74 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	6	x 3 =	18
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	26 (A)		118 (B)

Prevalence Index = B/A = 4.54

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area in the uplands to wetland and appears to have been recently mowed.

SOIL

Sampling Point: WSP 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/3	100					SL	Sandy loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal/hard soils

Depth (inches): 5 inches

Hydric Soil Present? Yes ____ No ✔

Remarks:

Shovel refusal at 5 inches; uniform color and texture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____

Water Table Present? Yes ____ No ✔ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley, Riverside Sampling Date: 7/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 9

Investigator(s): Lee Ripma, Shanti Santulli, Emily Trevino Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): In channel Local relief (concave, convex, none): None Slope (%): 1-2%

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909919642 Long: -117.252695994 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Area fed by culvert at the intersection of Graham St. & Cactus Ave., drains into a culvert immediately downstream; adjacent to wetland area upstream

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Anthemis cotula	40	Y	FACU
2. Cynodon dactylon	15	Y	FACU
3. Cyperus eragrostis	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Area dictates significant change in veg. from wetland area upstream that is dominated by Cyperus eragrostis; channel regularly mowed although no evidence of recent mowing observed in this section of the channel.

SOIL

Sampling Point: WSP 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-10	10 YR 3/3	100					SC	Sandy clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal

Depth (inches): 10 inches

Hydric Soil Present? Yes _____ No ✔

Remarks:

Hard impenetrable soils past 10 inches; uniform color and texture. The area is more sloped than the downstream wetland area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drainage patterns faintly visible. FAC-Neutral text not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: K4 Warehouse & Cactus Channel Improv. Pr City/County: Moreno Valley, Riverside Sampling Date: 7/17/18

Applicant/Owner: March Joint Powers Authority State: CA Sampling Point: WSP 10

Investigator(s): Lee Ripma Section, Township, Range: S13, T03S, R04W

Landform (hillslope, terrace, etc.): In drainage Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): LLRC - Mediterranean California Lat: 33.909941025 Long: -117.248824397 Datum: WGS84

Soil Map Unit Name: Monserate sandy loam, 0 to 5 percent slopes NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Sample point within Cactus Channel, appears to have been recently cleared/mowed; fed by culvert at intersection of Graham St. and Cactus Ave. and drains east to Heacock St. then is diverted south.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus fremontii	20	Y	NL
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: _____)			
1. N/A			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1. N/A			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

Sandy bare soil with litter and trash; NL (not listed plants treated as UPL plants per AW manual)

SOIL

Sampling Point: WSP 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10 YR 6/4	100					Sand	Lose sand
4-16	10 YR 4/3	100					Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Shovel refusal

Depth (inches): 16 inches

Hydric Soil Present? Yes _____ No ✔

Remarks:

No hydric soils; two visible distinct layers.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ✔ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Drainage patterns visible within 2 to 3-foot channel.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: K4 Warehouse & Cactus Channel Improv. Project
Project Number: --
Stream: OHWM 1
Investigator(s): Shanti Santulli and Emily Trevino

Date: 07/17/2018
Town: Moreno Valley
Photo begin file#:

Time: 0930
State: California
Photo end file#:

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:
See Figure 5 and Appendix C (photo log)

Projection:
Datum: WGS 1894
Coordinates: See below

Potential anthropogenic influences on the channel system:
Channel runs along Cactus Avenue and is a artificially/manipulated channel, culverted at each intersection, contains trash/debris, and large portions of the channel appear to have been recently mowed

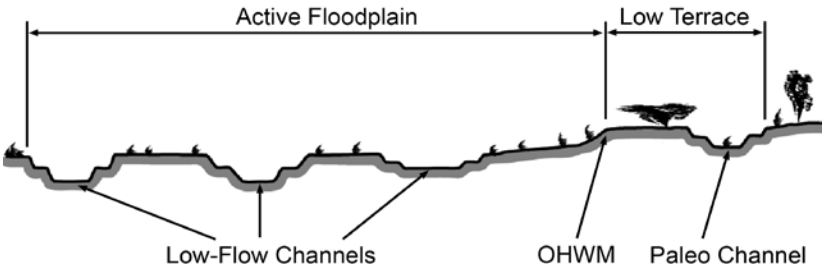
Brief site description:
Channel running along Cactus Avenue that is fed by multiple culverts, contains large wetland areas and flows through culverted intersections

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

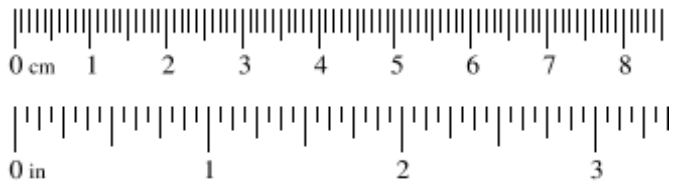


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

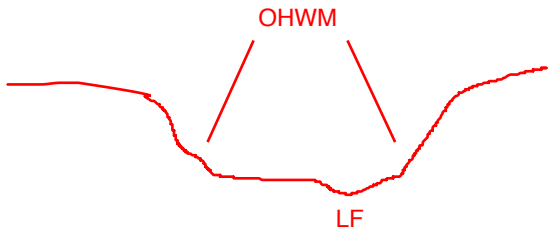
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64	Pebble	
0.157	4	Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: K4 Warehouse & **Cross section ID:** OHWM 1 **Date:** 07/17/2018 **Time:** 0939

Cross section drawing:



OHWM

GPS point: 33.909923908, -117.25278283

Indicators:

- ☑ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:
Non-wetland segment within earthen channel; vegetation composed primarily of Anthemis cotula

Floodplain unit:

☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: Within OHWM

Characteristics of the floodplain unit:

Average sediment texture: Coarse silt

Total veg cover: 20 % Tree: _____% Shrub: _____% Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:
2 ft wide LF channel with some Cyperus eragrostis individuals and sediment size slightly larger than active channel; area is very dry (typical July conditions)

Project ID: K4 Warehouse & **Cross section ID:** OHWM 1 **Date:** 07/17/2018 **Time:** 0930

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: 3 ft. Above south bank

Characteristics of the floodplain unit:

Average sediment texture: fine silt

Total veg cover: 40 % Tree: _____% Shrub: _____% Herb: 40 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☑ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Cyperus eragrostis sprinkled throughout LF and Anthemis cotula throughout the active floodplain

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Just above AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: very fine silt

Total veg cover: 80 % Tree: _____% Shrub: _____% Herb: 80 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☑ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

No low terrace, goes straight to upland; trapezoidal channel

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: K4 Warehouse & Cactus Channel Improv. Project
Project Number: --
Stream: OHWM 2
Investigator(s): Lee Ripma

Date: 7/17/2018
Town: Moreno Valley
Photo begin file#:

Time: 1540
State: California
Photo end file#:

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details:
See Figure 5 and Appendix C (photo log)

Projection:
Datum: WGS 1984
Coordinates: See below

Potential anthropogenic influences on the channel system:
Channel runs along Cactus Avenue and is a artificially/manipulated channel, culverted at each intersection, contains some trash/debris

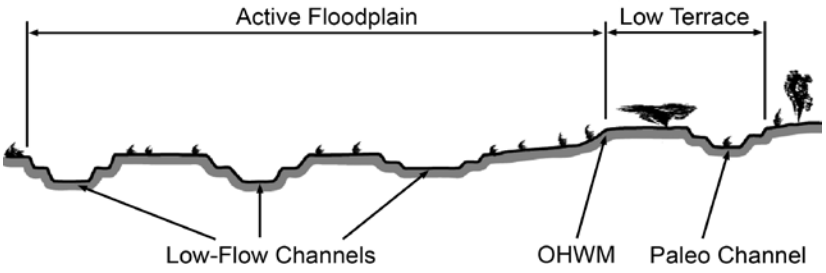
Brief site description:
Channel running along Cactus Avenue that is fed by multiple culverts, contains large wetland areas and flows through culverted intersections

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☑ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

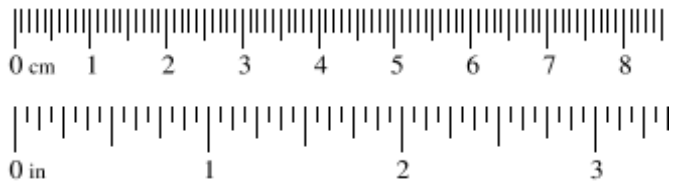


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☑ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

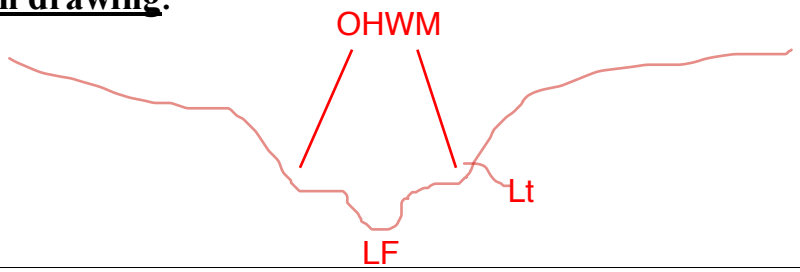
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64	Pebble	
0.157	4	Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: K4 Warehouse & **Cross section ID:** OHWM 2 **Date:** 7/17/18 **Time:** 1540

Cross section drawing:



OHWM

GPS point: 33.909937238, -117.24884056

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:
Very small drainage only 1 ft bw banks

Floodplain unit:

[x] Low-Flow Channel [x] Active Floodplain [ ] Low Terrace

GPS point: Within OHWM

Characteristics of the floodplain unit:

Average sediment texture: Pebble

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 20 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:
Approx. 5-foot wide active floodplain (with 1-ft. low flow - same sediment texture), pebble.

Project ID: K4 Warehouse & **Cross section ID:** OHWM 2 **Date:** 7/17/18 **Time:** 1540

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Just above OHWM

Characteristics of the floodplain unit:

Average sediment texture: coarse silt

Total veg cover: 20 % Tree: 20 % Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☑ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☑ Benches
- ☑ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Primarily unvegetated banks. Small patch of cottonwood on bank.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____% Shrub: _____% Herb: _____%

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

APPENDIX C

SITE PHOTOGRAPHS

Appendix C – Site Photographs*

K4 Warehouse & Cactus Channel Imprveoments Project Jurisdictional Delineation

July 18, 2018



Photo 1. View of Wetland Sample Point (WSP) 1, area contains standing water and appears to have been recently mowed. Photo taken facing northwest.



Photo 2. Upstream view of WSP 2, near WSP 1. WSP 2 did not show any indicators of wetland hydrology, hydrophytic vegetation or hydric soils. Photo taken facing north.

*See Corresponding Figure 7 for Photo Point Locations



Photo 3. Downstream view of area where WSP 1 and WSP 2 data was collected; WSP 2 in foreground. Area appears to have been recently mowed; Drainage patterns observed. Photo taken facing southeast.



Photo 4. Downstream view of area between the WSP 1 and 2 near Elsworth Street toward area dominated by *Typha latifolia-dominated* area at Veterans Way. Photo taken facing east.



Photo 5. WSP 3, taken within the mowed area adjacent to the *Typha latifolia*-dominated area by Veterans Way. The sample point met the hydrophytic vegetation, wetland hydrology, and hydric soil indicators.



Photo 6. Downstream view at WSP 3 showing extent of mowed area and taller hydrophytic vegetation (*Typha latifolia*) further downstream. Photo taken facing east.



Photo 7. View of WSP 3 soils showing presence of distinct and prominent redox features.



Photo 8. View of WSP 4, taken in the uplands, the sample point did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils indicators.



Photo 9. Upstream view of area where WSP 3 and WSP 4 was taken; WSP 4 visible in foreground and determined extent/width of the wetland area. Photo taken facing west.



Photo 10. Upstream view of wetland area. The area appears to have been recently mowed and the abrupt end of *Typha latifolia* dictates where mowing stopped. Photo taken facing west.



Photo 11. Downstream view of wetland area where standing water was visible. Photo taken facing east towards the Cactus Avenue and Veterans Way culvert outlet.



Photo 12. Upstream view of large *Typha latifolia* dominated area. Photo taken near the crossing of Cactus Avenue and Veterans Way, where a large culvert feeds the area. Photo taken facing west.



Photo 13. Downstream view of large *Typha latifolia* dominated area.
Photo taken near the crossing of Cactus Avenue and Veterans Way, facing east.



Photo 14. Upstream view of wetland area where standing water was observed. These conditions continue upstream, eventually growing into a large *Typha latifolia* area. Photo taken facing west.



Photo 15. Upstream view of WSP 5, the same point met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters. Photo taken facing west.



Photo 16. View of WSP 5 soils, abundant redox features present.



Photo 17. View of WSP 6, taken in the uplands; the sample point did not meet the hydrophytic vegetation, wetland hydrology, or hydric soils parameters.



Photo 18. Downstream view of area where WSP 5 and WSP 6 was taken; WSP 6 in foreground and determined the extent of the wetland area. Photo taken facing east.



Photo 19. Downstream view from a culvert outlet at Cactus Avenue and Frederick Street. Photo taken facing east.



Photo 20. View of culvert outlet at Cactus Avenue and Frederick Street. Vegetation within the area include *Rumex crispus* and *Salix exigua*. Photo taken facing north.



Photo 21. Upstream view of wetland area at the culvert outlet at Cactus Avenue and Frederick Street. Photo taken facing west.



Photo 22. Upstream view of continued wetland area. While vegetation was disturbed in this section of the channel, wetland hydrology and hydric soils remained present. Photo taken facing east.



Photo 23. View of area with visible soil cracks that displayed similar vegetation (albeit disturbed) and soil redox features as WSP 7, downstream. Photo taken facing east, downstream.



Photo 24. View of culvert that feeds into wetland area where WSP 7 and WSP 8 was taken. Photo taken facing north.



Photo 25. View of WSP 7. The sample point met the hydrophytic vegetation, wetland hydrology, and hydric soil parameters.



Photo 26. WSP 8, taken in the uplands adjacent to WSP 7, did not meet the hydrophytic vegetation, wetland hydrology, or hydric soil parameters. Photo taken facing north.



Photo 27. Downstream view at WSP 7 and WSP 8. Large amounts of *Cyperus eragrostic* located within the wetland area. Photo taken facing south.



Photo 28. Downstream view of the area where WSP 9 and Ordinary High Water Mark (OHWM) Data Point 1 was collected. WSP 9 met the hydrophytic vegetation parameter but not the wetland hydrology or hydric soils parameters. Photo taken east. OHWM determined to be present.



Photo 29. Upstream view of OHWM 1. OHWM 1 is defined by a break in slope, change in average sediment texture and vegetation species. Photo taken facing west.



Photo 30. Upstream view of ephemeral drainage from a road overpass. Photo taken facing east.



Photo 31. Downstream view of ephemeral drainage at a road overpass. Photo taken facing east.



Photo 32. Overview of ephemeral drainage, feature is visible and consistent along Cactus Avenue from Riverside Drive to Heacock Street. Photo taken facing east.



Photo 33. WSP 10. The sample point displayed wetland hydrology; however, hydrophytic vegetation and hydric soils were not observed.



Photo 34. Upstream view of WSP 10 and OHWM Data Point 2. Photo taken facing west.



Photo 35. OHWM Data Point 2 downstream. OHWM Data Point 2 is defined by a break in slope, change in sediment texture, vegetation species, and vegetation cover. Photo taken facing east.



Photo 36. View of potential ponding area observed by RBC field staff. Protocol fairy shrimp surveys are currently being undertaken to determine species presence/absence although the area appears to be a puddle in a disturbed asphalt/unvegetated area. Photo taken on October 4, 2018.

APPENDIX D

JD REQUEST FORMS

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Los Angeles District | File/ORM #: | PJD Date:

State: CA | City/County: Moreno Valley/Riverside

Nearest Waterbody: San Jacinto River

Location: TRS, LatLong or UTM: 33.909420, -117.263420

Name/ Address of Person Requesting PJD:
Jeff Gordon
Meridian Park K4, LLC
567 San Nicholas Drive, Suite 270
Newport Beach, CA 92660
San Diego, CA 92110
JGordon@waypointpg.com
949-200-6733

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: 2876 linear ft | 5-15 width | 0.42 acres | Stream Flow: Ephemeral

Wetlands: 1.40 acre(s) | Cowardin Class: Palustrine, emergent

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: N/A | Non-Tidal: N/A

☐ Office (Desk) Determination
☐ Field Determination: Date of Field Trip:

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: 2018 JD Report, prepared by Rocks Biological Consult
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☑ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: USGS 7.5-minute Riverside East and Sunnymead
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: USDA NRCS 2005
- ☑ National wetlands inventory map(s). Cite name: USFWS and NWI 2017
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☑ Aerial (Name & Date): See attached figures, SanGIS 2017
  ☑ Other (Name & Date): See Appendix C, Site Photographs
- ☐ Previous determination(s). File no. and date of response letter:
- ☑ Other information (please specify): 2018 JD Report, prepared by Rocks Biological Consult

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Signature and Date of Regulatory Project Manager (REQUIRED)

Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

Appendix A - Sites

District Office	Los Angeles District	File/ORM #		PJD Date:	
State	CA	City/County	Moreno Valley/Riverside	Person Requestinq PJD	Jeff Gordon

Site Number	Latitude	Longitude	Cowardin Class	Est. Amount of Aquatic Resource in Review Area	Class of Aquatic Resource
CACW	33.909944442	-117.26156467	Palustrine, emergent	1.40	Non-Section 10 wetland
CACNW	33.909960615	-117.25096585	Riverine	0.42	Non-Section 10 non-wetla

Notes:

The review area for this requested PJD includes the project survey area shown on the provided figures with the K4 Warehouse & Cactus Channel Improvements Project Jurisdictional Delineation Report (Rocks Biological Consulting 2018), incorporated here by reference. A majority of the Cactus Avenue Channel (CAC) displayed evidence of federally jurisdictional wetland waters of the U.S.; while the remaining portions displayed evidence of an OHWM as discussed in the provided Jurisdictional Delineation Report.

The delineated feature on site drains from west to east along Cactus Avenue until the intersection of Cactus Avenue and Heacock Street, where flows are diverted south to drain into the Perris Valley storm drain system. Flows continue into the San Jacinto River and ultimately into Lake Elsinore.

Appendix 1 - REQUEST FOR CORPS JURISDICTIONAL DETERMINATION (JD)

To: District Name Here

- I am requesting a JD on property located at: Cactus Ave. b/w Elsworth St. to Heacock St.
  (Street Address)
  City/Township/Parish: Moreno Valley County: Riverside State: CA
  Acreage of Parcel/Review Area for JD: 42.36 acres
  Section: S15, S22 Township: T03S Range: R04W
  Latitude (decimal degrees): 33.909420 Longitude (decimal degrees): -117.263420
  (For linear projects, please include the center point of the proposed alignment.)
- Please attach a survey/plat map and vicinity map identifying location and review area for the JD.
- ✔ I currently own this property. ___ I plan to purchase this property.
  ___ I am an agent/consultant acting on behalf of the requestor.
  ___ Other (please explain): _____.
- Reason for request: (check as many as applicable)
  ___ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all aquatic resources.
  ___ I intend to construct/develop a project or perform activities on this parcel which would be designed to avoid all jurisdictional aquatic resources under Corps authority.
  ___ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps, and the JD would be used to avoid and minimize impacts to jurisdictional aquatic resources and as an initial step in a future permitting process.
  ✔ I intend to construct/develop a project or perform activities on this parcel which may require authorization from the Corps; this request is accompanied by my permit application and the JD is to be used in the permitting process.
  ___ I intend to construct/develop a project or perform activities in a navigable water of the U.S. which is included on the district Section 10 list and/or is subject to the ebb and flow of the tide.
  ___ A Corps JD is required in order to obtain my local/state authorization.
  ___ I intend to contest jurisdiction over a particular aquatic resource and request the Corps confirm that jurisdiction does/does not exist over the aquatic resource on the parcel.
  ___ I believe that the site may be comprised entirely of dry land.
  ___ Other: _____
- Type of determination being requested:
  ___ I am requesting an approved JD.
  ✔ I am requesting a preliminary JD.
  ___ I am requesting a "no permit required" letter as I believe my proposed activity is not regulated.
  ___ I am unclear as to which JD I would like to request and require additional information to inform my decision.

By signing below, you are indicating that you have the authority, or are acting as the duly authorized agent of a person or entity with such authority, to and do hereby grant Corps personnel right of entry to legally access the site if needed to perform the JD. Your signature shall be an affirmation that you possess the requisite property rights to request a JD on the subject property.

*Signature: _____ Date: _____

- Typed or printed name: Jeff Gordon

Company name: Meridian Park K4, LLC

Address: 567 San Nicholas Drive, Suite 270
Newport Beach, CA 92660

Daytime phone no.: 949-200-6733

Email address: JGordon@waypointpg.com

***Authorities:** Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Program of the U.S. Army Corps of Engineers; Final Rule for 33 CFR Parts 320-332.
Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USACE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

APPENDIX E

GIS DATA

IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

K-4 PARCEL PROJECT

March Air Reserve Base, Moreno Valley Area
Riverside County, California

For Submittal to:

March Joint Powers Authority
14205 Meridian Parkway, #140
Riverside, CA 92518

Prepared for:

Lewis Retail Centers
1156 N. Mountain Avenue
Upland, CA 91785

Prepared by:

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

August 19, 2018
Revised April 1, 2019
CRM TECH Project No. 3347

Title: Identification and Evaluation of Historic Properties: K-4 Parcel Project, March Air Reserve Base, Moreno Valley Area, Riverside County, California

Author(s): Bai "Tom" Tang, Principal Investigator/Historian
Ben Kerridge, Archaeologist/Report Writer
Nina Gallardo, Archaeologist/Native American Liaison

Consulting Firm: CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: August 19, 2018; revised April 1, 2019

For Submittal to: March Joint Powers Authority
14205 Meridian Parkway, #140
Riverside, CA 92518
(909) 382-4100

Prepared for: Timothy Reeves
Lewis Retail Centers
1156 N. Mountain Avenue
Upland, CA 91785
(909) 882-3612

USGS Quadrangle: Riverside East, Calif., 7.5' quadrangle (Sections 13 and 14, T3S R4W, San Bernardino Baseline and Meridian)

Project Size: Approximately 35 acres

Keywords: Phase I historical/archaeological resources survey; Assessor's Parcel Numbers 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004; Site 33-028200 (CA-RIV-12721): WWII-era earthen drainage channel; no "historic property" or "historical resource" in the APE

EXECUTIVE SUMMARY

Between May and August 2018, at the request of Lewis Retail Centers, CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed K-4 Parcel Project on the northern edge of March Air Reserve Base (ARB), near the City of Moreno Valley, Riverside County, California. The APE consists of approximately 35 acres of undeveloped land in Assessor's Parcel Numbers 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004, located on the south side of Cactus Avenue at the termini of Veterans Way and Frederick Street, in the southwest quarter of Section 13 and the southeast quarter of Section 14, T3S R4W, San Bernardino Baseline and Meridian.

The proposed undertaking entails primarily the construction of an approximately 718,000-square-foot, 46-foot-tall industrial warehouse with 289 automobile parking stalls and 317 truck trailer parking stalls. All construction staging and storage will occur within the project footprint, and no additional APE was delineated for visual, atmospheric, or other indirect effects since no historic-period buildings are known to be located adjacent to the project boundary. The maximum depth of excavation required for the undertaking, or the vertical extent of the APE below surface, will not exceed 10 feet.

The study is a part of the environmental review process for the undertaking, as required by the March Joint Powers Authority (JPA) pursuant to the California Environmental Quality Act (CEQA). As the undertaking lies within the boundaries of March ARB, future oversight by relevant federal agencies also necessitates compliance with Section 106 of the National Historic Preservation Act. The purpose of the study is to provide March JPA and the pertinent federal agencies with the necessary information and analysis to determine whether the undertaking would have an effect on any "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), or "historic properties," as defined by 36 CFR 800.16(l), that may exist in the APE. In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, pursued historical and geoarchaeological background research, contacted Native American representatives, and carried out an intensive-level field survey of the APE.

As a result of these research procedures, a late-historic-period earthen drainage channel, recently recorded into the California Historical Resources Inventory as Site 33-028200 (CA-RIV-12721), was found to be located partially within the APE. The channel was built in the 1941-1953 era, most likely during the expansion of March Army Air Field (now March ARB) in the early 1940s, but does not appear to meet the definition of a "historic property" or a "historical resource." No other potential "historic properties" or "historical resources" of either prehistoric or historical origin were encountered during this study, and the subsurface sediments in the vertical APE appear to be low in sensitivity for potentially significant archaeological remains in buried deposits.

Based on these findings, and pursuant to 36 CFR 800.4(d)(1) and Calif. PRC §21084.1, CRM TECH recommends to March JPA and the appropriate federal agencies a conclusion that *no "historic properties" or "historical resources" will be affected by the proposed undertaking*. No further cultural resources investigation is recommended for the undertaking unless project plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the find.

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INTRODUCTION

Between May and August 2018, at the request of Lewis Retail Centers, CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed K-4 Parcel Project on the northern edge of March Air Reserve Base (ARB), near the City of Moreno Valley, Riverside County, California (Figure 1). The APE consists of approximately 35 acres of undeveloped land in Assessor's Parcel Numbers 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004, located on the south side of Cactus Avenue at the termini of Veterans Way and Frederick Street, in the southwest quarter of Section 13 and the southeast quarter of Section 14, T3S R4W, San Bernardino Baseline and Meridian (Figures 2, 3).

The proposed undertaking entails primarily the construction of an approximately 718,000-square-foot, 46-foot-tall industrial warehouse with 289 automobile parking stalls and 317 truck trailer parking stalls. All construction staging and storage will occur within the project footprint, and no additional APE was delineated for visual, atmospheric, or other indirect effects since no historic-period buildings are known to be located adjacent to the project boundary. The maximum depth of excavation required for the undertaking, or the vertical extent of the APE below surface, will not exceed 10 feet.

The study is a part of the environmental review process for the undertaking, as required by the March Joint Powers Authority (JPA) pursuant to the California Environmental Quality Act (CEQA). As the undertaking lies within the boundaries of March ARB, future oversight by relevant federal agencies also necessitates compliance with Section 106 of the National Historic Preservation Act

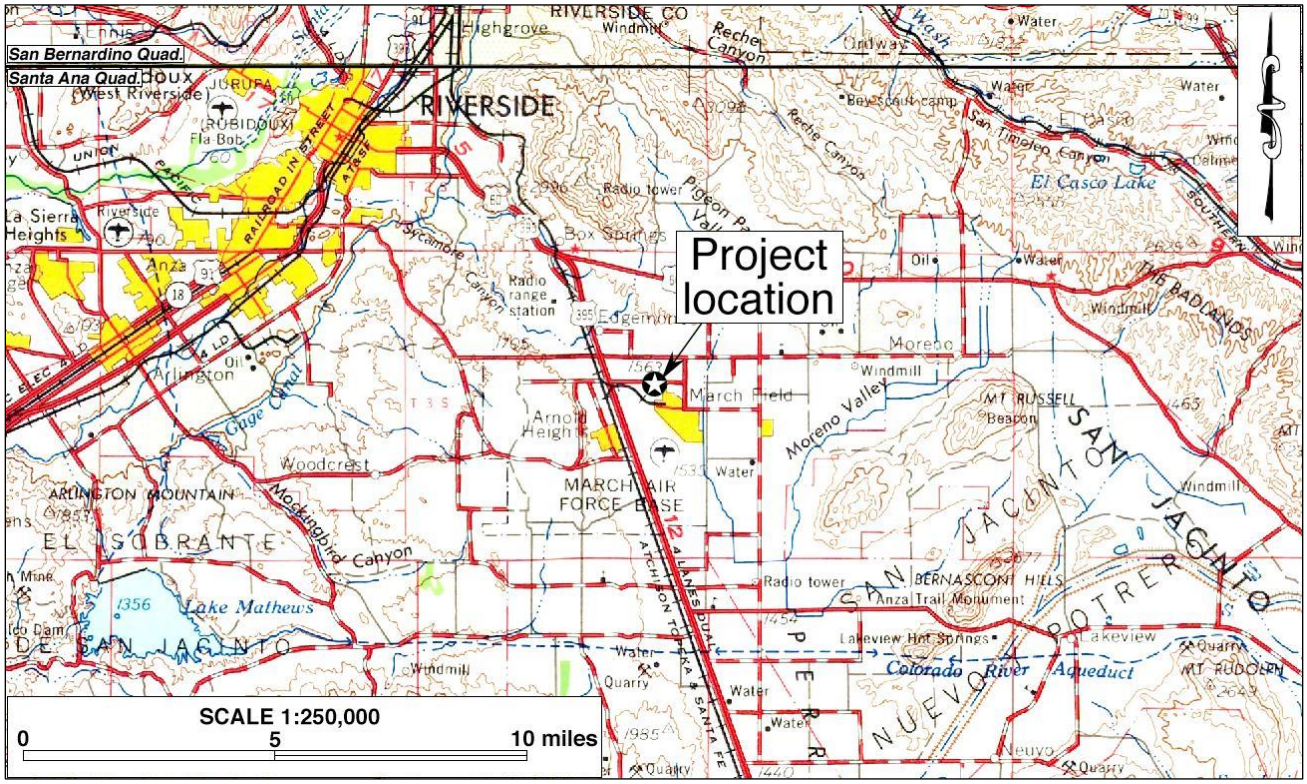


Figure 1. Project vicinity. (Based on USGS San Bernardino and Santa Ana quadrangles [USGS 1969; 1979])

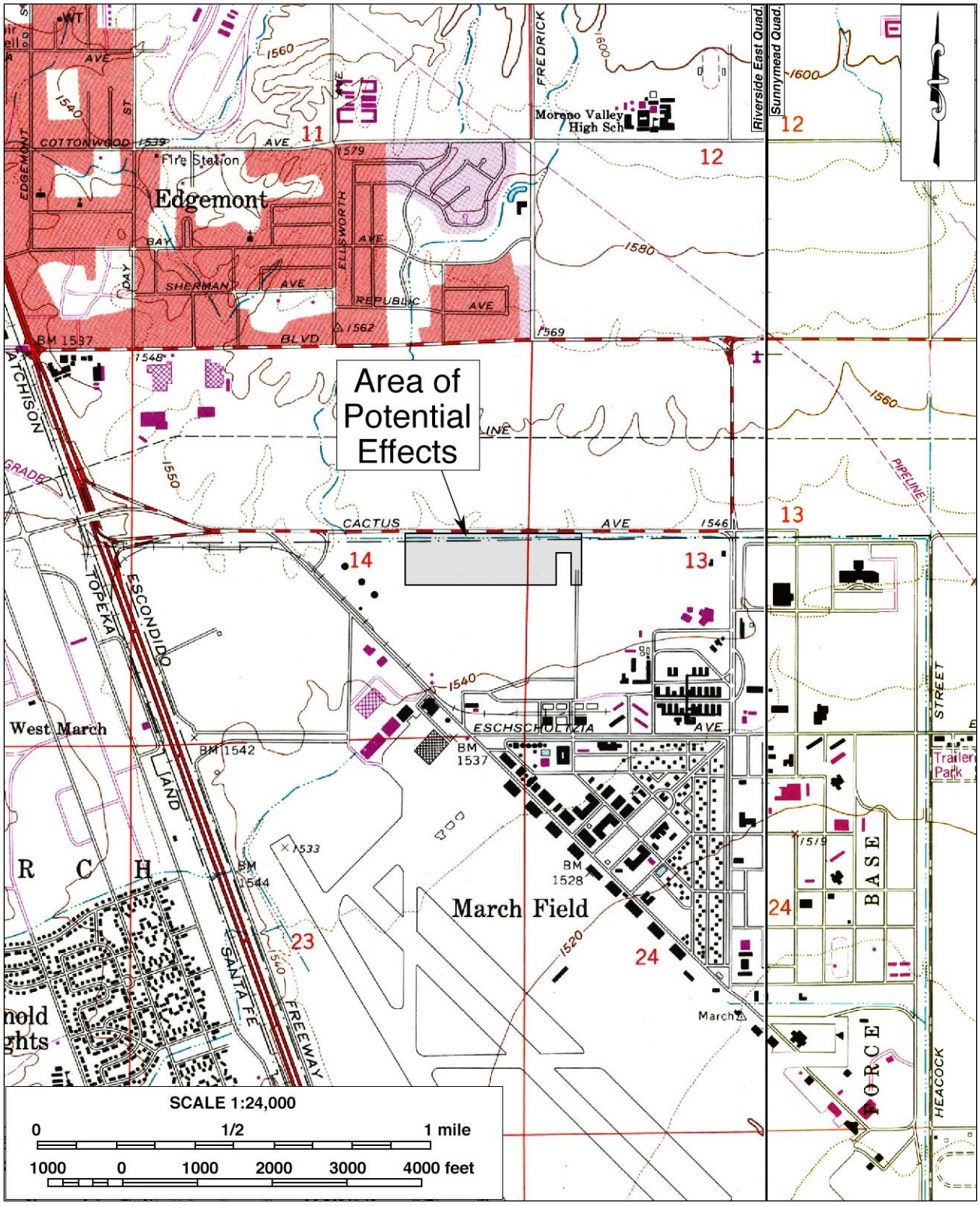


Figure 2. Area of Potential Effects. (Based on USGS Riverside and Sunnymead, Calif., 7.5' quadrangles [USGS 1980a; 1980b])

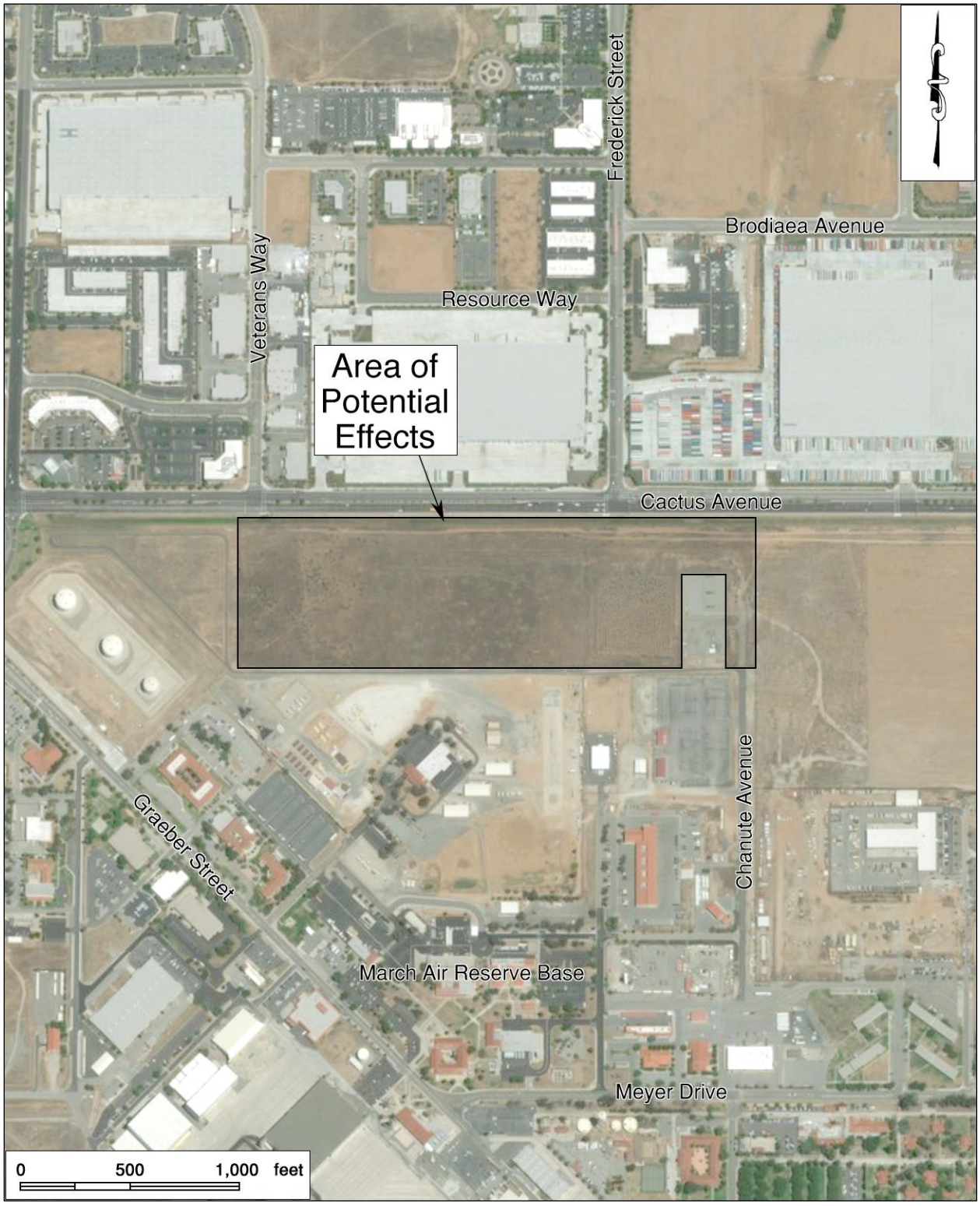


Figure 3. Aerial image of the APE and vicinity.

(NHPA). The purpose of the study is to provide March JPA and the pertinent federal agencies with the necessary information and analysis to determine whether the undertaking would have an effect on any "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), or "historic properties," as defined by 36 CFR 800.16(l), that may exist in the APE.

In order to identify such resources, CRM TECH conducted a historical/archaeological resources records search, pursued historical and geoarchaeological background research, contacted Native American representatives, and carried out an intensive-level field survey of the APE. The following report is a complete account of the methods, results, and final conclusion of the study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

SETTING

CURRENT NATURAL SETTING

The City of Moreno Valley occupies a lowland area in the northern portion of the Peninsular Ranges geomorphic province, surrounded by the Santa Ana Mountains on the southwest, the San Jacinto Mountains on the southeast, and the convergence of the San Gabriel and San Bernardino Mountain Ranges on the north. The natural landscape in the Peninsular Ranges province features a host of inland valleys divided by groups of rolling hills and rocky knolls. The mild Mediterranean climate of the region is typical of inland southern California lowlands, characterized by hot and dry summers and mild and wet winters. The average annual rainfall in the region is approximately 10 inches, the majority of which typically falls seasonally between December and March.

The APE consists of five parcels of vacant land along the northern perimeter of March ARB, between the Cactus right-of-way on the north and various existing base facilities on the south (Figure 3). It is generally rectangular in shape except for the exclusion of an existing substation near the eastern end. A man-made earthen drainage channel runs along the northern edge of the APE, and several power transmission lines and stockpiles of imported soil are found in the eastern portion of the APE, near the substation (Figures 3, 4).



Figure 4. Typical landscapes in the APE. *Left*: overview to the west; *right*: soil stockpile, view to the southwest. (Photographs taken on June 1, 2018)

The terrain in the APE is relatively level except for the drainage channel, with a slight incline to the west, and the elevations range approximately between 1,535 feet and 1,550 feet above mean sea level, including the depth of the channel. The ground surface has been disturbed extensively in the past and appears to have been cleared of much of the vegetation recently. Several manholes in the APE further indicate the presence of underground utility lines. Surface soil on the property consists of a hardpacked brown silty-clay loam, and vegetation growth, concentrated mainly in the western portion of APE, features solely typical small grasses and shrubs (Figure 4).

CULTURAL SETTING

Prehistoric Context

The earliest evidence of human occupation in western Riverside County was discovered below the surface of an alluvial fan in the northern portion of the Lakeview Mountains, some 12 miles southeast of the APE, with radiocarbon dates clustering around 9,500 B.P. (Horne and McDougall 2008). Another site found near the shoreline of Lake Elsinore, close to the confluence of Temescal Wash and the San Jacinto River, yielded radiocarbon dates between 8,000 and 9,000 B.P. (Grenda 1997). Additional sites with isolated Archaic dart points, bifaces, and other associated lithic artifacts from the same age range have been found in the nearby Cajon Pass area of San Bernardino County, roughly 25 miles to the northwest, typically atop knolls with good viewsheds (Basgall and True 1985; Goodman and McDonald 2001; Goodman 2002; Milburn et al. 2008).

The cultural prehistory of southern California has been summarized into numerous chronologies, including those developed by Chartkoff and Chartkoff (1984), Warren (1984), and others. Specifically, the prehistory of Riverside County has been addressed by O'Connell et al. (1974), McDonald et al. (1987), Keller and McCarthy (1989), Grenda (1993), Goldberg (2001), and Horne and McDougall (2008). Although the beginning and ending dates of different cultural horizons vary regionally, the general framework of the prehistory of western Riverside County can be broken into three primary periods:

- Paleoindian Period (ca. 12,500-9,000 B.P.): Native peoples of this period created fluted spearhead bases designed to be hafted to wooden shafts. The distinctive method of thinning bifaces and spearhead preforms by removing long, linear flakes leaves diagnostic Paleoindian markers at tool-making sites. Other artifacts associated with the Paleoindian toolkit include choppers, cutting tools, retouched flakes, and perforators. Sites from this period are very sparse across the landscape and most are deeply buried.
- Archaic Period (ca. 9,000-1,500 B.P.): Archaic sites are characterized by abundant lithic scatters of considerable size with many biface thinning flakes, bifacial preforms broken during manufacture, and well-made groundstone bowls and basin metates. As a consequence of making dart points, many biface thinning waste flakes were generated at individual production stations, which is a diagnostic feature of Archaic sites.
- Late Prehistoric Period (ca. 1,500 B.P.-contact): Sites from this period typically contain small lithic scatters from the manufacture of small arrow points, expedient groundstone tools such as tabular metates and unshaped manos, wooden mortars with stone pestles, acorn or mesquite bean granaries, ceramic vessels, shell beads suggestive of extensive trading networks, and steatite implements such as pipes and arrow shaft straighteners.

Ethnohistoric Context

According to current ethnohistorical scholarship, the traditional territories of several Native American groups, including the Luiseño, the Serrano, the Gabrielino, and the Cahuilla, overlapped one another in the present-day Riverside-San Bernardino region during the Late Prehistoric Period, but the Moreno Valley area is generally recognized as a part of the traditional homeland of the Luiseño, a Takic-speaking people whose territory extended from present-day Riverside to Escondido and Oceanside. The name of the group derived from Mission San Luis Rey, which held jurisdiction over most of the traditional Luiseño territory during the late 18th and early 19th centuries. In modern anthropological literature, the leading sources on Luiseño culture and history are Kroeber (1925), Strong (1929), and Bean and Shipek (1978).

Anthropologists have divided the Luiseño into several autonomous lineages or kin groups, which represented the basic political unit among most southern California Indians. According to Bean and Shipek (1978:551), each Luiseño lineage possessed a permanent base camp, or village, on the valley floor and another in the mountain regions for acorn collection. Luiseño villages were made up of family members and relatives, where chiefs of the village inherited their rank and each village owned its own land. Villages were usually located in sheltered canyons or near year-round sources of freshwater, always near subsistence resources.

The Luiseño exploited nearly all resources of the environment in a highly developed seasonal mobility system. The Luiseño people were primarily hunters and gatherers. They collected seeds, roots, wild berries, acorns, wild grapes, strawberries, wild onions, and prickly pear cacti, and hunted deer, elks, antelopes, rabbits, wood rats, and a variety of insects. Bows and arrows, atlatls or spear throwers, rabbit sticks, traps, nets, clubs, and slings were the main hunting tools. Each lineage had exclusive hunting and gathering rights in their procurement ranges. These boundaries were respected and only crossed with permission (Bean and Shipek 1978:551).

It is estimated that when Spanish colonization of Alta California began in 1769, the Luiseño had approximately 50 active villages with an average population of 200 individuals each, although other estimates place the total Luiseño population at 4,000-5,000 (Bean and Shipek 1978:557). Some of the villages were forcefully moved to the Spanish missions, while others were left largely intact (*ibid.*:558). Ultimately, Luiseño population declined rapidly after European contact because of diseases such as smallpox and harsh living conditions at the missions and, later, on the Mexican ranchos, where the Native people often worked as seasonal ranch hands.

After the American annexation of Alta California, the large number of non-Native settlers further eroded the foundation of traditional Luiseño society. During the latter half of the 19th century, almost all of the remaining Luiseño villages were displaced, their occupants eventually removed to the various reservations. Today, the nearest Native American groups of Luiseño heritage live on the Soboba, Pechanga, and Pala Indian Reservations.

Historic Context

In comparison to other nearby cities like Riverside and San Jacinto, the City of Moreno Valley is a "late-boomer" both in early development in the 19th century and in urban growth in the 20th. By the

mid-19th century, the area that constitutes today's Moreno Valley remained essentially uninhabited despite its location on a plain surrounded by several large Mexican land grants. In 1853-1855, when the U.S. government initiated the first official land survey in southern California, the only man-made features observed in the area were a few roads crisscrossing the desert floor, including a wagon road from San Bernardino to Temecula, a second one leading to San Jacinto, and several unidentified roads or trails (GLO 1856).

The Moreno Valley area remained unclaimed public land until 1870, when a 13,471-acre tract was purchased from the U.S. government in a single transaction (BLM n.d.). It was on this vast acquisition that the 11,560-acre Alessandro Tract and the town of Alessandro, which is occupied by March ARB today, were laid out and offered to settlers in 1887 during a land boom that swept through southern California in the 1880s (Gunther 1984:11). After this initial development scheme failed, the developers of Redlands in San Bernardino County, fresh from their acclaimed success in creating the Bear Valley reservoir and the thriving Redlands colony, took over the Alessandro Tract with the intention of irrigating the land with an elaborate water system (*ibid.*).

Water from the Bear Valley reservoir reached the Moreno Valley area in 1891, ushering in a few years of prosperity. Two more communities formed during this brief boom: New Haven, soon to be renamed Moreno, and Midland, also known as Armada (Gunther 1984:323, 333). The boom turned to bust during the drought of the late 1890s, when Bear Valley water was no longer delivered to the Moreno Valley area. As a result, the once flourishing towns in the area were largely abandoned, and many of the buildings were taken up and moved to Riverside (*ibid.*:13, 334).

During the early 20th century, the Moreno Valley area began to recover slowly. In 1912, a 1,100-acre portion of the original Alessandro Tract was re-subdivided as the Sunnymead Orchard Tract (County of Riverside 1912), and thus the community formerly known as Midland or Armada became Sunnymead. A decade later, a series of land development projects began just to the west of Sunnymead, which ultimately resulted in the establishment of the community of Edgemont (County of Riverside 1927; Gunther 1984:171-172).

Despite these development efforts, Moreno Valley's economic prospect was severely hampered by the lack of reliable water supply until 1973, after the completion of the California Aqueduct and its southern terminus, Lake Perris (Gunther 1984:334). Since then, the promise of affordable housing brought an influx of commuters to the Moreno Valley area, setting off a period of rapid growth and urbanization. By 1984, when residents in the communities of Moreno, Sunnymead, and Edgemont voted to incorporate as the City of Moreno Valley, the new city had already become the second most populous in Riverside County (*ibid.*), thanks mainly to its attraction as a "bedroom community."

In the vicinity of the APE, in contrast, the establishment of the U.S. Army's Alessandro Aviation Field in 1918 began a long history of military installations, a tradition that was reinforced by the WWII-era Camp Haan and carried to the present time by March ARB (formerly March Air Force Base). In more recent times, the area around project location has undergone a gradual transition to an industrial/commercial "park," largely because of its convenient location in close proximity to the Interstate Highway 215 corridor.

RESEARCH METHODS

RECORDS SEARCH

On May 15, 2018, CRM TECH archaeologist Nina Gallardo completed the historical/archaeological resources records search at the Eastern Information Center (EIC), University of California, Riverside. During the records search, Gallardo examined maps and records on file at the EIC for previously identified cultural resources and existing cultural resources reports within a one-mile radius of the APE. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Historic Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

GEOARCHAEOLOGICAL ANALYSIS

As part of the research procedures, CRM TECH archaeologist Ben Kerridge and project geologist Harry M. Quinn pursued geoarchaeological analysis to assess the APE's potential for the deposition and preservation of subsurface cultural deposits from the prehistoric period, which cannot be detected through a standard surface archaeological survey. Sources consulted for this purpose included a geotechnical exploration report completed for this undertaking (Leighton 2018a) as well as topographic, geologic, and soil maps pertaining to the surrounding area (e.g., Morton and Cox 1994; Morton et al. 2001). Findings from these sources were used to develop a geomorphologic history of the APE and address geoarchaeological sensitivity of the vertical APE.

NATIVE AMERICAN PARTICIPATION

On May 14, 2018, CRM TECH submitted a written request to the State of California Native American Heritage Commission (NAHC) for a records search in the commission's Sacred Lands File. In the meantime, CRM TECH notified the Soboba Band of Luiseño Indians, the Pechanga Band of Luiseño Indians, and the Morongo Band of Mission Indians of the upcoming archaeological fieldwork and invited tribal participation. Following the NAHC's recommendations and previously established consultation protocol, CRM TECH further contacted a total 17 tribal representatives in the region. The written requests for comments were sent to the tribal representatives via both U.S. mail and e-mail on May 18, 2018, and follow-up telephone solicitations were carried out on June 28 and July 5. The correspondence between CRM TECH and the Native American representatives is attached to this report as Appendix 2.

HISTORICAL RESEARCH

Historical background research for this study was conducted by CRM TECH principal investigator/ historian Bai "Tom" Tang. Sources consulted during the research included published literature in local and regional history, archival records of the County of Riverside, U.S. General Land Office (GLO) land survey plat maps dated 1856, U.S. Geological Survey (USGS) topographic maps dated 1901-1980, and aerial photographs taken in 1938-2018. The historic maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley. The aerial photographs are available

at the Nationwide Environmental Title Research (NETR) Online website, through the Google Earth software, and from the Environmental Site Assessment for this undertaking (Leighton 2018b).

FIELD SURVEY

On June 1, 2018, CRM TECH archaeologists Nina Gallardo and Ben Kerridge carried out the intensive-level field survey of the APE with the assistance of Native American monitors Leno Fernandez from the Pechanga Band of Luiseño Indians and Victoria Banda from the Soboba Band of Luiseño Indians. The survey was completed by walking a series of parallel north-south transects at 15-meter (approximately 50-foot) intervals. In this way, the entire APE was surveyed systematically for any evidence of human activities dating to the prehistoric or historic period (i.e., 50 years or older). Ground visibility was excellent (nearly 100 percent) at the time of the survey with the exception of the area occupied by the soil stockpiles, where visibility of the original ground surface was poor.

RESULTS AND FINDINGS

RECORDS SEARCH

EIC records identify at least four previous cultural resources studies that covered the APE (Figure 5). Three of these were large-scale surveys prepared for the realignment of March Air Force Base in the mid-1990s (#3510, #8272, and #10093 in Figure 5). Since they are now more than 20 years old, these studies are considered to be outdated today for statutory compliance purposes. The most recent study among the four, completed in 2002, included only a records search on the project area and no systematic field survey (#5055 in Figure 5). In addition to these, a recent survey covered the northernmost portion of the APE but is yet to be processed by the EIC (Tang et al. 2019). During that study, the drainage channel lying partially within the APE was recorded into the California Historical Resources Inventory as Site 33-028200 (CA-RIV-12721; see Appendix 3).

Within the one-mile scope of the records search, EIC records show 36 other previous studies on various tracts of land and linear features, which collectively covered roughly 60 percent of the land within the one-mile scope, mostly within the boundaries of March ARB (Figure 5). As a result of these and other similar studies in the vicinity, 246 additional historical/archaeological sites and one isolate—i.e., a locality with fewer than three artifacts—have been identified within one mile of the APE (see Appendix 4). One the 246 sites consisted of archaeological remains of WWII-era buildings, and the other 245 all represented built-environment features.

Among these localities, only the isolate was of prehistoric—i.e., Native American—origin, consisting of a bifacial mano fragment found on the ground about 0.75 mile southeast of the APE. All 246 of the sites dated to the historic period and included the former California Southern Railway (a Santa Fe Railway subsidiary), two other canals/channels, structural remains from Camp Haan, and a large number of buildings and structures. The vast majority of the buildings and structures were located in the March Field Historic District within March ARB, a National Register-listed property lying roughly a half-mile to the south of the APE. Other than Site 33-028200, all of these localities was found at least 1,500 feet from the APE. Therefore, none of them requires further consideration during this study.

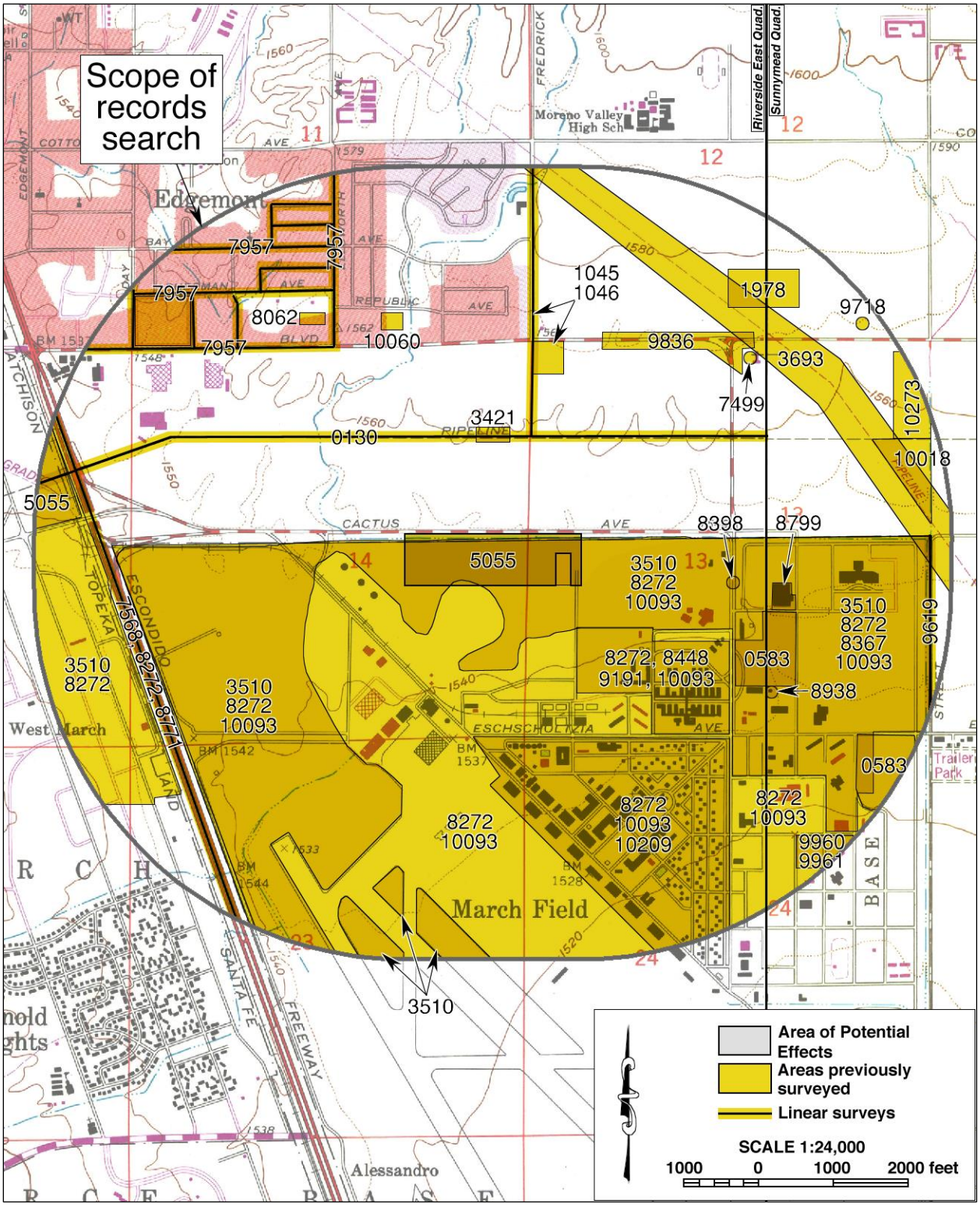


Figure 5. Previous cultural resources studies in the vicinity of the APE, listed by EIC file number. Locations of historical/archaeological sites are not shown as a protective measure.

GEOARCHAEOLOGICAL ANALYSIS

The geotechnical exploration report completed for this undertaking, based on a surface reconnaissance and nine exploratory borings, characterized the soil within the APE as a combination of undocumented artificial fill and older alluvium (Leighton 2018a:4). The artificial fill was noted mostly along Cactus Avenue and in the soil stockpiles, while the older alluvium was noted in all borings, at least below the surface (*ibid*.). The report describes these alluvial soils as "medium dense to very dense silty to clayey sand and localized layers of sandy silty to sandy clay" (*ibid*.).

The surface geology in the vicinity of the APE was mapped by Morton and Cox (1994) as *Qoa*, which represents Pleistocene-aged, "weakly to moderately indurated, yellowish-brown to reddish-brown, coarse-grained sandy alluvium" with "abundant silt and clay" as well as "silica-cemented hardpan." More recently, Morton et al. (2001) mapped the surface soils in the APE as $Qvof_a$, or very old (early Pleistocene, circa 2.6-0.8 million years ago) alluvial fan deposits, "mostly well-desiccated, well-indurated reddish-brown sand deposits." $Qvof_a$ is described further as commonly containing duripans and forming silcrete as well as being arenaceous.

According to existing ethnographic literature on Luiseño culture, "villages were usually in sheltered coves or canyons, on the side of slopes in a warm thermal zone, near good water supplies, and in defensive locations" (Bean and Shipek 1978:551). This is corroborated by observations made during numerous past studies that CRM TECH has completed in the Inland Empire region since 1993, which suggest that longer-term residential settlements of the Native population were more likely to occur near the base of hills and/or on elevated terraces or ridges near creeks or springs, while the level, unprotected valley floor was used mainly for resource procurement, travel, and occasional camping during these activities.

Based on this settlement pattern, the location of the APE, on an alluvial fan subject to occasional flooding but nearly 10 miles from any relatively steady streams, would not have provided a favorable setting for permanent or long-term habitation by the aboriginal population during prehistoric times. Instead, the area was more likely used as a travel route and for opportunistic sustenance activities, where surviving cultural remains are typically limited to the ground surface and shallow deposits.

In its current state, the APE has been disturbed by construction activities associated with March ARB, Cactus Avenue, and the drainage channel, and the surface and near-surface soils are mainly artificial fill. These soils offer a highly unlikely environment for any prehistoric archaeological deposits to survive intact. At depth, the early Pleistocene alluvial fan deposits well predate human habitation in California and would not be expected to contain deeply buried cultural materials. Overall, the proposed undertaking appears to have a minimal potential to impact any subsurface archaeological remains in the vertical APE.

NATIVE AMERICAN PARTICPATION

In response to CRM TECH's inquiry, the NAHC reported in a letter dated May 17, 2018, that the sacred lands record search identified no Native American cultural resources within the APE. Meanwhile, the NAHC cautioned that the area was sensitive for such resources and recommended

that local Native American groups be contacted for further information. For that purpose, the NAHC provided a list of potential contacts in the region (see Appendix 2).

Upon receiving the NAHC's reply, CRM TECH sent written requests for comments to all 16 tribes of Luiseño, Cahuilla, and Serrano heritage on the referral list. In addition to or in lieu of some of the individuals suggested by the NAHC, the designated spokespersons for the tribes were contacted as recommended previously by the appropriate tribal government staff. In all, the requests for comments were sent to 17 tribal representatives, and ten of the tribes have responded in writing while two others have provided their comments via telephone (see Appendix 2).

Among the 12 tribes that have responded, the San Manuel Band of Mission Indians noted that the APE was outside the tribe's ancestral territory and declined to participate in further consultations over this undertaking, while the Santa Rosa Band of Cahuilla Indians stated that the tribe had no concerns regarding the undertaking. The Agua Caliente Band of Cahuilla Indians and the Morongo Band of Mission Indians requested copies of all cultural resources documentation generated in association with the undertaking for tribal review.

The Augustine Band of Cahuilla Indians, the Cabazon Band of Mission Indians, the Cahuilla Band of Indians, the Pauma Band of Luiseño Indians, and the Rincon Band of Luiseño Indians stated that they had no information on any Native American cultural resources that may be affected by the proposed undertaking. Nonetheless, the Cahuilla Band and the Pauma Band requested to be kept appraised of future progress of the undertaking. The Augustine Band recommended further consultation with other tribes in the vicinity and monitoring during ground-disturbing activities in the APE. In addition, the Augustine Band requested to be notified if any Native American cultural resources were discovered during the undertaking, as did the Serrano Nation of Indians.

The Pechanga Band of Luiseño Indians and the Soboba Band of Luiseño Indians, which participated in the archaeological field survey of the APE, both found the project vicinity to be culturally sensitive, and both requested further government-to-government consultation with March JPA. Furthermore, the Pechanga Band and the Soboba Band requested the presence of their tribal monitors during all earth-moving activities in the APE, with the Pechanga Band also requesting the presence of an archaeological monitor. In addition, the Soboba Band provided a set of recommended procedures to address inadvertent discovery of Native American cultural remains (see Appendix 2).

HISTORICAL RESEARCH

Historical sources consulted during this study yielded no evidence of any settlement or development activities in the APE prior to the establishment of present-day March ARB. In the mid-1850s, when the U.S. government conducted the first systematic land surveys in the Moreno Valley-Riverside area, the only man-made feature observed in the vicinity was a "Wagon Road to Timicula" running generally north-south just to the west of the APE (Figure 6). By end of the 19th century, some widely scattered buildings had appeared in the surrounding area, but the only man-made feature in existence within or adjacent to the APE was part of a grid of crisscrossing roads (Figure 7).

In 1918, the U.S. Army built Alessandro Aviation Field in the project vicinity (Gunther 1984:13). The facility was renamed March Field later that year, and later the name was further changed to

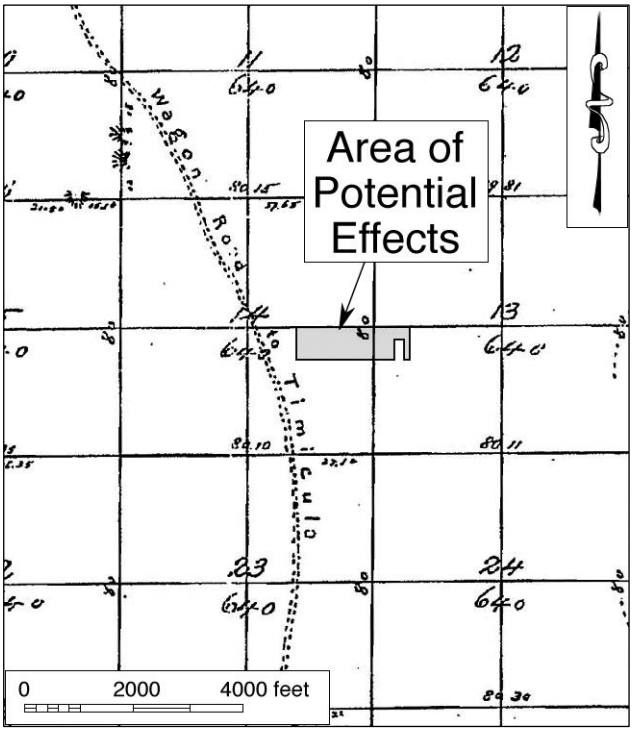


Figure 6. The APE and vicinity in 1853-1855. (Source: GLO 1856)

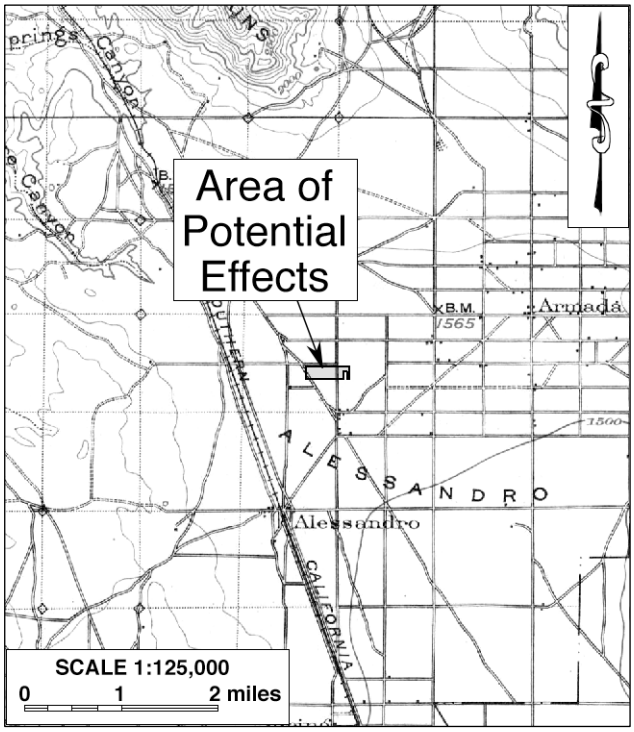


Figure 7. The APE and vicinity in 1897-1898. (Source: USGS 1901)

March Army Air Field in 1941, March Army Air Base in 1942, March Air Force Base in 1947, and finally March Air Reserve Base in 1996 (*ibid*.:310; March ARB n.d.). In 1941-1942, the APE became a part of the base when the U.S. government acquired several hundred acres in Sections 13 and 14 of T3S R4W, including the land "south of the centerline of Cactus Avenue," for a major base expansion in preparation for its wartime service as a bomber crew training facility that hosted as many as 75,000 troops (County Assessor 1937-1948; March ARB n.d.).

In the late 1930s, no man-made features were known to be present in the APE (Figure 8; Leighton 2018b). By the early 1950s, the drainage channel in the northern portion of the APE had been completed (Figure 9). The channel was most likely excavated during the 1941-1942 base expansion to convey seasonal storm runoff from the north to a preexisting channel along Heacock Street to the east (USGS 1943) and around the perimeter of the base. By the 1950s, the northern end of present-day Chanute Avenue was observed in the easternmost portion of the APE, and Cactus Avenue had been extended across the project vicinity, just outside the northern boundary of the APE (Figure 9; Leighton 2018b).

Between 1949 and 1959, a few small, apparently temporary structures were noted in the APE, while the eastern portion of the property was cleared and used for parking or storage (Leighton 2018b). All of these uses had ceased by the mid-1960s, however, and the entire APE has been vacant and largely unused since then (Fig. 10; NETR Online 1966-2012; Google Earth 1994-2018; Leighton 2018b). The substation adjacent to the APE was built sometime between 1989 and 1994, and the soil stockpiles appeared on the property in 2006-2008 (NETR Online 1978; 1994; Google Earth 2006;

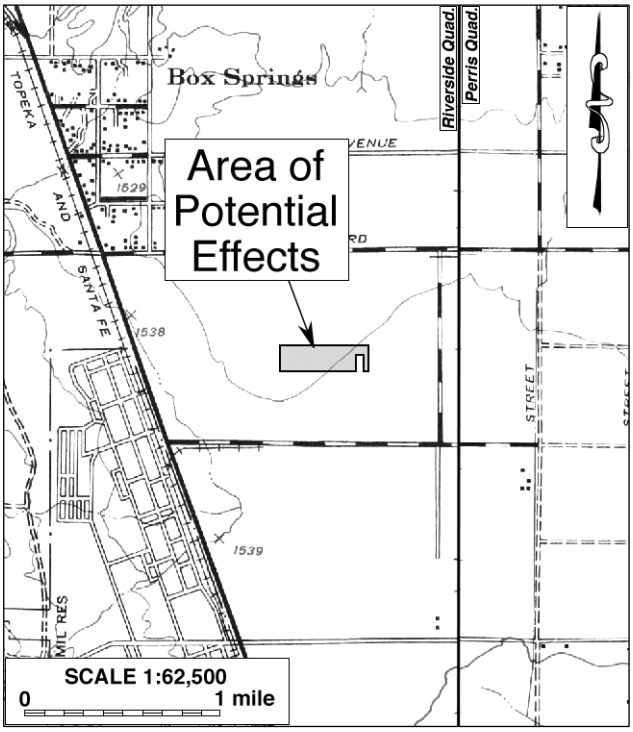


Figure 8. The APE and vicinity in 1939. (Source: USGS 1942; 1943)

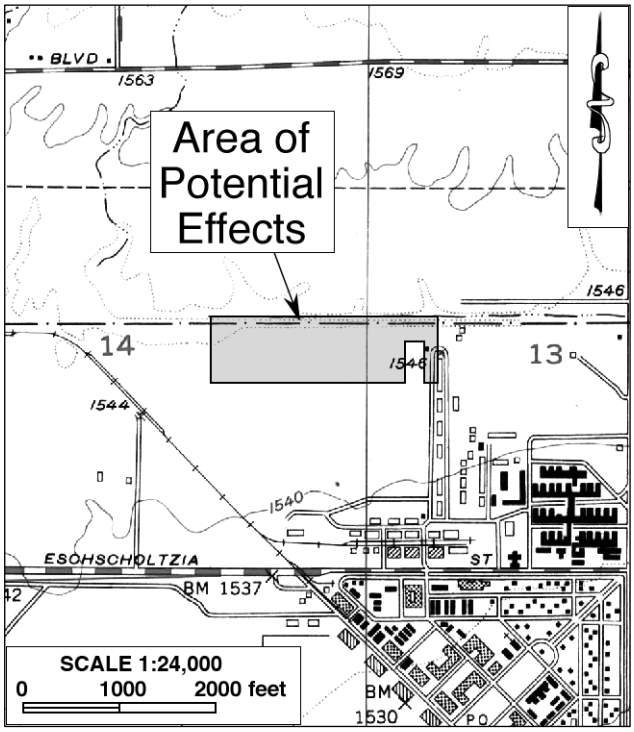


Figure 9. The APE and vicinity in 1951-1953. (Source: USGS 1953)

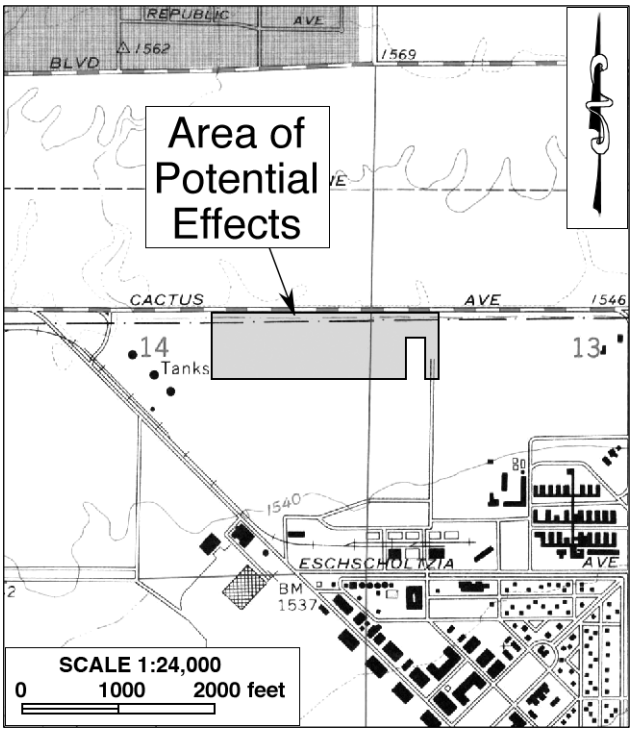


Figure 10. The APE and vicinity in 1966-1967. (Source: USGS 1967)

2008; Leighton 2018b). Other than these and the various dirt roads, no additional features have appeared within or immediately adjacent to the APE.

FIELD SURVEY

As mentioned above, the drainage channel across the northernmost portion of the APE was recorded during a recent study as Site 33-028200 (see Appendix 3). The segment of the channel in the APE measures typically 41 feet wide across the top, 18 feet wide across the bottom, and six feet deep, with gentle slopes along the banks. The bottom of the channel is covered by dense vegetation growth, and a part of the channel in the westernmost portion of the APE is filled with standing water (Figure 11). As a typical and unremarkable open earthen ditch, the drainage channel demonstrates no distinctively historical characteristics or features.



Figure 11. Earthen drainage channel across the northern edge of the APE (Site 33-028200), view to the northeast. (Photograph taken on June 1, 2018)



Figure 12. Abandoned segment of Chanute Avenue in the southeastern corner of the APE, view to the northwest. (Photograph taken on June 1, 2018)

Besides the channel, the small segment of Chanute Avenue in the southeastern corner of the APE is known to date to the 1950s (Leighton 2018b). The road was apparently well maintained and in use for accessing the substation until around 2006, but has since been largely abandoned (Google Earth 1994-2018; Figure 12). As a minor, ubiquitous late-historic-period infrastructure feature that remained functional until recent years, the segment of Chanute Avenue in the APE does not retain any distinctively historical character, and is not considered a potential "historic property" or "historical resource." Therefore, it requires no further study or formal recordation into the California Historical Resources Inventory.

No other features or artifacts more than 50 years of age were encountered within the APE. The APE is devoid of any bedrock outcrops, which often contain bedrock milling features, the most common type of prehistoric archaeological sites to be found in the Moreno Valley area, nor was any other indication of prehistoric or historical cultural remains observed during the field survey.

MANAGEMENT CONSIDERATIONS

APPLICABLE STATUTORY/REGULATORY FRAMEWORK

Section 106 of NHPA mandates that federal agencies take into account the effects of their undertakings on historic properties and seek ways to avoid, minimize, or mitigate any adverse effects on such properties (36 CFR 800.1(a)). Similarly, CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired."

The purpose of this study is to identify any "historic properties" or "historical resources" that may exist within the APE. "Historic properties," as defined by the Advisory Council on Historic

Preservation, include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" (36 CFR 800.16(l)). The eligibility for inclusion in the National Register is determined by applying the following criteria, developed by the National Park Service as per provision of NHPA:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

For CEQA-compliance considerations, the State of California's Public Resources Code (PRC) establishes the definitions and criteria for "historical resources," which require similar protection to what NHPA Section 106 mandates for "historic properties." "Historical resources," according to PRC §5020.1(j), "includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California."

More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the lead agency (Title 14 CCR §15064.5(a)(1)-(3)). Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate that "generally a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

> (1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
> (2) Is associated with the lives of persons important in our past.
> (3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
> (4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

A local register of historical resources, as defined by PRC §5020.1(k), "means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution." For properties in the County of Riverside, the County maintains a list of officially designated Historic Landmarks, but the lead local agency for this undertaking, namely March JPA, does not maintain its own register of officially designated or recognized historical

resources, nor has it implemented any additional regulations or guidelines to be applied to cultural resources under its jurisdiction.

DISCUSSION

In summary of the research results presented above, Site 33-028200, the earthen drainage channel across the northernmost portion of the APE, is the only potential "historic property"/"historical resource" that may be affected by the proposed undertaking. The construction of the channel dates to the 1941-1953 era, most likely the early 1940s. As stated in the recent study that resulted in the recordation of the site:

> Evidently excavated during the expansion of March Army Air Field, the channel is a peripheral feature associated with the establishment the large WWII-era military base, but does not demonstrate a unique or particularly close association with that event or with any other events (Criterion A/1) or persons (Criterion B/2) of recognized historic significance. Simple in design and utilitarian in character, the channel does not stand out as an important example of any style, type, period, region, or method of construction, nor is it known to represent the work of a prominent architect, designer, engineer, or builder (Criterion C/3). Finally, as a late-historic-period infrastructure feature of standard construction, it demonstrates little potential for any important historical/archaeological information (Criterion D/4). (Tang et al. 2019:14-15)

Based on these considerations, and in light of the criteria listed above, the drainage channel at Site 33-028200 does not appear to meet any of the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and does not qualify as a "historic property" or a "historical resource." No other potential "historic properties" or "historical resources" of either prehistoric or historical origin were identified throughout the various avenues of research, and the subsurface sediments in the vertical APE appear to be low in sensitivity for potentially significant archaeological remains in buried deposits. Therefore, the present study concludes that no "historic properties" or "historical resources" are present within the APE.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the results of this study indicate that no "historic properties" or "historical resources" are known to be present within the APE, and the subsurface sediments in the APE appear to be low in sensitivity for potentially significant archaeological deposits. Based on these findings, and pursuant to 36 CFR 800.4(d)(1) and Calif. PRC §21084.1, CRM TECH presents the following recommendations to March JPA and the appropriate federal agencies:

- No "historic properties" or "historical resources" will be affected by the proposed undertaking.
- No further cultural resources investigation will be necessary for the undertaking unless project plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are inadvertently discovered during earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the find.

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County of Riverside
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1927 Plat map of Edgemont Gardens; Map Book 15, Page 90. Microfiche on file, Riverside County Surveyor's Office, Riverside.
1937-1948 Real property tax assessment records, Book 11, Map 29. Microfiches on file, Riverside County Assessor's Office, Riverside.

GLO (General Land Office, U.S. Department of the Interior)
1856 Plat Map: Township No. III South Range No. IV West, San Bernardino Baseline and Meridian; surveyed in 1853-1855.

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2002 Archaeological Survey of the Charter Communications Cable Project, Mountaintop Ranger District, San Bernardino National Forest, California. San Bernardino National Forest Technical Report 05-12-BB-102. San Bernardino.

Goodman, John D., II, and M. McDonald
2001 Archaeological Survey of the Southern California Trials Association Event Area, Little Pine Flats, Mountaintop Ranger District, San Bernardino National Forest, California. San Bernardino National Forest Technical Report 05-12-BB-106. San Bernardino.

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1994-2018 Aerial photographs of the project vicinity taken in 1994, 2002-2006, 2008, 2009, 2011-2014, and 2016-2018. Available through the Google Earth software.

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1997 Continuity and Change: 8,500 Years of Lacustrine Adaptation on the Shores of Lake Elsinore. Statistical Research Technical Series 59. Statistical Research, Inc., Tucson, Arizona.

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1989 Data Recovery at the Cole Canyon Site (CA-RIV-1139), Riverside County, California. *Pacific Coast Archeological Society Quarterly* 25.
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2018b Phase I and Limited Phase II Environmental Site Assessment: Proposed Industrial Warehouse Site K-4, Unincorporated Riverside County, near City of Moreno Valley, California. Appendix G: The EDR Aerial Photo Decade Package. Report prepared by Leighton Consulting, Inc., Rancho Cucamonga, California.
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2008 Archaeological Investigation at Baldy Mesa-Cajon Divide for the Baldy Mesa Off-Highway-Vehicle Recreation Trails Project, San Bernardino National Forest, San Bernardino County, California. San Bernardino National Forest Technical Report 05-12-53-091. San Bernardino.
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USGS (United States Geological Survey, U.S. Department of the Interior)
1901 Map: Elsinore, Calif. (30', 1:125,000); surveyed in 1897-1898.
1942 Map: Riverside, Calif. (15', 1:62,500); aerial photographs taken in 1939.
1943 Map: Perris, Calif. (15', 1:62,500); aerial photographs taken in 1939.
1953 Map: Riverside East, Calif. (7.5', 1:24,000); aerial photographs taken in 1951, field-checked in 1953.
1967 Map: Riverside East, Calif. (7.5', 1:24,000); aerial photographs taken in 1966, field-checked in 1967.
1969 Map: San Bernardino, Calif. (1:250,000); 1958 edition revised.
1979 Map: Santa Ana, Calif. (1:250,000); 1959 edition revised.
1980a Map: Riverside East, Calif. (7.5', 1:24,000); 1967 edition photorevised in 1978.
1980b Map: Sunnymead, Calif. (7.5', 1:24,000); 1967 edition photorevised in 1978.
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APPENDIX 1
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.
2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (with Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.
2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U. C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U. C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT GEOLOGIST/ARCHAEOLOGIST
Harry M. Quinn, M.S.

Education

1978 Certificate in Archaeology, University of California, Los Angeles.
1968 M.S., Geology, University of Southern California, Los Angeles.
1964 B.S., Geology, Long Beach State College, Long Beach.
1962 A.A., Los Angeles Harbor College, Wilmington.

2001 "The Art and Science of Flintknapping," presented by Jeanne D. Binning, Zzyzx.
1999 "Certified Local Government Preservation Commission, Board, and Staff Training Program," presented by the California Preservation Foundation, Long Beach and Palm Springs.
1998 "Historic Archaeology Workshop," presented by Richard Norwood, Torres-Martinez Indian Reservation.
1997 "Native American Archaeology," presented by Russell Kaldenberg, College of the Desert, Palm Desert.
1996-1998 "Project Archaeology," presented by BLM and DOE, North Palm Springs.
1996 "Mojave Desert Heritage Interagency Workshop," Palm Springs,.
1996 "Cultural Resources and CEQA: Your Responsibility," presented by the Association of Environmental Professionals, Hemet.
1991 "Ceramic Workshop," presented by Dr. Jerry Schaefer, Palm Springs.
1990 "Introduction to Coachella Valley Archaeology," presented by Anne Duffield, Palm Desert.
1989 "Prehistoric Rock Art and Archaeology of the Southern California Deserts," presented by Anne Duffield, UC Riverside Extension, Palm Springs.

Professional Experience

1998- Project Archaeologist/Field Director, CRM TECH, Riverside/Colton, California.
1994-1996 Environmental Geologist, E.C.E.S., Inc., Redlands, California.
1992-1998 Independent Geological/Archaeological/Environmental Consultant, Pinyon Pines.
1988-1992 Project Geologist/Director of Environmental Services, STE Associates/Soil and Testing Engineers, San Bernardino, California.
1966-1988 Geologist/Senior Geologist, Texaco, Inc., Los Angeles; Tenneco Oil Exploration and Production, Englewood, Colorado; Loco Exploration, Inc., Aurora, Colorado; Jirsa Environmental Services, Norco, California.

Memberships

Society for American Archaeology; Society for California Archaeology; Archaeological Survey Association of Southern California; Coachella Valley Archaeological Society (President, 1993-1994, 2000; Vice President, 1992, 1995-1999, 2001; Basic Archaeology Training Course Instructor, 1996-2000; Environmental Assessment Committee Chair, 1997-1999); Coachella Valley Historical Society; Malki Museum; Southwest Museum; El Paso Archaeological Society; Ohio Archaeological Society; West Virginia Archaeological Society; Museum of the Fur Trade; Cahokia Mounds Association.

PROJECT ARCHAEOLOGIST/REPORT WRITER
Ben Kerridge, M.A.

Education

2014	Archaeological Field School, Institute for Field Research, Kephallenia, Greece.
2010	M.A., Anthropology, California State University, Fullerton.
2009	Project Management Training, Project Management Institute/CH2M HILL, Santa Ana, California.
2004	B.A., Anthropology, California State University, Fullerton.

Professional Experience

2015-	Project Archaeologist/Report Writer, CRM TECH, Colton, California.
2015	Teaching Assistant, Institute for Field Research, Kephallenia, Greece.
2009-2014	Publications Delivery Manager, CH2M HILL, Santa Ana, California.
2010-	Naturalist, Newport Bay Conservancy, Newport Beach, California.
2006-2009	Technical Publishing Specialist, CH2M HILL, Santa Ana, California.

Memberships

Society for California Archaeology; Pacific Coast Archaeological Society.

PROJECT ARCHAEOLOGIST/NATIVE AMERICAN LIAISON
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004- Project Archaeologist, CRM TECH, Riverside/Colton, California.

- Surveys, excavations, construction monitoring, field recordation, mapping, records searches, and Native American liaison.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* Seventeen local Native American representatives were contacted during this study, representing a total of 16 tribal organizations (highlighted in the NAHC referral list); a sample letter is included in the appendix.

SACRED LANDS FILE RECORDS SEARCH & NATIVE AMERICAN

CONTACTS LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916)373-3710
(916)373-5471 Fax
nahc@pacbell.net

Project: Proposed K-4 Parcel Project (CRM TECH No. 3347)

County: Riverside

USGS Quadrangle Name: Riverside East and Sunnymead, Calif.

Township 3 South **Range** 4 West SB **BM; Section(s)** 13 and 14

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The primary component of the project is to develop approximately 35 acres located along the south side of Cactus Avenue between Veterans Way and Frederick Street within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California.

May 14, 2018

From: ngallardo@crmtech.us
Sent: Monday, May 14, 2018 2:40 PM
To: 'Tony Foussat'
Subject: Cultural Study and Participation in Fieldwork for the Proposed K-4 Parcel Project, near the City of Moreno Valley, Riverside County (CRM TECH No. 3347)

Hello,

I'm emailing to inform you that CRM TECH will be conducting a cultural study for the Proposed K-4 Parcel Project near the City of Moreno Valley, Riverside County (CRM TECH No. 3347). I'm contacting you to see if the tribe would like to participate in the field survey for the project and we will contact the tribe again when we have a specific time and date for the fieldwork. We would appreciate any information regarding the project area. We will be sending an NA scoping letter with additional information in a few weeks. I'm attaching the proposed project area map and other information.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

From: ngallardo@crmtech.us
Sent: Monday, May 14, 2018 2:42 PM
To: 'Jessica Valdez'; jontiveros@soboba-nsn.gov
Subject: Cultural Study and Participation in Fieldwork for the Proposed K-4 Parcel Project, near the City of Moreno Valley, Riverside County (CRM TECH No. 3347)

Hello,

I'm emailing to inform you that CRM TECH will be conducting a cultural study for the Proposed K-4 Parcel Project near the City of Moreno Valley, Riverside County (CRM TECH No. 3347). I'm contacting you to see if the tribe would like to participate in the field survey for the project and we will contact the tribe again when we have a specific time and date for the fieldwork. We would appreciate any information regarding the project area. We will be sending an NA scoping letter with additional information in a few weeks. I'm attaching the proposed project area map and other information.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

From: ngallardo@crmtech.us
Sent: Monday, May 14, 2018 2:44 PM
To: 'Ray Huaute'; Tribal Historic Preservation Officer; 'dtorres@morongo-nsn.gov'
Subject: Cultural Study and Participation in Fieldwork for the Proposed K-4 Parcel Project, near the City of Moreno Valley, Riverside County (CRM TECH No. 3347)

Hello,

I'm emailing to inform you that CRM TECH will be conducting a cultural study for the Proposed K-4 Parcel Project near the City of Moreno Valley, Riverside County (CRM TECH No. 3347). I'm contacting you to see if the tribe would like to participate in the field survey for the project and we will contact the tribe again when we have a specific time and date for the fieldwork. We would appreciate any information regarding the project area. We will be sending an NA scoping letter with additional information in a few weeks. I'm attaching the proposed project area map and other information.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

STATE OF CALIFORNIA — Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

May 17, 2018

Nina Gallardo
CRM TECH

Sent by E-mail: ngallardo@crmtech.us

RE: Proposed K-4 Parcel (CRM TECH No. 3347) Project, near the Community of Edgemont; Riverside East and Sunnymead USGS Quadrangles, Riverside County, California

Dear Ms. Gallardo:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results however the area within the APE provided is sensitive for cultural resources. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

CONFIDENTIALITY NOTICE: This communication with its contents may contain confidential and/or legally privileged information. It is solely for the use of the intended recipient(s). Unauthorized interception, review, use or disclosure is prohibited and may violate applicable laws including the Electronic Communications Privacy Act. If you are not the intended recipient, please contact the sender and destroy all copies of the communication.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264 — Luiseno
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264 — Luiseno
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

Cahuilla Band of Indians
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

Campo Band of Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Kumeyaay
Campo, CA, 91906
Phone: (619) 478 - 9046
Fax: (619) 478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Tribal Office
Robert Pinto, Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
wmicklin@leaningrock.net

Ewiiaapaayp Tribal Office
Michael Garcia, Vice Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
michaelg@leaningrock.net

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 — Kumeyaay
Jamul, CA, 91935
Phone: (619) 669 - 4785
Fax: (619) 669-4817
mohusky@jiv-nsn.gov

La Jolla Band of Luiseno Indians
Thomas Rodriguez, Chairperson
22000 Highway 76 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 3771

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
LP13boots@aol.com

La Posta Band of Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
jmiller@LPtribe.net

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Los Coyotes Band of Mission Indians
John Perada, Environmental Director
P. O. Box 189 — Cahuilla
Warner Springs, CA, 92086
Phone: (760) 782 - 0712
Fax: (760) 782-2730

Los Coyotes Band of Mission Indians
Shane Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712
Chapparosa@msn.com

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

Pauma Band of Luiseno Indians - Pauma & Yuima Reservation
Temet Aguilar, Chairperson
P.O. Box 369 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6000
Fax: (951) 695-1778
epreston@pechanga-nsn.gov

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resources Coordinator
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6306
Fax: (951) 506-9491
pmacarro@pechanga-nsn.gov

Ramona Band of Cahuilla Mission Indians
John Gomez, Environmental Coordinator
P. O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramonatribe.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairperson
P.O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramonatribe.com

Rincon Band of Mission Indians
Bo Mazzetti, Chairperson
1 West Tribal Road — Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
bomazzetti@aol.com

Rincon Band of Mission Indians
Jim McPherson, Tribal Historic Preservation Officer
1 West Tribal Road — Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
vwhipple@rincontribe.org

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Serrano
Phone: (503) 539 - 0933 — Tataviam
Fax: (503) 574-3308
ddyocum@comcast.net

San Manuel Band of Mission Indians
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Santa Rosa Band of Mission Indians
Steven Estrada, Chairperson
P.O. Box 391820 — Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
mflaxbeard@santarosacahuilla-nsn.gov

Serrano Nation of Mission Indians
Goldie Walker, Chairperson
P.O. Box 343 — Serrano
Patton, CA, 92369
Phone: (909) 528 - 9027

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 — Cahuilla
San Jacinto, CA, 92581 — Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Soboba Band of Luiseno Indians
Carrie Garcia, Cultural Resources Manager
P. O. Box 487 — Cahuilla
San Jacinto, CA, 92583 — Luiseno
Phone: (951) 654 - 2765
Fax: (951) 654-4198
carrieg@soboba-nsn.gov

Soboba Band of Luiseno Indians
Scott Cozart, Chairperson
P. O. Box 487 — Cahuilla
San Jacinto, CA, 92583 — Luiseno
Phone: (951) 654 - 2765
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935
lhaws@sycuan-nsn.gov

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 445 - 2613
Fax: (619) 445-1927
ssilva@sycuan-nsn.gov

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 — Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

Viejas Band of Kumeyaay Indians
Julie Hagen,
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

Viejas Band of Kumeyaay Indians
Robert Welch, Chairperson
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

May 18, 2018

Patricia Garcia-Plotkin, Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

RE: Proposed K-4 Parcel Project
Assessor's Parcel Numbers 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004
35.4 Acres near the City of Moreno Valley, Riverside County, California
CRM TECH Contract #3347

Dear Ms. Garcia-Plotkin:

I am writing to bring your attention to an ongoing CEQA- and Section 106-compliance study for the proposed project referenced above. The undertaking entails the construction of a business park on approximately 35.4 acres of vacant land in APNs 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004, located along the south side of Cactus Avenue between Veterans Way and Frederick Street within the March Joint Powers Authority jurisdiction in unincorporated Riverside County. The Area of Potential Effects (APE) previously was part of a 2,500-acre cultural resources study conducted in 1995, but no cultural resources were identified at that time. The accompanying map, based on the USGS Riverside East and Sunnymead, Calif., 7.5' quadrangles, depicts the location of the project area in Sections 13 and 14, T3S R4W, SBBM.

In a letter dated May 17, 2018, the Native American Heritage Commission (NAHC) reports that the sacred lands record search identified no Native American cultural resources within the APE, but the area is sensitive for cultural resources. The NAHC recommends that local Native American groups be contacted for further information (see attached). Therefore, as part of the cultural resources study for this project, I am writing to request your input on potential Native American cultural resources in or near the APE.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value in or near the APE, or any other information to consider during the cultural resources investigations. Any information or concerns may be forwarded to CRM TECH by telephone, e-mail, facsimile, or standard mail. Requests for documentation or information we cannot provide will be forwarded to our client and/or the lead agency, namely the March Joint Powers Authority.

We would also like to clarify that, as the cultural resources consultant for the project, CRM TECH is not involved in the AB 52-compliance process or in government-to-government consultations. The purpose of this letter is to seek any information that you may have to help us determine if there are cultural resources in or near the project area that we should be aware of and to help us assess the sensitivity of the APE. Thank you for your time and effort in addressing this important matter.

Respectfully,

Nina Gallardo
Project Archaeologist/Native American liaison
CRM TECH
Email: ngallardo@crmtech.us

Encl.: NAHC response letter and project location map

From: Cultural Pauma <cultural@pauma-nsn.gov>
Sent: Monday, May 21, 2018 7:59 AM
To: ngallardo@crmtech.us
Cc: Dixon, Patti; Jeremy Zagarella
Subject: RE: NA Scoping Letter for the Proposed K-4 Parcel Project; APNs 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004, near the City of Moreno Valley, Riverside County (CRM TECH #3347)

Ms. Gallardo,

Thank you for the notice for the K-4 Parcel Project. We are unaware of any Cultural sites or resources within the proposed project area. Please keep us appraised of the project as it progresses. If there are any questions, please contact us.

Thank you,

Mr. Chris Devers
Cultural Liaison
Pauma Band of Luiseno Indians

From: Jessica Mauck <JMauck@sanmanuel-nsn.gov>
Sent: Monday, May 21, 2018 11:52 AM
To: ngallardo@crmtech.us
Subject: RE: NA Scoping Letter for the Proposed K-4 Parcel Project; APNs 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004, near the City of Moreno Valley, Riverside County (CRM TECH #3347)

Hi Nina,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 18 May 2018. The proposed project is located just outside of Serrano ancestral territory and, as such, SMBMI will not request consulting party status or elect to participate in the scoping, development, and/or review of documents created pursuant to these legal and regulatory mandates.

Regards,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive, Highland California 92346

From: Cultural Department <culturaldirector@cahuilla.net>
Sent: Tuesday, May 22, 2018 3:24 PM
To: ngallardo@crmtech.us
Cc: anthonymad2002@gmail.com
Subject: Re: NA Scoping Letter for the Proposed K-4 Parcel Project; APNs 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004, near the City of Moreno Valley, Riverside County (CRM TECH #3347)

Dear Ms. Gallardo,

The Cahuilla Band of Indians has received your letter on May 18, 2018 regarding the proposed K-4 Parcel Project APN 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004 in the City of Moreno Valley, Riverside County, CA. The Cahuilla band does not have knowledge of any cultural resources/sites within or near the project site. Although the project is outside the Cahuilla reservation boundary, it is within the Cahuilla traditional land use area. We respectfully request to be notified of all updates and /or changes with the project moving forward and appreciate your help in preserving Tribal Cultural Resources in your project.

Respectfully,

BobbyRay Esparza
Cultural Coordinator
Cahuilla Band of Indians
Cell: (760)423-2773
Office: (951)763-5549
Fax:(951)763-2808

CABAZON BAND OF MISSION INDIANS
Indio • • CA

May 24, 2018

Nina Gallardo
Project Archaeologist/Native American Liaison
CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re.: Proposed K-4 Parcel Project
Assessor's Parcel Nos. 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004
35.4 Acres in the City of Moreno Valley
Riverside, County, California
CRM TECH Contract #3347

Dear Ms. Gallardo:

Thank you for contacting the Cabazon Band of Mission Indians concerning cultural resource information relative to the above referenced project.

The project is located outside of the Tribe's current reservation boundaries. The Tribe has no specific archival information on the site indicating that it may be a sacred/religious site or other site of Native American traditional cultural value within the project area.

We look forward to continued collaboration in the preservation of cultural resources or areas of traditional cultural importance.

Best regards,

Judy Stapp
Director of Cultural Affairs

RECEIVED
MAY 29 2018
BY: .....

84-245 INDIO SPRINGS PARKWAY • INDIO, CALIFORNIA 92203-3499 • 760.342.2593 • FAX: 760.347.7880

AUGUSTINE BAND OF CAHUILLA INDIANS

PO Box 846 84-481 Avenue 54 Coachella CA 92236
Telephone: (760) 398-4722
Fax (760) 369-7161
Tribal Chairperson: Amanda Vance
Tribal Vice-Chairperson: William Vance
Tribal Secretary: Victoria Martin

May 25, 2018

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

RE: **Proposed K-4 Parcel Project. Assessor's Parcel Numbers 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004**
35.4 Acres Near in the City of Moreno Valley Riverside County, California
CRM TECH Contract #3347

Dear Ms. Gallardo -

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project, and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources has resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time we are unaware of specific cultural resources that may be affected by the proposed project. We encourage you to contact other Native American Tribes and individuals within the immediate vicinity of the project site that may have specific information concerning cultural resources that may be located in the area. We also encourage you to contract with a monitor who is qualified in Native American cultural resources identification and who is able to be present on-site full-time during the pre-construction and construction phase of the project. Please notify us immediately should you discover any cultural resources during the development of this project.

Very truly yours,

Victoria Martin
Tribal Secretary

RECEIVED
MAY 31 2018

PECHANGA CULTURAL RESOURCES
Temecula Band of Luiseño Mission Indians

Post Office. Box 2183 • Temecula, CA 92593
Telephone (951) 770-6300 • Fax (951) 506-9491

Chairperson:
Neal Ibanez

Vice Chairperson:
Bridgett Barcello

Committee Members:
Andrew Masiel, Sr.
Darlene Miranda
Evie Gerber
Richard B. Scearce, III
Robert Villalobos

Director:
Gary DuBois

Coordinator:
Paul Macarro

Planning Specialist:
Tuba Ebru Ozdil

June 7, 2018

VIA E-Mail and USPS

Nina Gallardo, Project Archaeologist/ Native American Liaison
CRM Tech
1016 E. Cooley Drive. Suite A/B
Colton, CA 92324

RE: Request for Information for the Proposed K-4 Parcel Project in the City of Moreno Valley.

Dear Mr. Gallardo,

The Pechanga Band of Luiseño Indians ("the Tribe") appreciates your request for information regarding the above referenced Project. After reviewing the provided maps and our internal documents, we have determined that the Project area is not within reservation lands although it is within our ancestral territory.

At this time, the Tribe is interested in participating in this Project since it is located within a highly sensitive Luiseño cultural area. The project site is located less than 2 miles of an extensive Luiseño habitation area, which includes sacred and ceremonial resources. The Tribe understands that the eastern portion of the APE has been previously disturbed; however, due to the projects proximity to a very large habitation area the Tribe believes that there is a possibility of recovering subsurface resources during ground-disturbing activities.

The Tribe is dedicated to providing comprehensive cultural information to you and your firm for inclusion in the archaeological study as well as to the Lead Agency for CEQA review. At this time, the Tribe requests the following so we may continue the consultation process and to provide adequate and appropriate recommendations for the Project:

1) Notification once the Project begins the entitlement process, if it has not already;
2) Copies of all applicable archaeological reports, site records, proposed grading plans and environmental documents (EA/IS/MND/EIR, etc.);
3) Government-to-government consultation with the Lead Agency; and
4) The Tribe believes that monitoring by a Riverside County qualified archaeologist and a professional Pechanga Tribe monitor may be required during earthmoving activities. Therefore, the Tribe reserves its right to make additional comments and recommendations once the environmental documents have been received and fully reviewed. Further, in the event that subsurface cultural resources are identified, the

RECEIVED
JUN 11 2018
BY: .....

Tribe requests consultation with the Project proponent and Lead Agency regarding the treatment and disposition of all artifacts.

As a sovereign governmental entity, the Tribe is entitled to appropriate and adequate government-to-government consultation regarding the proposed Project. We would like you and your client to know that the Tribe does not consider initial inquiry letters from project consultants to constitute appropriate government-to-government consultation, but rather tools to obtain further information about the Project area. Therefore, the Tribe reserves its rights to participate in the formal environmental review process, including government-to-government consultation with the Lead Agency, and requests to be included in all correspondence regarding this Project.

Please note that we are interested in participating in surveys within Luiseño ancestral territory. Prior to conducting any surveys, please contact the Cultural Department to schedule specifics. Please be advised, the lead contact for this project is our Cultural Analyst, Ebru Ozdil, and she can be reached at eozdil@pechanga-nsn.gov or at (951) 770-6313. If you have any questions or concerns regarding this letter, please contact me at crs@pechanga-nsn.gov or 951-770-6314.

Sincerely,

Molly Earp-Escobar
Cultural Resource Specialist

RINCON BAND OF LUISEÑO INDIANS

Cultural Resources Department

1 W. Tribal Road · Valley Center, California 92082 ·
(760) 297-2635 Fax:(760) 692-1498

June 19, 2018

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re: K-4 Parcel Project

Dear Gallardo:

This letter is written on behalf of the Rincon Band of Luiseño Indians. We have received your notification regarding the K-4 Parcel Project and we thank you for the opportunity to consult on this project. The identified location is within the Territory of the Luiseño people, and is also within Rincon's specific area of Historic interest.

Embedded in the Luiseño territory are Rincon's history, culture and identity. Rincon does not have knowledge of any known cultural resources in the proposed project area. We do not request consultation at this time.

If you have additional questions or concerns please do not hesitate to contact our office at your convenience at (760) 297-2635.

Thank you for the opportunity to protect and preserve our cultural assets.

Sincerely,

Destiny Colocho
Director
Rincon Cultural Resources

Bo Mazzetti, Tribal Chairman · Tishmall Turner, Vice Chairwoman · Steve Stallings, Council Member · Laurie E. Gonzalez, Council Member · Alfonso Kolb, Council Member

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

05-009-2018-001

June 20, 2018

[VIA EMAIL TO:ngallardo@crmtech.us]
CRM TECH
Ms. Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re: K-4 Parcel Development

Dear Ms. Nina Gallardo,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the K-4 Parcel Development project. The project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area. For this reason, the ACBCI THPO requests the following:

*A copy of the records search with associated survey reports and site records from the information center.

*Copies of any cultural resource documentation (report and site records) generated in connection with this project.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760)699-6829. You may also email me at ACBCI-THPO@aguacaliente.net.

Cordially,

Katie Croft

Katie Croft
Cultural Resources Manager
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
T 760/699/6800 F 760/699/6924 WWW.AGUACALIENTE-NSN.GOV

June 27, 2018

Attn: Nina Gallardo, Project Archaeologist/NA Liaison
CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324

SOBOBA BAND OF LUISEÑO INDIANS
EST. JUNE 19, 1883

RE: Proposed K-4 Parcel Project – along the south side of Cactus Avenue between Veterans Way and Frederick Street within the March Joint Powers Authority jurisdiction (APNs 297-150-006, 297-150-007, 297-150-038, 297-160-005, 297-200-004) – City of Moreno Valley, Riverside County, CA

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your project. The information provided to us on said project has been assessed through our Cultural Resource Department, where it was concluded that although it is outside the existing reservation, the project area does fall within the bounds of our Tribal Traditional Use Areas. This project location is in proximity to known sites, is a shared use area that was used in ongoing trade between the tribes, and is considered to be culturally sensitive by the people of Soboba.

Soboba Band of Luiseño Indians is requesting the following:

1. To initiate a consultation with the project proponents and lead agency.
2. The transfer of information to the Soboba Band of Luiseno Indians regarding the progress of this project should be done as soon as new developments occur.
3. Soboba Band of Luiseño Indians continues to act as a consulting tribal entity for this project.
4. Working in and around traditional use areas intensifies the possibility of encountering cultural resources during the construction/excavation phase. For this reason the Soboba Band of Luiseño Indians requests that Native American Monitor(s) from the Soboba Band of Luiseño Indians Cultural Resource Department to be present during any ground disturbing proceedings. Including surveys and archaeological testing.
5. Request that proper procedures be taken and requests of the tribe be honored (Please see the attachment)

Multiple areas of potential impact were identified during an in-house database search. Specifics to be discussed in consultation with the lead agency.

Sincerely,

Joseph Ontiveros, Tribal Historic Preservation Officer
Soboba Band of Luiseño Indians
P.O. Box 487
San Jacinto, CA 92581
Phone (951) 654-5544 ext. 4137
Cell (951) 663-5279
jontiveros@soboba-nsn.gov

Cultural Items (Artifacts). Ceremonial items and items of cultural patrimony reflect traditional religious beliefs and practices of the Soboba Band. The Developer should agree to return all Native American ceremonial items and items of cultural patrimony that may be found on the project site to the Soboba Band for appropriate treatment. In addition, the Soboba Band requests the return of all other cultural items (artifacts) that are recovered during the course of archaeological investigations. Where appropriate and agreed upon in advance, Developer's archeologist may conduct analyses of certain artifact classes if required by CEQA, Section 106 of NHPA, the mitigation measures or conditions of approval for the Project. This may include but is not limited or restricted to include shell, bone, ceramic, stone or other artifacts.

The Developer should waive any and all claims to ownership of Native American ceremonial and cultural artifacts that may be found on the Project site. Upon completion of authorized and mandatory archeological analysis, the Developer should return said artifacts to the Soboba Band within a reasonable time period agreed to by the Parties and not to exceed (30) days from the initial recovery of the items.

Treatment and Disposition of Remains.

A. The Soboba Band shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and grave goods shall be treated and disposed of with appropriate dignity.

B. The Soboba Band, as MLD, shall complete its inspection within twenty-four (24) hours of receiving notification from either the Developer or the NAHC, as required by California Public Resources Code § 5097.98 (a). The Parties agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes.

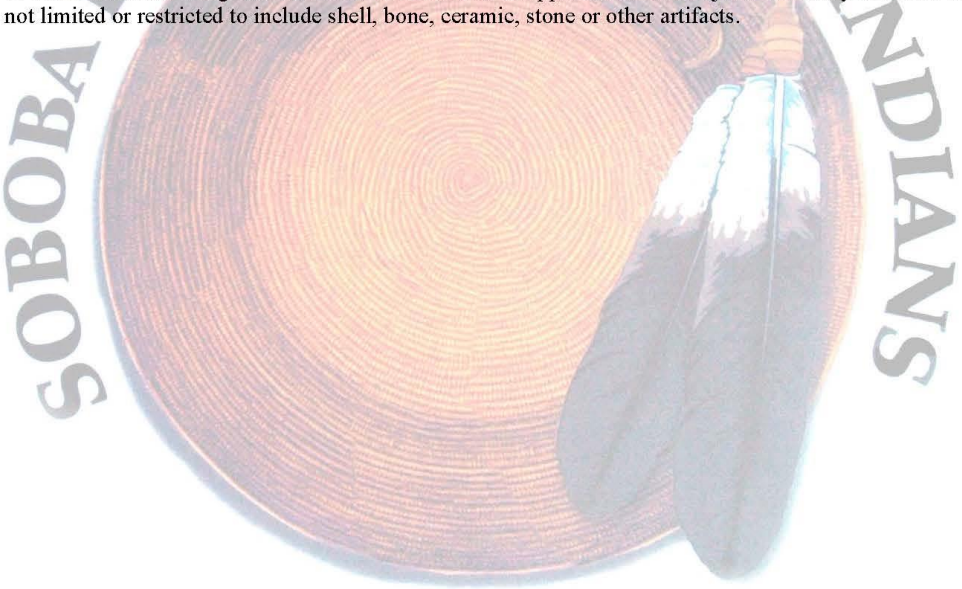
C. Reburial of human remains shall be accomplished in compliance with the California Public Resources Code § 5097.98 (a) and (b). The Soboba Band, as the MLD in consultation with the Developer, shall make the final discretionary determination regarding the appropriate disposition and treatment of human remains.

D. All parties are aware that the Soboba Band may wish to rebury the human remains and associated ceremonial and cultural items (artifacts) on or near, the site of their discovery, in an area that shall not be subject to future subsurface disturbances. The Developer should accommodate on-site reburial in a location mutually agreed upon by the Parties.

E. The term "human remains" encompasses more than human bones because the Soboba Band's traditions periodically necessitated the ceremonial burning of human remains. Grave goods are those artifacts associated with any human remains. These items, and other funerary remnants and their ashes are to be treated in the same manner as human bone fragments or bones that remain intact

Coordination with County Coroner's Office. The Lead Agencies and the Developer should immediately contact both the Coroner and the Soboba Band in the event that any human remains are discovered during implementation of the Project. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c).

Non-Disclosure of Location Reburials. It is understood by all parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agencies, will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r). Ceremonial items and items of cultural patrimony reflect traditional religious beliefs and practices of the Soboba Band. The Developer agrees to return all Native American ceremonial items and items of cultural patrimony that may be found on the project site to the Soboba Band for appropriate treatment. In addition, the Soboba Band requests the return of all other cultural items (artifacts) that are recovered during the course of archaeological investigations. Where appropriate and agreed upon in advance, Developer's archeologist may conduct analyses of certain artifact classes if required by CEQA, Section 106 of NHPA, the mitigation measures or conditions of approval for the Project. This may include but is not limited or restricted to include shell, bone, ceramic, stone or other artifacts.



Confidentiality: The entirety of the contents of this letter shall remain confidential between Soboba and the March Joint Powers Authority, as well as hired consultant (CRM TECH). No part of the contents of this letter may be shared, copied, or utilized in any way with any other individual, entity, municipality, or tribe, whatsoever, without the expressed written permission of the Soboba Band of Luiseño Indians.

From: Gabriella Rubalcava <grubalcava@santarosacahuilla-nsn.gov>
Sent: Thursday, July 5, 2018 2:55 PM
To: ngallardo@crmtech.us
Subject: RE: NA Scoping Letter for the Proposed K-4 Parcel Project; APNs 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004, near the City of Moreno Valley, Riverside County (CRM TECH #3347)

Good afternoon,

The Santa Rosa Band of Cahuilla Indians would like to thank you for your consultation efforts in regards to the above-mentioned project. After reviewing the projects it has been determined that the Band does have concerns in regards to cultural resources at this time.

Thank you,

Gabriella Rubalcava
Santa Rosa Band of Cahuilla Indians
Envrionmental Director

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

05-009-2018-001

August 08, 2018

[VIA EMAIL TO:ngallardo@crmtech.us]
CRM TECH
Ms. Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re: Cactus Avenue Channel/K-4 Parcel Development

Dear Ms. Nina Gallardo,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the K-4 Parcel Development project. The project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area. For this reason, the ACBCI THPO requests the following:

*A copy of the records search with associated survey reports and site records from the information center.

*Copies of any cultural resource documentation (report and site records) generated in connection with this project.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760)699-6829. You may also email me at ACBCI-THPO@aguacaliente.net.

Cordially,

Katie Croft

Katie Croft
Cultural Resources Manager
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

5401 DINAH SHORE DRIVE, PALM SPRINGS, CA 92264
T 760/699/6800 F 760/699/6924 WWW.AGUACALIENTE-NSN.GOV

TELEPHONE LOG

Name	Tribe/Affiliation	Telephone Contacts	Comments
Patricia Garcia-Plotkin, Tribal Historic Preservation Officer	Agua Caliente Band of Cahuilla Indians	None	Katie Croft, Cultural Resources Manager, responded in letters dated June 20 and August 8, 2018 (copy attached).
Amanda Vance, Chairperson	Augustine Band of Cahuilla Mission Indians	None	Victoria Martin, Tribal Secretary, responded in a letter dated May 25, 2018 (copy attached).
Judy Stapp, Director of Cultural Affairs	Cabazon Band of Mission Indians	None	Ms. Stapp responded in a letter dated May 24, 2018 (copy attached).
Bobby Ray Esparza, Cultural Coordinator	Cahuilla Band of Indians	None	Mr. Esparza responded by e-mail on May 22, 2018 (copy attached).
Shane Chapparosa, Chairman	Los Coyotes Band of Mission Indians	12:21 pm, June 28, 2018; 2:31 pm, July 5, 2018	Left voice messages; no response to date.
Raymond Huaute, Tribal Historic Preservation Officer	Morongo Band of Mission Indians	12:28 pm, June 28, 2018; 2:38 pm, July 5, 2018; 3:38 pm, July 5, 2018	Alicia Benally, Cultural Resources Specialist, answered the call and stated that the tribe had no comments at this time but would like to review the report when completed.
Shasta Gaughen, Tribal Historic Preservation Officer	Pala Band of Mission Indians	12:35 pm, June 28, 2018; 2:44 pm, July 5, 2018	Left voice messages; no response to date.
Chris Devers, Cultural Liaison	Pauma Band of Luiseno Indians	None	Mr. Devers responded by e-mail on May 21, 2018 (copy attached).
Paul Macarro, Cultural Resources Director	Pechanga Band of Luiseño Indians	None	Tuba Ebru Ozdil is the designated spokesperson for the tribe (see below).
Tuba Ebru Ozdil, Cultural Analyst	Pechanga Band of Luiseño Indians	None	Molly Earp-Escobar, Cultural Resource Specialist, responded in a letter dated June 7, 2018 (copy attached).
John Gomez, Jr., Cultural Resource Coordinator	Ramona Band of Cahuilla Indians	12:39 pm, June 28, 2018; 2:47 pm, July 5, 2018	Left voice messages; no response to date.
Destiny Colocho, Cultural Resources Director	Rincon Band of Luiseno Indians	None	Ms. Colocho responded in a letter dated June 19, 2018 (copy attached).

Lee Clauss, Cultural Resources Director	San Manuel Band of Mission Indians	None	Jessica Mauck, Cultural Resources Analyst, responded by e-mail on May 21, 2018 (copy attached).
Gabriella Rubalcava, Environmental Director	Santa Rosa Band of Cahuilla Indians	12:43 pm, June 28, 2018; 2:51 pm, July 5, 2018	Ms. Rubalcava responded by e-mail on July 5, 2018 (copy attached).
Goldie Walker, Chairperson	Serrano Nation of Indians	12:45 pm, June 28, 2018	Mark Cochrane, Ms. Walker's successor, stated that the tribe would like to be notified if any cultural remains were found during construction.
Joseph Ontiveros, Tribal Historic Preservation Officer	Soboba Band of Luiseño Indians	None	Mr. Ontiveros responded in a letter dated June 27, 2018 (copy attached).
Michael Mirelez, Cultural Resources Coordinator	Torres Martinez Desert Cahuilla Indians	1:09 pm, June 28, 2018; 2:57 pm, July 5, 2018	Left voice messages; no response to date.

APPENDIX 3

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM RECORD FORMS

Site 33-028200 (CA-RIV-12721)

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 33-028200
HRI #
Trinomial CA-RIV-12721
NRHP Status Code 6Z
Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

P1. **Other Identifier:** Cactus Avenue Drainage Channel

***P2.** **Location:** ___ **Not for Publication** √ **Unrestricted** ***a. County** Riverside
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Riverside East and Sunnymead, Calif. **Date** 1980
T 3S **; R** 4W **; Sections** 13 **and** 14 **;** S.B. **B.M.**
Elevation: Approximately 1,520-1,555 feet above mean sea level (including the depth of the channel)

c. **Address** N/A **City** Moreno Valley **Zip** 92518

d. **UTM:** (Give more than one for large and/or linear resources) **Zone** 11 **;** A: 475060 **mE/** 3752207 **mN;**
B: 477462 **mE/** 3752237 **mN;**
UTM Derivation: ___ USGS Quad ___ GPS √ Google Earth

e. **Other Locational Data:** (e.g., parcel #, directions to resource, etc., as appropriate) On the northern edge of March Air Reserve Base, and along the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street

***P3a.** **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The site consists of an approximately 1.5-mile segment of drainage channel along the southern side of Cactus Avenue and the northern edge of March Air Reserve Base. The unlined open earthen channel is built of natural material (hardened soil), and measures approximately 41-47 feet wide across the top, 13-18 feet wide across the bottom, and 6-24 feet deep, with steep, sloping sides that show signs of erosion caused by periodic flooding. It was excavated sometime between 1941 and 1953, most likely during the expansion of March Army Air Field (now March Air Reserve Base) in the early 1940s, to channel seasonal storm runoff from the north to a preexisting channel along Heacock Street to the east and around the perimeter of the base. As a typical and largely nondescript infrastructure feature, it demonstrates no distinctively historical characteristics.

***P3b.** **Resource Attributes:** (List attributes and codes) HP20. Canal/aqueduct

***P4.** **Resources Present:** ___ Building √ Structure ___ Object ___ Site ___ District ___ Element of District ___ Isolate ___ Other

P5a. **Photograph or Drawing** (Photograph required for buildings, structures, and objects.) (See Item L8a)

P5b. **Description of Photo:** (view, date, accession #)

***P6.** **Date Constructed/Age and Sources:** √ Historic ___ Prehistoric ___ Both 1941-1953

***P7.** **Owner and Address:** March Air Reserve Base, 2145 Graeber Street, March ARB, CA 92518

***P8.** **Recorded by:** (Name, affiliation, and address) Salvadore Z. Boites, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

***P9.** **Date Recorded:** July 27, 2018

***P10.** **Survey Type:** (Describe) Intensive-level survey for Section 106 and CEQA-compliance purposes

***P11.** **Report Citation:** (Cite survey report and other sources, or enter "none.") Bai "Tom" Tang, Michael Hogan, and Terri Jacquemain (2018): Identification and Evaluation of Historic Properties: Cactus Avenue Drainage Channel Improvement Project, March Air Reserve Base, Moreno Valley Area, Riverside County, California

***Attachments:** ___ None √ Location Map ___ Sketch Map ___ Continuation Sheet ___ Building, Structure, and Object Record ___ Archaeological Record ___ District Record √ Linear Resource Record ___ Milling Station Record ___ Rock Art Record ___ Artifact Record ___ Photograph Record ___ Other (List):

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # 33-028200
HRI #
Trinomial CA-RIV-12721

***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

L1. **Historic and/or Common Name:** Cactus Avenue Drainage Channel

L2a. **Portion Described:** ___ Entire Resource √ Segment ___ Point Observation **Designation:**

b. **Location of Point or Segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Along the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street

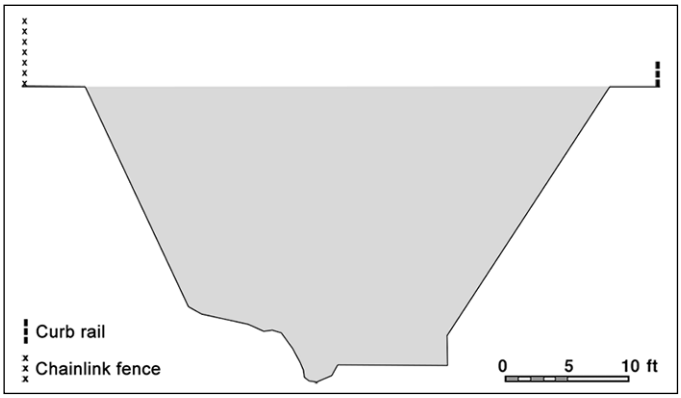
L3. **Description:** (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/ sections as appropriate.) See Item P3a

L4. **Dimensions:** (In feet for historic features and meters for pre-historic features)

a. **Top Width** 41-47 feet
b. **Bottom Width** 13-18 feet
c. **Height or Depth** 6-24 feet
d. **Length of Segment** 1.5 miles

L5. **Associated Resources:** Concrete drains

L4e. **Sketch of Cross-Section** (Include scale)
Facing: West



L6. **Setting** (Describe natural features, landscape characteristics, slope, etc. as appropriate) The site is situated in an urban setting between the perimeter fence of March Air Reserve Base and the Cactus Avenue right-of-way, at elevations of approximately 1,520-1,555 feet above mean sea level (including the depth of the channel).

L7. **Integrity Considerations:** The site is a nondescript open earthen ditch that has not been extensively documented in the past, and its historic integrity is different to assess.

L8a. **Photograph, Map or Drawing**



L8b. **Description of Photo, Map, or Drawing** (View, scale, etc.) Photo taken on July 27, 2018; view to the west

L9. **Remarks:**

L10. **Form Prepared by:** (Name, affiliation and address): Salvadore Z. Boites, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

L11. **Date:** July 27, 2018

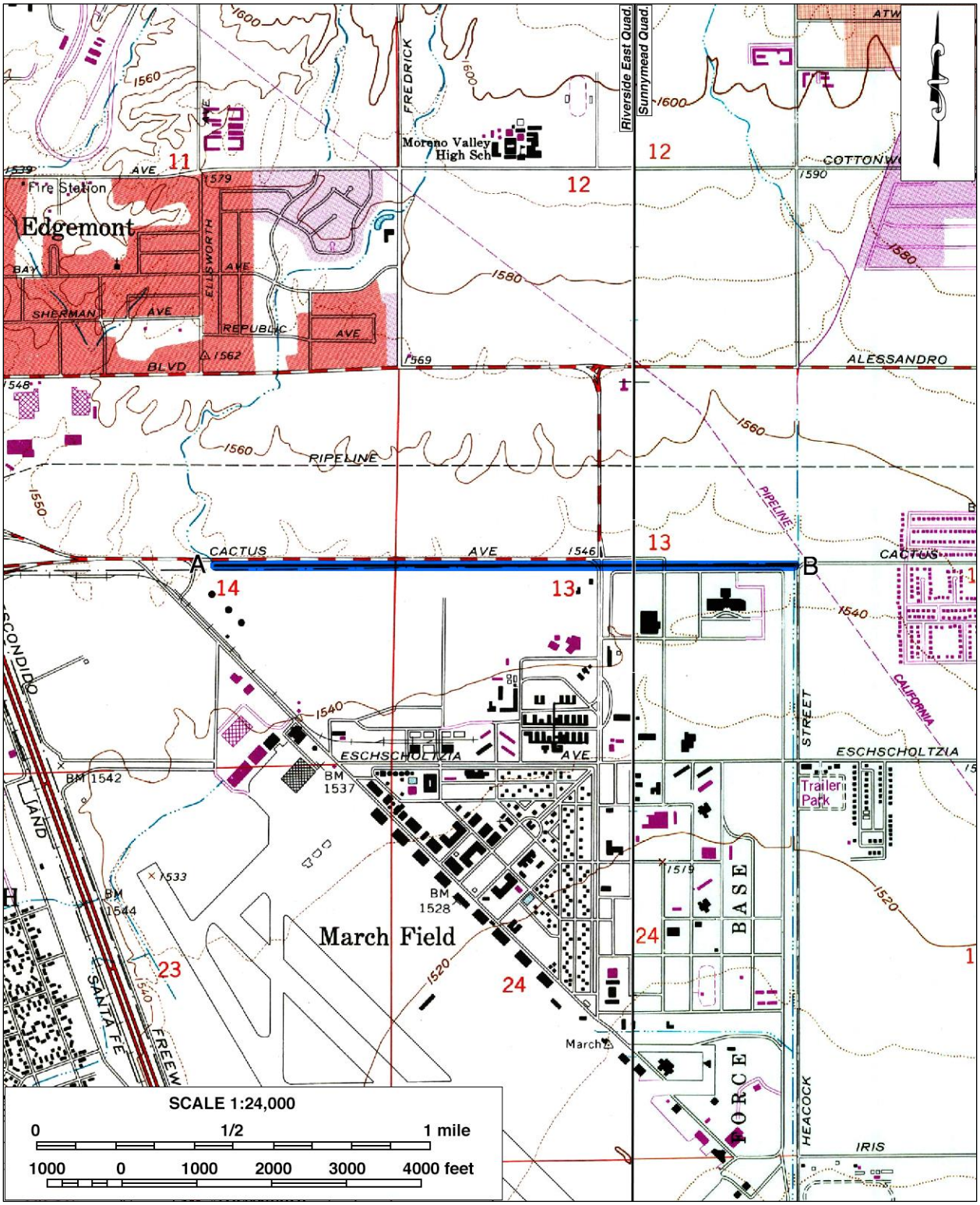
State of California - Natural Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 33-028200
HRI#
Trinomial CA-RIV-12721

Page 3 **of** 3 ***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

***Map Name:** Riverside East and Sunnymead ***Scale:** 1:24,000 ***Date of Map:** 1980



APPENDIX 4

PREVIOUS STUDIES AND RECORDED CULTURAL RESOURCES WITHIN THE SCOPE OF THE RECORDS SEARCH

(Confidential)

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-00130	NADB-R - 1080145; Voided - MF-0110	1974	Helen Clough	Filed Notes for the Archaeological Survey of PL984 Weter Systems Additions.		33-001016, 33-001017
RI-00583	NADB-R - 1080624; Voided - MF-0508	1986	Laurence W. Spanne	Report on a Cultural Resources Survey for Three Proposed Construction Locations on March Air Force Base	1 STRAD/Environmental Task Force, Vandenberg Air Force Base, CA	
RI-01045	NADB-R - 1081140; Voided - MF-0989	1978	David Chavez	Cultural Resources Evaluation of the Four Corners Interconnect Facilities, San Bernardino and Riverside Counties, California	Consulting Archaeologist, Mill Valley, CA	
RI-01046	NADB-R - 1083247; Voided - MF-0989	1978	David Chavez	Final Cultural Resources Evaluation for the Rialto Crude Oil Tank Farm to the Four Corners Pipeline, Kern County, Calfiornia.	URS Company, San Mateo, CA	33-000497
RI-01894	NADB-R - 1082269; Voided - MF-2054	1984	SCIENTIFIC RESOURCE SURVEYS, INC.	CULTURAL RESOURCES SURVEY, PROPOSED RIVERSIDE MIXED-USE DEVELOPMENT PROJECT	AUTHOR(S)	33-002763
RI-01957	NADB-R - 1082351; Voided - MF-2126	1978	LEONARD, JOANNE C.	AN ARCHAEOLOGICAL EVALUATION OF THE PROPOSED DEVELOPMENT OF TT # 12554, CITY OF CALIMESA, RIVERSIDE COUNTY, CALIFORNIA	SAN BERNARDINO COUNTY MUSEUM ASSOCIATION	
RI-01978	NADB-R - 1082396; Voided - MF-2169	1985	BROCK, JAMES	LETTER REPORT: ARCHAEOLOGICAL FIELD RECONNAISSANCE OF PROPOSED POST OFFICE SITE IN SUNNYMEAD, CALIFORNIA	ARCHAEOLOGICAL ADVISORY GROUP	
RI-03189	NADB-R - 1083751; Other - 89-90; Voided - MF-3408	1990	PEAK AND ASSOCIATES and Brian F. Mooney Associates	CULTURAL RESOURCES ASSESSMENT OF AT&T'S PROPOSED SAN BERNARDINO TO SAN DIEGO FIBER OPTIC CABLE, SAN BERNARDINO, RIVERSIDE AND SAN DIEGO COUNTIES, CALIFORNIA	PEAK AND ASSOCIATES & BRIAN F. MOONEY ASSOCIATES	
RI-03243	NADB-R - 1083834; Voided - MF-3475	1990	TETRA TECH, INC.	CULTURAL RESOURCES INVESTIGATIONS FOR A PROPOSED REALIGNMENT OF FACILITIES FROM LOS ANGELES AIR FORCE BASE TO MARCH AIR FORCE BASE, RIVERSIDE COUNTY, CALIFORNIA.	TETRA TECH	33-003285, 33-004067, 33-004068, 33-004069, 33-012662
RI-03421	NADB-R - 1084088; Submitter - 89-1229; Voided - MF-3678	1989	BROWN, JOAN and JUANITA SHINN	Cultural Resources Literature Review for the 1,162 Acre Deutsch Specific Plan Project, Located In the City Of Beaumont, Riverside County, California	RMW PALEO	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-03510	NADB-R - 1085079; Voided - MF-3772	1996	MCDONALD, MEG and BARB GIACOMINI	AN INTENSIVE SURVEY OF APPROXIMATELY 2,500 ACRES OF MARCH AIR FORCE BASE, RIVERSIDE COUNTY, CALIFORNIA	ASM AFFILIATES, INC.	33-005399, 33-005400, 33-005401, 33-005402, 33-005403, 33-005404, 33-005405, 33-005406, 33-005407, 33-005408, 33-005409, 33-005410, 33-005411, 33-005412, 33-005413, 33-005414, 33-005415, 33-005416, 33-005417, 33-005418, 33-005419, 33-005420, 33-005421, 33-005422, 33-005424, 33-005425, 33-005426, 33-005428, 33-005429, 33-005430, 33-005431, 33-005432, 33-005433, 33-005434, 33-005435, 33-005436, 33-005437, 33-005438, 33-005439, 33-005440, 33-005441, 33-005442, 33-005443, 33-005444, 33-005445, 33-005446, 33-005447, 33-005448, 33-005449, 33-005450, 33-005451, 33-005453, 33-005454, 33-005455, 33-005456, 33-007721, 33-007722, 33-007723, 33-007743, 33-007744, 33-007745, 33-007746, 33-007747, 33-007748, 33-007749
RI-03693	NADB-R - 1084465; Voided - MF-3996	1991	FOSTER, JOHN M., JAMES J. SCHMIDT, CARMEN A. WEBER, GWENDOLYN R. ROMANI, and ROBERTA S. GREENWOOD	CULTURAL RESOURCE INVESTIGATION: INLAND FEEDER PROJECT, METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA	GREENWOOD & ASSOCIATES	33-000021, 33-000024, 33-000399, 33-000608, 33-001017, 33-001697, 33-002504, 33-002505, 33-002951, 33-003098
RI-03879	NADB-R - 1084820; Voided - MF-4236	1994	WHITE, ROBERT S.	AN ARCHAEOLOGICAL ASSESSMENT OF THE GILMAN HOME CHANNEL LATERAL A, STAGE 2, LOCATED IN BANNING, RIVERSIDE COUNTY	ARCHAEOLOGICAL ASSOCIATES	33-006017
RI-05055	NADB-R - 1086417; Submitter - 02-627A	2002	MCKENNA ET AL.	REVIEW OF AN ARCHAEOLOGICAL RECORDS CHECK FOR AREA D-3 WITHIN THE MARCH JOINT POWERS AUTHORITY, RIVERSIDE COUNTY, CALIFORNIA	MCKENNA ET AL.	
RI-06144	NADB-R - 1087507	2005	AISLIN-KAY, MARNIE	LETTER REPORT: CULTURAL RESOURCE RECORDS SEARCH RESULTS AND SITE VISIT FOR NEXTEL TELECOMMUNICATIONS FACILITY CANDIATE CA8390A MAKENZIE, 21801 ALESSANDRO BOULEVARD, MORENO VALLEY, RIVERSIDE COUNTY, CA	MICHAEL BRANDMAN ASSOCIATES	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-06147	NADB-R - 1087510	2003	DICE, MICHAEL	LETTER REPORT: CULTURAL RESOURCE RECORDS SEARCH ANS SITE VISIT RESULTS FOR SPRINT TELECOMMUNICATION FACILITY CANDIDATE RV57XC602B (MORENO VALLEY PLAZA) 23300 COTTONWOOD AVENUE, MORENO VALLEY, RIVERSIDE COUNTY, CA	MICHAEL BRANDMAN ASSOCIATES	
RI-07499		2007	Bonner, Wayne H. and Marnie Aislin-Kay	Letter Report: Cultural Resource Records Search Results and Site Visit for Royal Street Communications, LLC Candidate LA2360B (Motel 7), 23581 Alessandro Boulevard, Moreno Valley, Riverside County, California	Michael Brandman Associates	
RI-07568		2007	McGinnis, Patrick	ARCHAEOLOGICAL SURVEY REPORT OF THE I-215/VAN BUREN BOULEVARD INTERCHANGE PROJECT RIVERSIDE COUNTY, CALIFORNIA	TIERRA ENVIRONMENTAL SERVICES	
RI-07817	Submitter - Project No. KHA0701	2007	Tibbett, Casey and Bill Bell	Historic Resources Assessment, Arnold Heights Elementary School, 15801 Harmon Street, Unincorporated Area Adjacent to March Air Reserve Base, Riverside County, California	LSA Associates, Inc.	
RI-08062		2009	Wayne H. Bonner	Leter Report:Cultural Resources Records Search and Site Vist Results for T-Mobile USA candidate IE24904H (Elseworth Gardens), 13931 Elsworth Street, Moreno Valley, Riverside County, California.	Michael Brandman Associates	
RI-08167		2014	Michael Hogan	Van Buren Boulevard Street Improvement Project, Phase I		
RI-08272		1995	William Manely Consulting and Earth Tech	Historic Building Inventory and Evaluation, March Air Force Base, Riverside County, California	Michael Brandman Associates	
RI-08367	Submitter - Job No. 05-08-10-1363	2008	Jeanette A. McKenna	A Cultural Resources Investigation and Assessment of Potential Impacts of the Proposed March Village Medical Campus at the March Air Force Base in Riverside County, California.	McKenna et al.	33-017872, 33-017967, 33-017968, 33-017969, 33-017970, 33-017971, 33-017972
RI-08398		2008	Jennifer Mermilliod	Cultural Resources Survey and Evaluation of Impacts of the Former March AFB Main Entrance.	JM Research and	33-018039

Report List

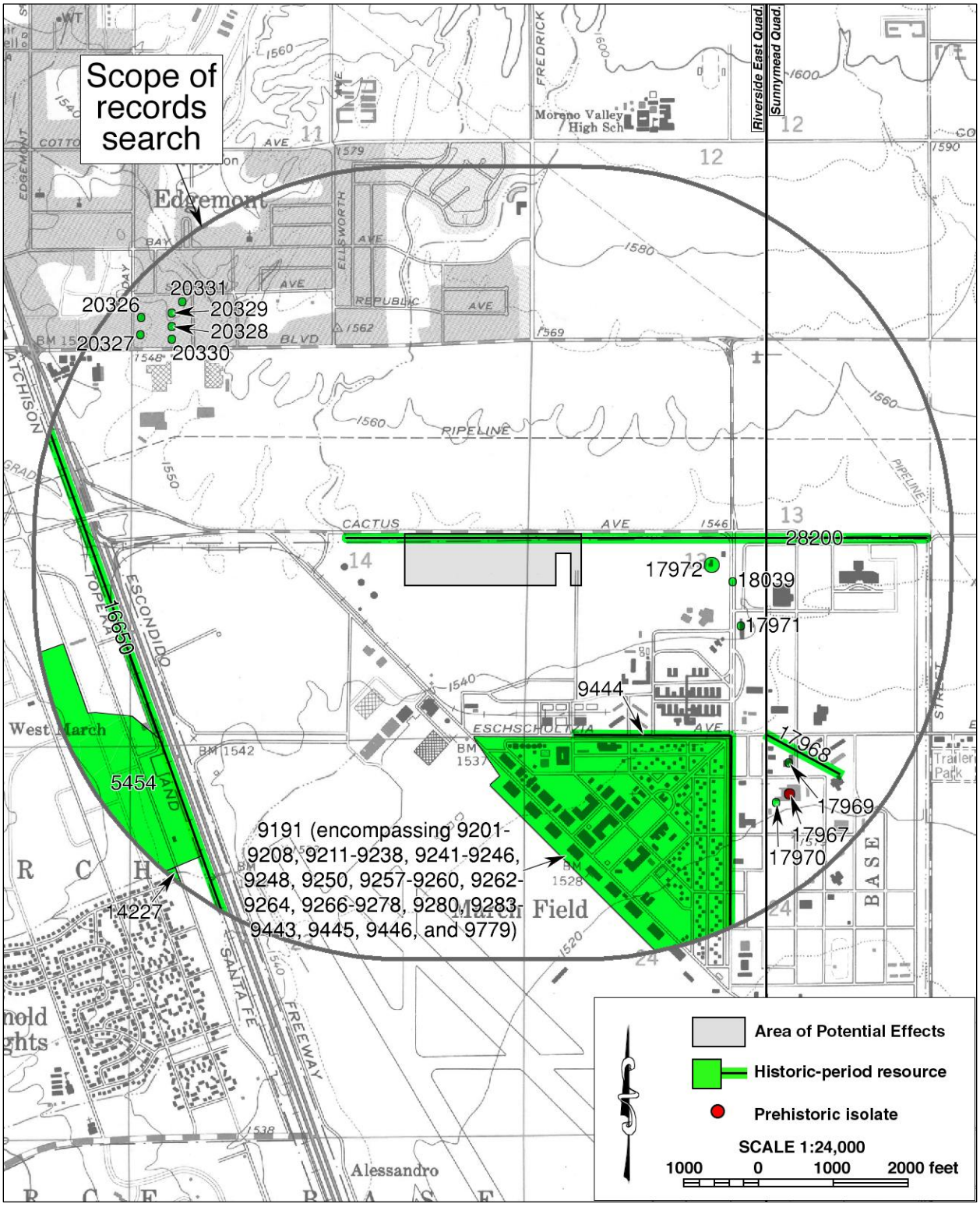
Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-08448		2003	NA	Draft, Environmental Assessment of Construction and Operation of the Moreno Valley Readiness Center, Riverside County, California.	US Army Corps of Engineers Mobile District and Tetra Tech, Inc.	
RI-08771		2010	Bai 'Tom' Tang	Preliminary Historical/Archaeological Resourece Study Souther California Regional Rail Authority (SCRRA) Perris Valley Line Positive Train Control (PTC) Project	CRM TECH	
RI-08799		2012	M. J. Cromarte	Letter Report: Concrete Gutter/Swale Installation Project at Naval Operational Support Center Moreno Valley	Department of the Navy	
RI-08915		2009	Patrick McGinnis	Cultural Resources Survey, Test, and Evaluation Report for the Meridian Specific Plan Amendment Riverside County, California	Tierra Environmental Services	33-005454
RI-08938	Submitter - Contract No. 2735	2013	Bai "Tom" Tang	Archaeological Field Survey, Van Buren Boulevard Widening/Improvement Project, Near March Air Reserve Base, Riverside County, California	CRM Tech	
RI-09085		2008	Jessica J. Auck and Jay K. Sander	Cultural Resources Inventory: Assessor Parcel Numbers 291-191-002, 291-191-006, 291-191-008 & -009, 291-191-012, Moreno Valley, Riverside County California	Chaqmbers Group Inc.	
RI-09191		2013	PAR ENVIRONMENTAL SERVICES	Cultural Resource Inventory of the Moreno Valley Armed Forces Reserve Center in Riverside County, California 63d Regional Support Command Facility CA165	PAR Environmental Services	
RI-09617		2014	Don C. Perez	Cultural Resources Survey CLV6237	EBI Consulting	
RI-09718		2016	David Brunzell	Cultural Resources Assessment of the Toby (MCE Design) project, City of moreno Valley, Riverside County, Califonia (BCR Counsulting Project No. TRF 1608)	BCR Consulting LLC	
RI-09836	Other - Federal Project No. HSIPL 5441 (062)	2017	Carrie Chasteen	Historic Property Survey Report: District 8, Riverside County, Federal Project Number: HSIPL 5441 (062), Moreno Valley, Riverside County	Caltrans, Division of Environmental Analysis	
RI-09960	Other - CRM TECH Contract No. 3054P	2017	Daniel Ballester	Palentological Monitoring Program March Veterans Village; APNs 294-0080-006, -007, -008 Near the City of Moreno Valley, California	CRM TECH	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-09961	Other - CRM TECH Contract No.3054A	2017	Daniel Ballester	Archaelogical Monitoring Program March Veterans Village; APNs 294-080-006, -007,-008 Near the City of Moreno Valley	CRM TECH	
RI-10060		2014	ACE Environmental, LLC	Cultural Resource Records Search and Site Survey	Ace Environmental	
RI-10093	Other - SCH# 96031022	1996	Unknown	Enviromental Impact Report for the March Air Force Base Redevelopment Project	Urban Futures, Inc.	
RI-10142		1990	Tetra Tech, Inc.	DRAFT REPORT CULTURAL RESOURCES INVESTUGATIONS FOR A PROPOSED REALIGNMENT OF FACILITIES FROM LOS ANGELES AIR FORCE BASE TO MARCH AIR FORCE BASE, RIVERSIDE COUNTY, CALIFORNIA	Tetra Tech, Inc.	33-003285, 33-004067, 33-004068, 33-004069, 33-012662
RI-10209		1999	March Joint Powers Authority	General Plan of the March Joint Powers Authority	March Joint Powers Authority	

RECORDED CULTURAL RESOURCES
WITHIN THE SCOPE OF THE RECORDS SEARCH
(See p. 61 for locations)

Resource Number	Description
33-005454	Concrete slab foundations from WWII-era Camp Haan
33-009191	March Field Historic District
33-009201 to 33-009208	Buildings/structures in the March Field Historic District
33-009211 to 33-009238	Buildings/structures in the March Field Historic District
33-009241 to 33-009246	Buildings/structures in the March Field Historic District
33-009248	Building/structure in the March Field Historic District
33-009250	Building/structure in the March Field Historic District
33-009257 to 33-009260	Buildings/structures in the March Field Historic District
33-009262 to 33-009264	Buildings/structures in the March Field Historic District
33-009266 to 33-009278	Buildings/structures in the March Field Historic District
33-009280	Building/structure in the March Field Historic District
33-009283 to 33-009443	Buildings/structures in the March Field Historic District
33-009444	Stone-lined drainage canal
33-009445	Building/structure in the March Field Historic District
33-009446	Building/structure in the March Field Historic District
33-009779	Building/structure in the March Field Historic District
33-014227	Arnold Heights Elementary School
33-016650	Segment of the California Southern Railway
33-017967	Isolate: mano fragment
33-017968	Canal built by WPA
33-017969 to 33-017972	Buildings at March Medical Village Campus
33-018039	Former March Air Force Base main entrance
33-020326	Single-family residence, ca. 1947
33-020327	Single-family residence, ca. 1946
33-020328	Single-family residence, ca. 1946
33-020329	Single-family residence, ca. 1950
33-020330	Single-family residence, ca. 1950
33-020331	Single-family residence, ca. 1953
33-028200	Cactus Avenue Drainage Channel



Locations of recorded cultural resources within the scope of the records search

IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

CACTUS AVENUE DRAINAGE CHANNEL IMPROVEMENT PROJECT

March Air Reserve Base, Moreno Valley Area
Riverside County, California

For Submittal to:

March Joint Powers Authority
14205 Meridian Parkway, #140
Riverside, CA 92518
and
United States Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard
Los Angeles, CA 90017

Prepared for:

Lewis Retail Centers
1156 N. Mountain Avenue
Upland, CA 91785

Prepared by:

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

August 15, 2018
Revised April 1, 2019
CRM TECH Contract No. 3375

Title: Identification and Evaluation of Historic Properties: Cactus Avenue Drainage Channel Improvement Project, March Air Reserve Base, Moreno Valley Area, Riverside County, California

Author(s): Bai "Tom" Tang, Principal Investigator, History
Michael Hogan, Principal Investigator, Archaeology
Terri Jacquemain, Project Historian/Architectural Historian

Consulting Firm: CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: August 15, 2018; revised April 1, 2019

For Submittal to: March Joint Powers Authority
14205 Meridian Parkway, #140
Riverside, CA 92518
(909) 382-4100
and
United States Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard
Los Angeles, CA 90017
(213) 452-3333

Prepared for: Timothy Reeves
Lewis Retail Centers
1156 N. Mountain Avenue
Upland, CA 91785
(909) 882-3612

USGS Quadrangle: Riverside East, Calif., 7.5' quadrangle (Sections 13 and 14, T3S R4W, San Bernardino Baseline and Meridian)

Project Size: Approximately 1.5 linear miles in length and 80-100 feet in width

Keywords: Phase I historical/archaeological resources survey; APNs 297-150-006, 297-150-007, 297-150-037, 297-150-038, 297-200-004, 297-200-012, 297-250-011, 297-250-013, and 297-250-014; Site 33-028200 (CA-RIV-12721): WWII-era earthen drainage channel; no "historic property" or "historical resource" in the APE

EXECUTIVE SUMMARY

In July and August 2018, at the request of Lewis Retail Centers, CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed Cactus Avenue Drainage Channel Improvement Project on the northern edge of March Air Reserve Base, near the City of Moreno Valley, Riverside County, California. The APE consists of the right-of-way of an approximately 1.5-mile segment of earthen drainage channel on the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street, across Sections 13 and 14 of T3S R4W, San Bernardino Baseline and Meridian.

The study is part of the environmental review process for the undertaking, which entails primarily the conversion of the open ditch to an underground concrete culvert, along with minor improvements such as extending a number of existing storm drains. The APE is delineated to encompass the maximum extent of ground disturbance required for the undertaking and measures generally 80-100 feet in width. All construction staging and storage will occur within the footprint of an associated undertaking known as the K-4 Parcel Project, for which a cultural resources study is prepared under separate cover. The vertical extent of the APE, represented by the maximum depth of excavations required, will be 5.0 to 6.5 feet below the bottom of the existing channel, depending on the location.

The March Joint Powers Authority (JPA), as the lead agency, required the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the undertaking by the United States Army Corps of Engineers (USACE), the study was also completed in compliance Section 106 of the National Historic Preservation Act. The purpose of the study is to provide March JPA and USACE with the necessary information and analysis to determine whether the proposed undertaking would have an effect on any "historic properties," as defined by 36 CFR 800.16(l), or "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), that may exist in or near the APE. In order to identify such properties, CRM TECH conducted a historical/archaeological resources records search, pursued historical and geoarchaeological background research, contacted Native American representatives, and carried out an intensive-level field survey of the entire APE.

The results of these research procedures indicate that the existing channel in the APE was built in the 1941-1953 era, most likely during the expansion of March Army Air Field (now March Air Reserve Base) in the early 1940s. In light of its age, the channel was recorded into the California Historical Resources Inventory as Site 33-028200 (CA-RIV-12721) during this study, but it does not appear to meet any of the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources. Therefore, it does not meet the definition of a "historic property" or a "historical resource." No other potential "historic properties" or "historic resources" of either prehistoric or historical origin were encountered during this study, and the subsurface sediments within the APE appear to be low in sensitivity for potentially significant archaeological deposits.

Based on these findings, and pursuant to 36 CFR 800.4(d)(1) and Calif. PRC §21084.1, CRM TECH recommends to March JPA and USACE a conclusion that *no "historic properties" or "historical resources" will be affected by the proposed undertaking*. No further cultural resources investigation is recommended for the undertaking unless project plans undergo such changes as to include areas not covered by this study. However, if buried cultural materials are encountered during any earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

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INTRODUCTION

In July and August 2018, at the request of Lewis Retail Centers, CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed Cactus Avenue Drainage Channel Improvement Project on the northern edge of March Air Reserve Base (ARB), near the City of Moreno Valley, Riverside County, California (Fig. 1). The APE consists of the right-of-way of an approximately 1.5-mile segment of earthen drainage channel on the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street, across Sections 13 and 14 of T3S R4W, San Bernardino Baseline and Meridian (Figs. 2, 3).

The study is part of the environmental review process for the undertaking, which entails primarily the conversion of the open ditch to an underground concrete culvert, along with minor improvements such as extending a number of existing storm drains. The APE is delineated to encompass the maximum extent of ground disturbance required for the undertaking and measures generally 80-100 feet in width. All construction staging and storage will occur within the footprint of an associated undertaking known as the K-4 Parcel Project, for which a cultural resources study is prepared under separate cover (Tang et al. 2018). The vertical extent of the APE, represented by the maximum depth of excavations required, will be 5.0 to 6.5 feet below the bottom of the existing channel, depending on the location.

The March Joint Powers Authority (JPA), as the lead agency, required the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the undertaking by the United States Army Corps of Engineers (USACE), the study was also completed in compliance Section 106 of the National Historic Preservation Act (NHPA). The purpose of the study is to provide March JPA and USACE with the necessary information and analysis to determine whether the proposed undertaking would have an effect on any "historic properties," as defined by 36 CFR 800.16(l), or "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), that may exist in or near the APE.

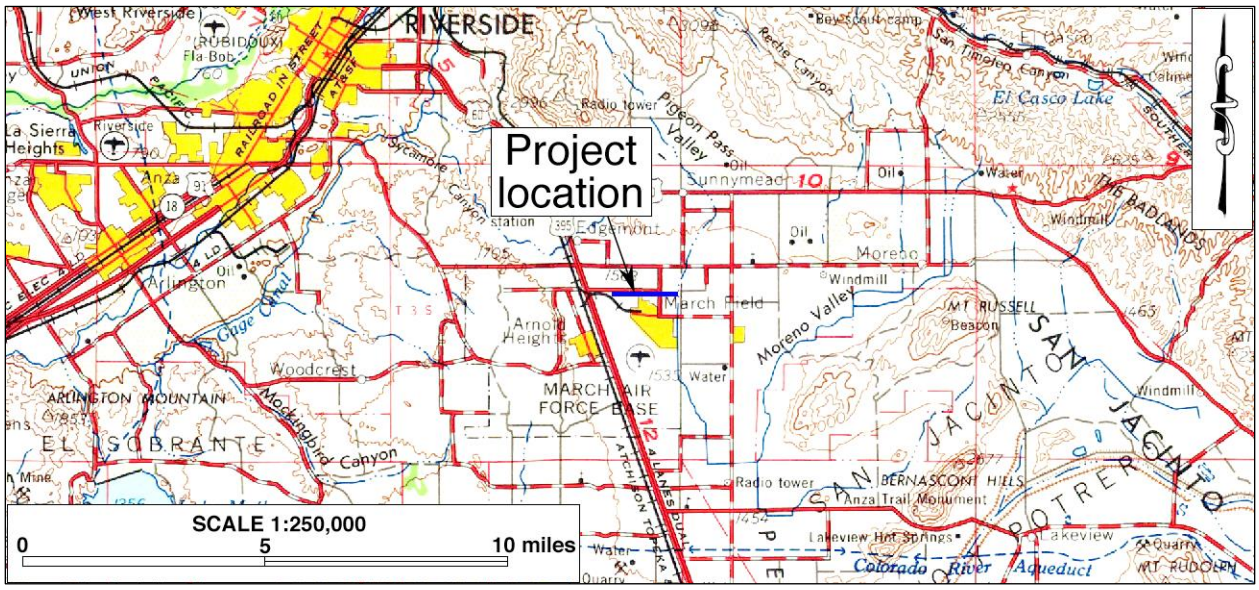


Figure 1. Project vicinity. (Based on USGS Santa Ana quadrangle [USGS 1979])

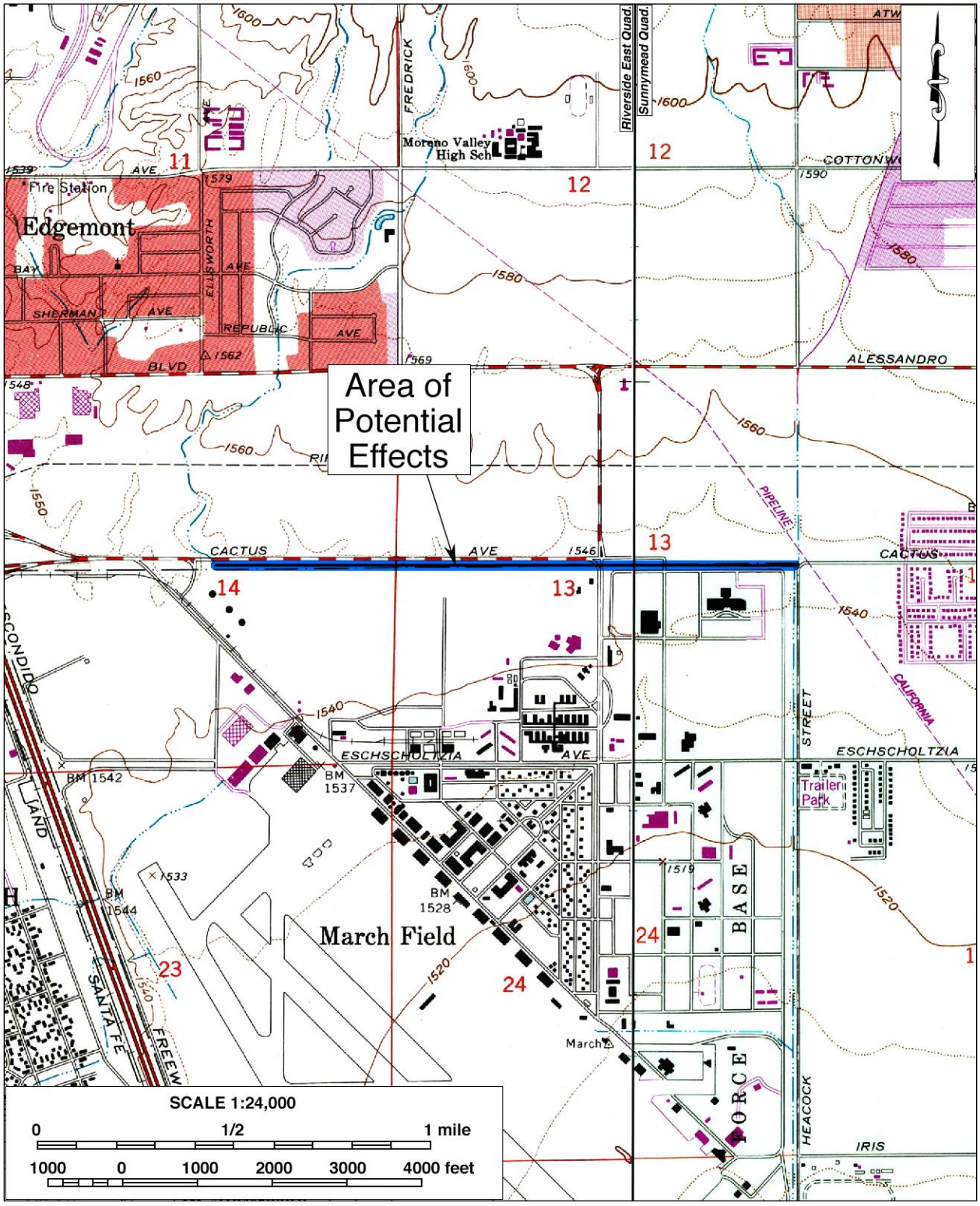


Figure 2. Project location. (Based on USGS Riverside East and Sunnymead, Calif., 1:24,000 quadrangles [USGS 1980a; 1980b])

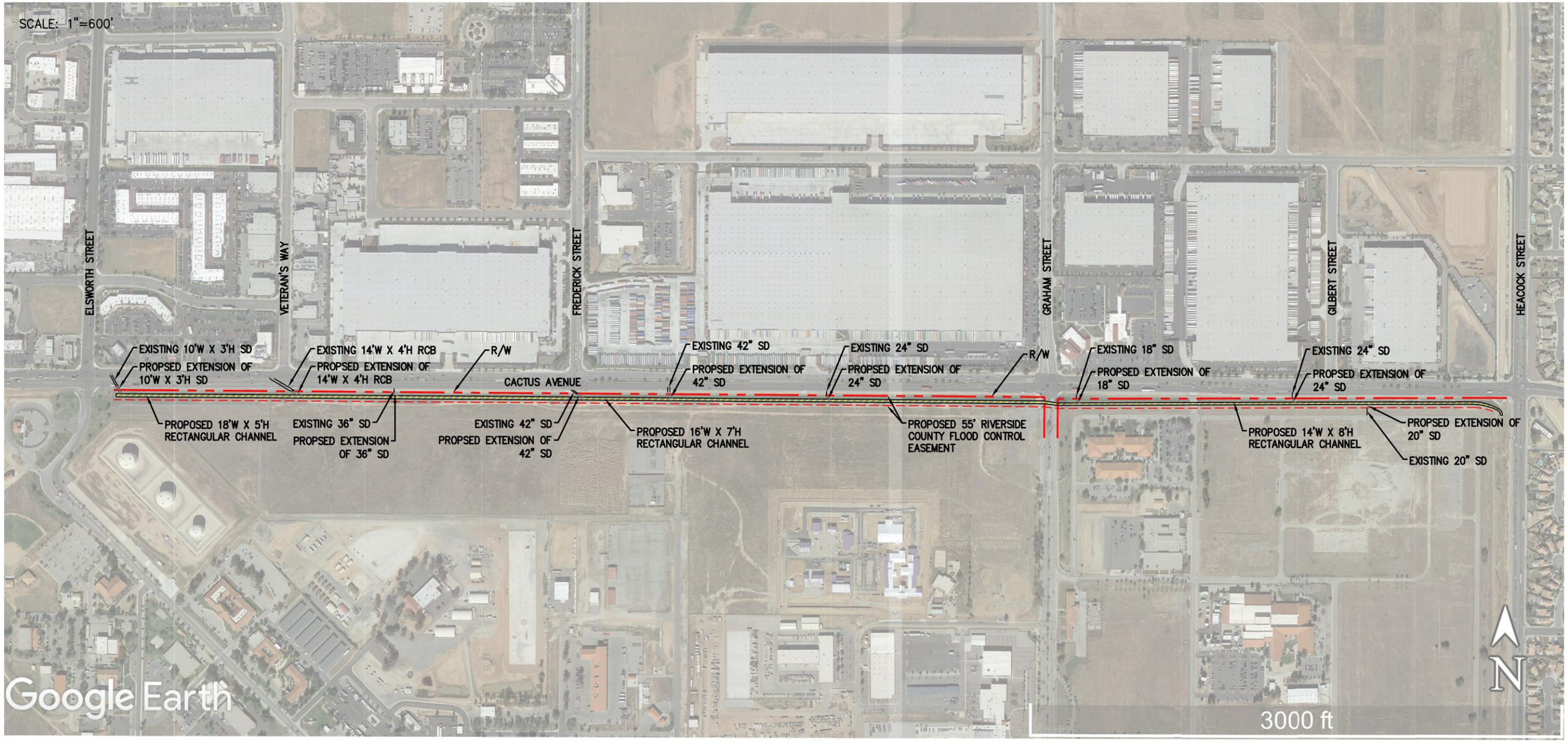


Figure 3. Project plans and aerial view of the project location.

In order to identify such properties, CRM TECH conducted a historical/archaeological resources records search, pursued historical and geoarchaeological background research, contacted Native American representatives, and carried out an intensive-level field survey of the entire APE. The following report is a complete account of the methods and results of the various avenues of research, and the final conclusion of the study.

SETTING

CURRENT NATURAL SETTING

The City of Moreno Valley occupies a lowland area in the northern portion of the Peninsular Ranges geomorphic province, surrounded by the Santa Ana Mountains on the southwest, the San Jacinto Mountains on the southeast, and the convergence of the San Gabriel and San Bernardino Mountain Ranges on the north. The natural landscape in the Peninsular Ranges province features a host of inland valleys divided by groups of rolling hills and rocky knolls. The mild Mediterranean climate of the region is typical of inland southern California lowlands, characterized by hot and dry summers and mild and wet winters. The average annual rainfall in the region is approximately 10 inches, the majority of which typically falls seasonally between December and March.

As stated above, the APE for this undertaking comprises entirely the right-of-way of the existing earthen drainage channel along the south side of Cactus Avenue. One of the major east-west thoroughfares and commercial corridors across the Moreno Valley area, Cactus Avenue serves as the boundary between the City of Moreno Valley and March ARB, and the perimeter fence of the base marks the southern limit of the APE (Fig. 4). Elevations along the APE range approximately from 1,520 feet to 1,550 feet above mean sea level (including the depth of the channel), and the topsoil generally consists of cemented brown silty-clay loam. Vegetation in the APE consists solely of the typical small grasses and shrubs, often in dense growth at the bottom of the channel (Fig. 4).

CULTURAL SETTING

Prehistoric Context

The earliest evidence of human occupation in western Riverside County was discovered below the surface of an alluvial fan in the northern portion of the Lakeview Mountains, some 12 miles southeast of the APE, with radiocarbon dates clustering around 9,500 B.P. (Horne and McDougall 2008). Another site found near the shoreline of Lake Elsinore, close to the confluence of Temescal Wash and the San Jacinto River, yielded radiocarbon dates between 8,000 and 9,000 B.P. (Grenda 1997). Additional sites with isolated Archaic dart points, bifaces, and other associated lithic artifacts from the same age range have been found in the nearby Cajon Pass area of San Bernardino County, roughly 25 miles to the northwest, typically atop knolls with good viewsheds (Basgall and True 1985; Goodman and McDonald 2001; Goodman 2002; Milburn et al. 2008).

The cultural prehistory of southern California has been summarized into numerous chronologies, including those developed by Chartkoff and Chartkoff (1984), Warren (1984), and others. Specifically, the prehistory of Riverside County has been addressed by O'Connell et al. (1974), McDonald et al. (1987), Keller and McCarthy (1989), Grenda (1993), Goldberg (2001), and Horne



Figure 4. Overview of the APE. (Photograph taken on July 27, 2018; view to the west from the eastern end)

and McDougall (2008). Although the beginning and ending dates of different cultural horizons vary regionally, the general framework of the prehistory of western Riverside County can be broken into three primary periods:

- Paleoindian Period (ca. 18,000-9,000 B.P.): Native peoples of this period created fluted spearhead bases designed to be hafted to wooden shafts. The distinctive method of thinning bifaces and spearhead preforms by removing long, linear flakes leaves diagnostic Paleoindian markers at tool-making sites. Other artifacts associated with the Paleoindian toolkit include choppers, cutting tools, retouched flakes, and perforators. Sites from this period are very sparse across the landscape and most are deeply buried.
- Archaic Period (ca. 9,000-1,500 B.P.): Archaic sites are characterized by abundant lithic scatters of considerable size with many biface thinning flakes, bifacial preforms broken during manufacture, and well-made groundstone bowls and basin metates. As a consequence of making dart points, many biface thinning waste flakes were generated at individual production stations, which is a diagnostic feature of Archaic sites.
- Late Prehistoric Period (ca. 1,500 B.P.-contact): Sites from this period typically contain small lithic scatters from the manufacture of small arrow points, expedient groundstone tools such as tabular metates and unshaped manos, wooden mortars with stone pestles, acorn or mesquite bean granaries, ceramic vessels, shell beads suggestive of extensive trading networks, and steatite implements such as pipes and arrow shaft straighteners.

Ethnohistoric Context

According to current ethnohistorical scholarship, the traditional territories of several Native American groups, including the Luiseño, the Serrano, the Gabrielino, and the Cahuilla, overlapped one another in the present-day Riverside-San Bernardino region during the Late Prehistoric Period,

but the Moreno Valley area is generally recognized as a part of the traditional homeland of the Luiseño, a Takic-speaking people whose territory extended from present-day Riverside to Escondido and Oceanside. The name of the group derived from Mission San Luis Rey, which held jurisdiction over most of the traditional Luiseño territory during the late 18th and early 19th centuries. In modern anthropological literature, the leading sources on Luiseño culture and history are Kroeber (1925), Strong (1929), and Bean and Shipek (1978).

Anthropologists have divided the Luiseño into several autonomous lineages or kin groups, which represented the basic political unit among most southern California Indians. According to Bean and Shipek (1978:551), each Luiseño lineage possessed a permanent base camp, or village, on the valley floor and another in the mountain regions for acorn collection. Luiseño villages were made up of family members and relatives, where chiefs of the village inherited their rank and each village owned its own land. Villages were usually located in sheltered canyons or near year-round sources of freshwater, always near subsistence resources.

The Luiseño exploited nearly all resources of the environment in a highly developed seasonal mobility system. The Luiseño people were primarily hunters and gatherers. They collected seeds, roots, wild berries, acorns, wild grapes, strawberries, wild onions, and prickly pear cacti, and hunted deer, elks, antelopes, rabbits, wood rats, and a variety of insects. Bows and arrows, atlatls or spear throwers, rabbit sticks, traps, nets, clubs, and slings were the main hunting tools. Each lineage had exclusive hunting and gathering rights in their procurement ranges. These boundaries were respected and only crossed with permission (Bean and Shipek 1978:551).

It is estimated that when Spanish colonization of Alta California began in 1769, the Luiseño had approximately 50 active villages with an average population of 200 individuals each, although other estimates place the total Luiseño population at 4,000-5,000 (Bean and Shipek 1978:557). Some of the villages were forcefully moved to the Spanish missions, while others were left largely intact (*ibid.*:558). Ultimately, Luiseño population declined rapidly after European contact because of diseases such as smallpox and harsh living conditions at the missions and, later, on the Mexican ranchos, where the Native people often worked as seasonal ranch hands.

After the American annexation of Alta California, the large number of non-Native settlers further eroded the foundation of traditional Luiseño society. During the latter half of the 19th century, almost all of the remaining Luiseño villages were displaced, their occupants eventually removed to the various reservations. Today, the nearest Native American groups of Luiseño heritage live on the Soboba, Pechanga, and Pala Indian Reservations.

Historic Context

In comparison to other nearby cities like Riverside and San Jacinto, the City of Moreno Valley is a "late-boomer" both in early development in the 19th century and in urban growth in the 20th. By the mid-19th century, the area that constitutes today's Moreno Valley remained essentially uninhabited despite its location on a plain surrounded by several large Mexican land grants. In 1853-1855, when the U.S. government initiated the first official land survey in southern California, the only man-made features observed in the area were a few roads crisscrossing the desert floor, including a wagon road from San Bernardino to Temecula, a second one leading to San Jacinto, and several unidentified roads or trails (GLO 1856a).

The present-day Moreno Valley area remained unclaimed public land until 1870, when a 13,471-acre tract was purchased from the U.S. government in a single transaction (BLM n.d.). It was on this vast acquisition that the 11,560-acre Alessandro Tract and the town of Alessandro, which is occupied by March ARB today, were laid out and offered to settlers in 1887 during a land boom that swept through southern California in the 1880s (Gunther 1984:11). After this initial development scheme failed, the developers of Redlands in San Bernardino County, fresh from their acclaimed success in creating the Bear Valley reservoir and the thriving Redlands colony, took over the Alessandro Tract with the intention of irrigating the land with an elaborate water system (*ibid.*).

Water from the Bear Valley reservoir reached the Moreno Valley area in 1891, ushering in a few years of prosperity. Two more communities formed during this brief boom: New Haven, soon to be renamed Moreno, and Midland, also known as Armada (Gunther 1984:323, 333). The boom turned to bust during the drought of the late 1890s, when Bear Valley water was no longer delivered to the Moreno Valley area. As a result, the once flourishing towns in the area were largely abandoned, and many of the buildings were taken up and moved to Riverside (*ibid.*:13, 334).

During the early 20th century, the Moreno Valley area began to recover slowly. In 1912, a 1,100-acre portion of the original Alessandro Tract was re-subdivided as the Sunnymead Orchard Tract (County of Riverside 1912), and thus the community formerly known as Midland or Armada became Sunnymead. A decade later, a series of land development projects began just to the west of Sunnymead, which ultimately resulted in the establishment of the community of Edgemont (County of Riverside 1927; Gunther 1984:171-172).

Despite these development efforts, Moreno Valley's economic prospect was severely hampered by the lack of reliable water supply until 1973, after the completion of the California Aqueduct and its southern terminus, Lake Perris (Gunther 1984:334). Since then, the promise of affordable housing brought an influx of commuters to the Moreno Valley area, facilitating growth and urbanization. By 1984, when residents in the communities of Moreno, Sunnymead, and Edgemont voted to incorporate as the City of Moreno Valley, the new city had already become the second most populous in Riverside County (*ibid.*), thanks mainly to its attraction as a "bedroom community."

In the project vicinity, in contrast, the establishment of the U.S. Army's Alessandro Aviation Field in 1918 began a long history of military installations, a tradition that was reinforced by the WWII-era Camp Haan and carried to the present time by March ARB (formerly March Air Force Base). In more recent times, the area around project location has undergone a gradual transition to an industrial/commercial "park," largely because of its convenient location in close proximity to the Interstate Highway 215 corridor.

RESEARCH METHODS

RECORDS SEARCH

On July 19, 2018, CRM TECH archaeologist Nina Gallardo (see App. 1 for qualifications) completed the records search at the Eastern Information Center (EIC). Located at the University of

California, Riverside, the EIC is the State of California's official cultural resource records repository for the County of Riverside. During the records search, Gallardo examined maps and records on file at the EIC for previously identified cultural resources and existing cultural resources reports within a one-mile radius of the APE. Previously identified cultural resources include properties designated as California Historical Landmarks, Points of Historical Interest, or Riverside County Historic Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

NATIVE AMERICAN PARTICIPATION

Prior to the commencement of this study, CRM TECH submitted a written request to the State of California Native American Heritage Commission (NAHC) for a Sacred Lands File records search on a property adjacent to the APE, and the NAHC's reply was used to identify known Native American cultural resources in the vicinity and local tribes to contact regarding the current undertaking. Following the NAHC's recommendations and previously established consultation protocol, CRM TECH sought consultation with 17 tribal representatives in the region in writing as well as by telephone between July 18 and August 3, 2018, for further information on Native American cultural resources in the project vicinity. In addition, on July 23 CRM TECH notified the nearby Soboba Band of Luiseño Indians and Pechanga Band of Luiseño Indians of the upcoming archaeological fieldwork and invited tribal participation. The correspondence between CRM TECH and the Native American representatives is attached as Appendix 2.

HISTORICAL BACKGROUND RESEARCH

Historical background research for this study was conducted by CRM TECH historian Terri Jacquemain (see App. 1 for qualifications) for the purpose of establishing a historical context for the APE and ascertaining the history of the existing drainage channel. In addition to published literature in local history, sources consulted during the research included archival records of the County of Riverside, various online genealogical databases, U.S. General Land Office (GLO) land survey plat maps dated 1856, U.S. Geological Survey (USGS) topographic maps dated 1901-1980, and aerial photographs taken in 1938-2012. In an effort to locate archival records pertaining to the construction and maintenance of the channel, Jacquemain also contacted staff members of the March JPA Planning Department.

GEOARCHAEOLOGICAL ANALYSIS

As part of the research procedures, CRM TECH principal investigator/archaeologist Michael Hogan (see App. 1 for qualifications) pursued geoarchaeological analysis to assess the APE's potential for the deposition and preservation of subsurface cultural deposits from the prehistoric period, which could not be determined through standard surface archaeological survey procedures. Sources consulted for this purpose included a geotechnical exploration report completed for the adjacent K-4 Parcel Project (Leighton 2018) as well as topographic, geologic, and soil maps pertaining to the surrounding area (e.g., Morton et al. 2001a; 2001b). Findings from these sources were used to develop a geomorphologic history of the APE and address the geoarchaeological sensitivity of the vertical APE.

FIELD SURVEY

On July 27, 2018, CRM TECH archaeologist Salvadore Boites (see App. 1 for qualifications) carried out the field survey of the APE with the assistance of Native American monitor Talitha Arceo from the Soboba Band of Luiseno Indians. In light of the narrow, linear configuration of the APE, the survey was conducted by walking a transect on each side of the existing channel for the entire length of the APE. In this way all of the ground surface within the APE was systematically and carefully examined for any evidence of human activities dating to prehistoric or historic period (i.e., 50 years or older).

Ground visibility ranged from greater than 80% on the topsides and slopes of the channel to less than 5% at the bottom, due to vegetation grown and dumped refuse items. In light of the extensively disturbed condition of the ground surface thought the APE, the visibility was deemed adequate for this study. As a part of the fieldwork, Boites made detailed notations, photo-documentation, and scaled sketches of the drainage channel, and the field data were then compiled on standard archaeological site record forms for submittal to the EIC and inclusion in the California Historical Resources Inventory (see App. 3).

RESULTS AND FINDINGS

RECORDS SEARCHES

According to EIC records, the APE was entirely or partially included in as many as six previous cultural resources studies (Fig. 5), but all but one of them were completed between 1991 and 2008 and are thus considered outdated for regulatory compliance purposes today. In any event, the APE was not the focus of any of those studies, and the only recent study, completed in 2014, focused on a similar drainage channel along Heacock Street and included only the easternmost fraction of the current APE. That channel, which evidently predates 1939 (USGS 1943), was not addressed in the 2014 study as a potential "historic property" or "historical resource" (Gust et al. 2014), and no historical/archaeological resources were recorded within or adjacent to the APE during any of the six previous studies.

Outside the APE but within the scope of the records search, EIC records show 44 other previous cultural resources studies on various tracts of land and linear features, which collectively covered roughly half of the land within the one-mile scope, mostly within the boundaries of March ARB (Fig. 5). As a result of these and other similar studies in the vicinity, 245 historical/archaeological sites and one isolate—i.e., a locality with fewer than three artifacts—have been identified within one mile of the APE (see App. 3). One the 245 sites consisted of archaeological remains of WWII-era buildings, and the other 244 all represented built-environment features.

Among these localities, only the isolate was of prehistoric—i.e., Native American—origin, consisting of a bifacial mano fragment found on the ground more than a half-mile south of the eastern portion of the APE. All 245 of the sites dated to the historic period and included a farm, the former California Southern Railway (a Santa Fe Railway subsidiary), two canals/channels unrelated to the one in the APE, structural remains from Camp Haan, and a large number of buildings and structures. The nearest one among them, 33-017972, was recorded more than 300 feet south of the

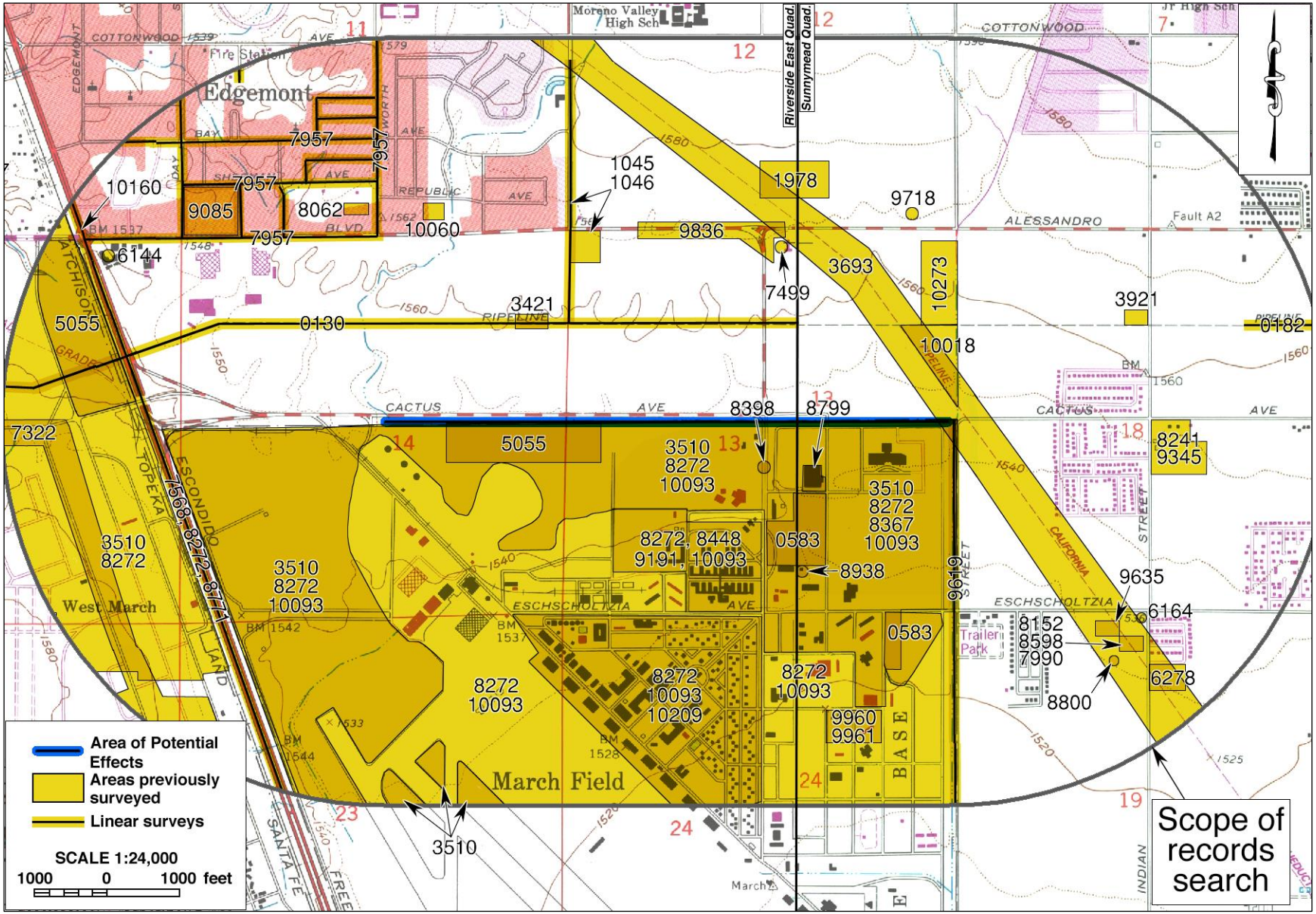


Figure 5. Previous cultural resources studies in the vicinity of the APE, listed by EIC file number. Locations of historical/archaeological sites are not shown as a protective measure.

APE (see App. 3). The vast majority of the buildings and structures were located in the March Field Historic District within March ARB, a National Register-listed property lying roughly a half-mile to the south of the APE. Since none of these known cultural resources was found within or adjacent to the APE, none of them requires further consideration during this study.

NATIVE AMERICAN PARTICPATION

In a letter dated May 17, 2018, the NAHC stated that the sacred lands record search identified no Native American cultural resources in the vicinity of the APE. However, the NAHC indicated the area to be sensitive for such resources and recommended further contact with local Native American groups for additional information. For that purpose, the NAHC provided a list of potential contacts in the region (see App. 2). For this study, CRM TECH sent written requests for comments to all of the tribes on the referral list that are affiliated with the Luiseño group and/or the nearby Cahuilla and Serrano groups (see App. 2). In addition to or in lieu of some of the individuals recommended by the NAHC, the following designated spokespersons for the tribes were also contacted:

- Judy Stapp, Director of Cultural Affairs, Cabazon Band of Mission Indians;
- Bobby Ray Esparza, Cultural Coordinator, Cahuilla Band of Indians;
- Raymond Huaute, Tribal Historic Preservation Officer, Morongo Band of Mission Indians;
- Chris Devers, Cultural Liaison, Pauma Band of Luiseño Indians;
- Tuba Ebru Ozdil, Planning Specialist, Pechanga Band of Luiseño Indians;
- Destiny Colocho, Tribal Historic Preservation Officer, Rincon Band of Luiseño Indians;
- Gabriella Rubalcava, Environmental Director, Santa Rosa Band of Cahuilla Indians.

In all, 17 individuals from a total of 16 tribal organizations were contacted via both U.S. mail and e-mail on July 18, 2018, followed by telephone calls on August 1-3. As of this time, nine of the tribes have responded in writing, and another has provided their comment by telephone (see App. 2). Among them, Tuba Ebru Ozdil stated that the Pechanga Band of Luiseño Indians had no comments regarding the undertaking at this time, while Judy Stapp stated that the Cabazon Band of Mission Indians had no specific information on any Native American cultural resources in the APE. Jessica Mauk, Cultural Resources Analyst for the San Manuel Band of Mission Indians, noted that the APE was outside the tribe's ancestral territory and declined to participate in further consultations over this undertaking.

Destiny Colocho of the Rincon Band of Luiseño Indians and Victoria Martin, Tribal Secretary for the Augustine Band of Cahuilla Indians, also indicated that their tribes had no information on any Native American cultural resources in or near the APE. Ms. Colocho requested to review the records search results in this study, while Ms. Martin encouraged further consultation with other tribes in the vicinity and monitoring during ground-disturbing activities in the APE. In addition, Ms. Martin requested to be notified immediately if any Native American cultural resources were discovered during the undertaking, as did Chris Devers of the Pauma Band of Luiseño Indians.

In their replies, Katie Croft, Cultural Resources Manager for the Agua Caliente Band of Cahuilla Indians, Bobby Ray Esparza of the Cahuilla Band of Indians, and the Morongo Tribal Historic Preservation Office identified the APE as a part of their tribes' traditional use area. Mr. Esparza stated that the tribe was not aware of any Native American cultural resources in or near the APE but

requested that tribal monitors be present during all ground-disturbing activities for the undertaking. Ms. Croft and the Morongo Tribal Historic Preservation Office both requested copies of the completed cultural resources study for tribal review.

As mentioned above, the Soboba Band of Luiseño Indians, the nearest tribe of Luiseño heritage, participated in the field survey of the APE on July 27, 2018. In a subsequent written response, Tribal Historic Preservation Officer Joseph Ontiveros also identified the APE to be a part of the tribe's traditional use area and found the location to be culturally sensitive. The Soboba Band requested to participate in further consultation with Lewis Retail Centers, March JPA, and USACE, and to monitor future ground-disturbing activities associated with the undertaking. In addition, Mr. Ontiveros stated that an in-house database search identified "multiple areas of potential impacts" and offered to share specific information during future consultation with March JPA and USACE.

HISTORICAL BACKGROUND RESEARCH

Historic maps from the mid-1850s, when the U.S. government conducted the first systematic land surveys in the Moreno Valley-Riverside area, show that the only notable man-made feature observed in the project vicinity at the time was a "Wagon Road to Timicula," which extended from San Bernardino to Temecula along a generally north-south alignment across the western end of the APE (Fig. 6). By the late 1890s, the project vicinity was occupied by a regular grid of roads but no settlements or buildings, while the main transportation corridor had moved further west to the Atchison, Topeka and Santa Fe (now Burlington Northern Santa Fe) Railway (Fig. 7). Other than a few roads running north-south across the area and patches of agricultural fields, no man-made features were known to be present in or near the APE in the late 1940s (Fig. 8; Leighton 2018).

In 1941-1942, the U.S. government acquired from Mary H. Trautwein et al. several hundred acres in Sections 13 and 14 of T3S R4W, including the land "south of the centerline of Cactus Avenue" (County Assessor 1937-1948). The acquisition was undoubtedly a part of the expansion of what was then March Army Air Field in preparation for its wartime service as a bomber crew training facility that hosted as many as 75,000 troops (March ARB n.d.). Genealogical sources indicate that Mary Henrietta Trautwein (1916-1954) was born in Pennsylvania but was bought to the Pasadena area in California as an infant and later moved to Los Angeles (Ancestry.com n.d.). There is no evidence that any development or construction activities occurred in the vicinity of the APE during the Trautwein ownership.

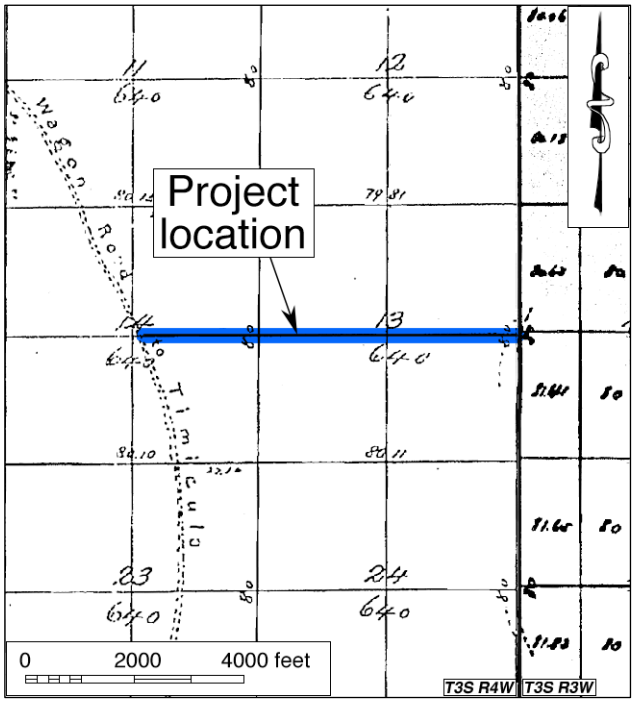


Figure 6. The APE and vicinity in 1853-1855. (Source: GLO 1856a; 1856b)

As the result of the 1941-1942 expansion, March Army Air Field was doubled in size (March

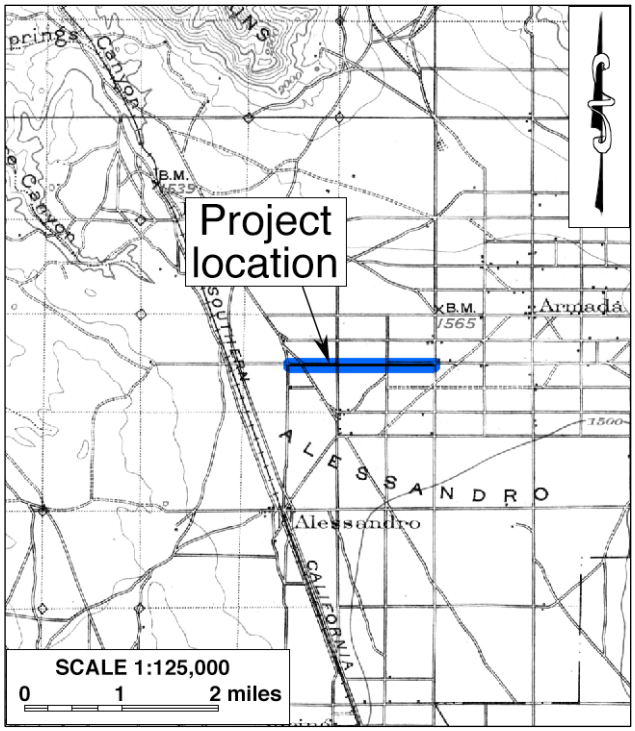


Figure 7. The APE and vicinity in 1897-1898. (Source: USGS 1901)

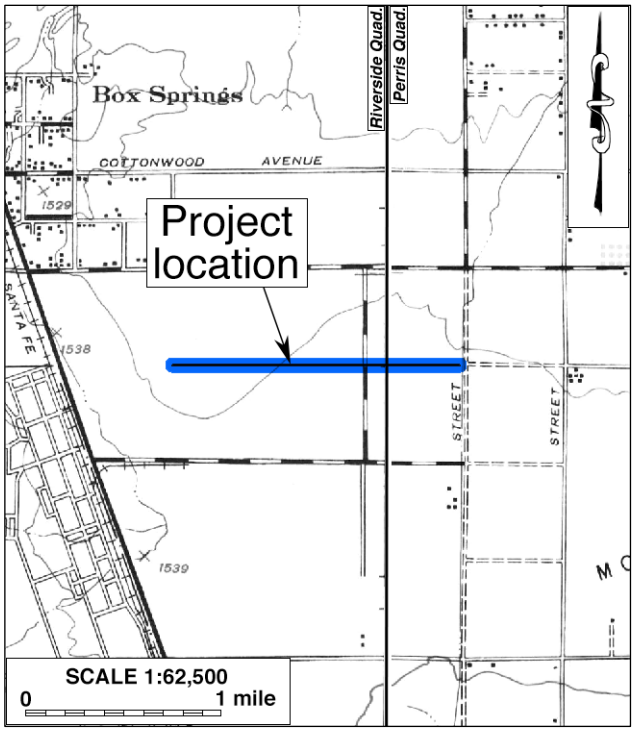


Figure 8. The APE and vicinity in 1939. (Source: USGS 1942; 1943)

ARB n.d.). By 1953, March Air Force Base, as the installation was renamed in 1947, had reached its current perimeters in the vicinity of the APE, and the drainage channel in the APE was evidently in existence as of 1949 (Figs. 8, 9; LOR 2018). The channel was most likely excavated during the 1941-1942 expansion to convey seasonal storm runoff from the north to the preexisting channel along Heacock Street to the east (Fig. 8) and around the perimeter of the base. Other than the channel, the only man-made feature known to extend into the APE in the 1949-1978 era was the forerunner of present-day Graham Street/Riverside Drive, which crosses the project alignment in the north-south direction (RCFCWCD 1960; LOR 2018).

The segment of Cactus Avenue between Graham Street/Riverside Drive and present-day Highway 215 was turned into a paved road sometime between 1953 and 1966, and the road was extended further east to Fourth Street in 1966-1967 and finally to Heacock Street in 1978-1994 (Figs. 2, 9, 10; NETR Online 1966-1994; LOR 2018). These projects may have had some impact on the current configuration and appearance of the channel, but the extent of the impact is unclear due to the lack of specific documentation. Today, the right-of-way for the channel remains the property of March ARB (County of Riverside n.d.). However, inquiries to the March JPA Planning Department have so far yielded no archival records pertaining to the construction, modifications, and maintenance of the channel.

GEOARCHAEOLOGICAL ANALYSIS

The surface geology of the entire APE was mapped by Morton et al. (2001a; 2001b) as *Qvof*$_a$. Defined as very old alluvial fan deposits from the early Pleistocene age (circa 2.6-0.8 million years

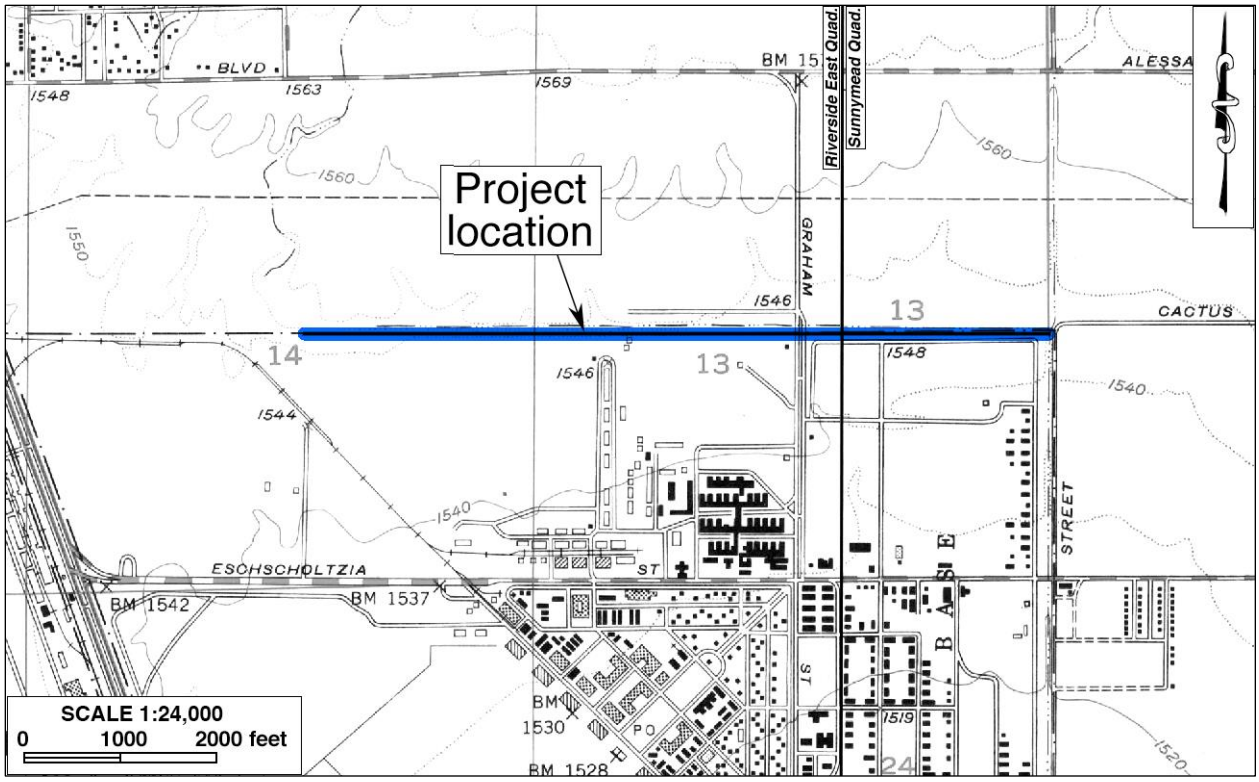


Figure 9. The APE and vicinity in 1951-1953. (Source: USGS 1953a; 1953b)

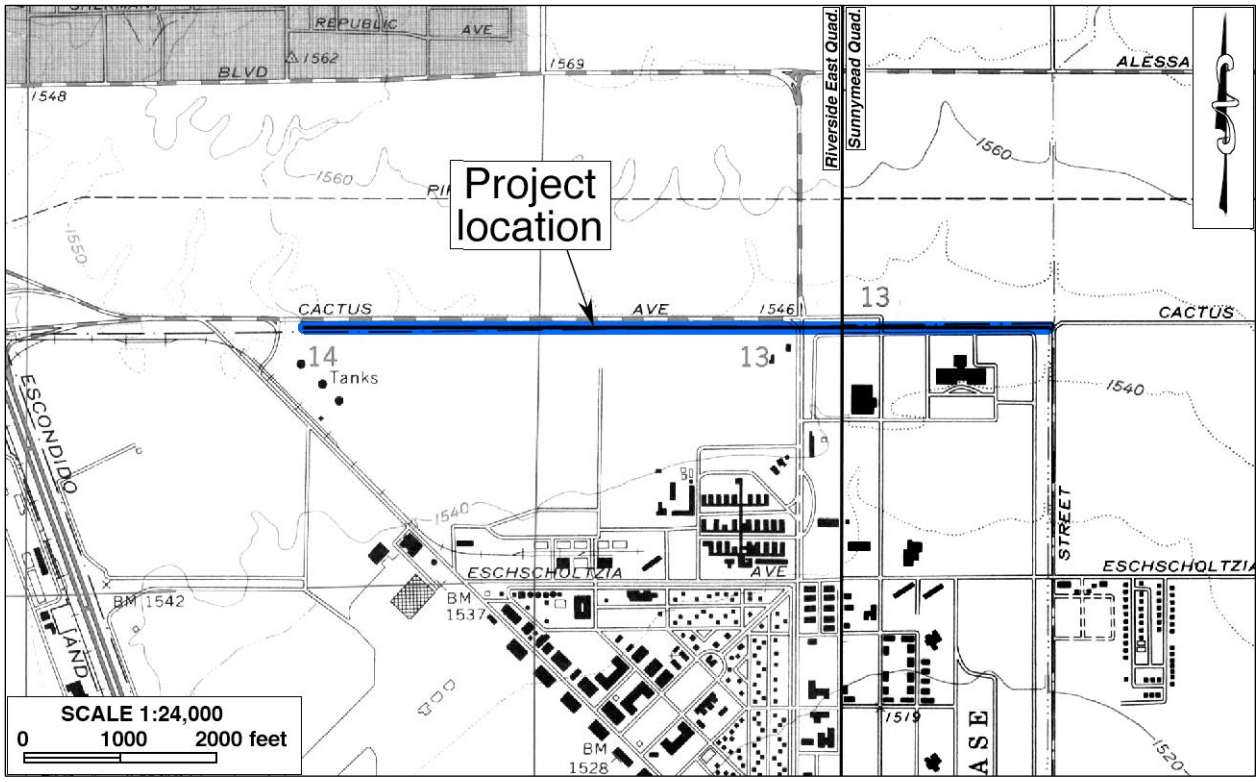


Figure 10. The APE and vicinity in 1966-1967. (Source: USGS 1967a; 1967b)

ago) that forms widespread deposits north and south of Moreno Valley, $Qvof_a$ is characterized as mostly well-dissected, well-indurated, reddish-brown, and very coarse through very fine sands mixed with a minor gravel component. The geotechnical analysis for the adjacent K-4 Parcel Project (Leighton 2018) characterized the soil in the vicinity as a combination of undocumented artificial fill and the older alluvium. The artificial fill was noted mostly along Cactus Avenue and the existing drainage channel (*ibid.*:28-37).

According to existing ethnographic literature on Luiseño culture, "villages were usually in sheltered coves or canyons, on the side of slopes in a warm thermal zone, near good water supplies, and in defensive locations" (Bean and Shipek 1978:551). This is corroborated by observations made during numerous past studies that CRM TECH has completed in the Inland Empire region since 1993, which suggest that longer-term residential settlements of the Native population were more likely to occur near the base of hills and/or on elevated terraces or ridges near creeks or springs, while the level, unprotected valley floor was used mainly for resource procurement, travel, and occasional camping during these activities.

Based on this settlement pattern, the location of the APE, on an alluvial fan subject to occasional flooding but nearly 10 miles from any relatively steady streams, would not have provided a favorable setting for permanent or long-term habitation by the aboriginal population during prehistoric times. Instead, the area was more likely used as a travel route and for opportunistic sustenance activities, where surviving cultural remains are typically limited to the ground surface and shallow deposits.

In its current state, the APE has been heavily disturbed by construction activities associated with the channel and Cactus Avenue, and the surface and near-surface soils are mainly artificial fill. These soils offer a highly unlikely environment for any prehistoric archaeological deposits to survive intact. At depth, the early Pleistocene alluvial fan deposits well predate human habitation in California and would not be expected to contain deeply buried cultural materials. Overall, the proposed undertaking appears to have a minimal potential to impact any subsurface archaeological remains in the vertical APE.

FIELD SURVEY

During the field survey, the segment of the drainage channel in the APE was recorded into the California Historical Resources Inventory and subsequently designated by the EIC as Site 33-028200 (CA-RIV-12721; see App. 4). The channel measures approximately 41-47 feet wide across the top, 13-18 feet wide across the bottom, and 6-24 feet deep, with steep, sloping sides that show signs of erosion due to periodic flooding (Fig. 4). As a typical and unremarkable open earthen ditch, it demonstrates no distinctively historical characteristics or features.

Beside the channel, several streets lying across or adjacent to the APE are also known to date to the late historic period, namely Riverside Drive, Fourth Street, and Cactus Avenue. However, their current configuration and appearance reflect the results of repeated upgrading and constant maintenance over the years, and none of them retains any distinctively historical character. As working components of the modern transportation infrastructure, these streets are not considered potential "historic properties" or "historical resources," and require no further study.

No other buildings, structures, objects, sites, features, or artifacts more than 50 years of age were encountered within the APE, and no remnants of the 1850s "Wagon Road to Timicula" or any associated artifacts were observed across the APE. The APE is devoid of any bedrock outcrops, which often contain bedrock milling features, the most common type of prehistoric archaeological sites to be found in the Moreno Valley area, nor was any other indication of prehistoric or historical cultural remains observed during the field survey. As mentioned above, the ground surface in the APE has been extensively disturbed in the past, and it is currently littered with small piles of rubble and a larger pile of asphalt near Riverside Drive, interspersed with modern refuse. None of these items is of any historical/archaeological interest.

MANAGEMENT CONSIDERATIONS

APPLICABLE STATUTORY/REGULATORY FRAMEWORK

Section 106 of NHPA mandates that federal agencies take into account the effects of their undertakings on historic properties and seek ways to avoid, minimize, or mitigate any adverse effects on such properties (36 CFR 800.1(a)). Similarly, CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1). "Substantial adverse change," according to PRC §5020.1(q), "means demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired."

The purpose of this study is to identify any "historic properties" or "historical resources" that may exist within the APE. "Historic properties," as defined by the Advisory Council on Historic Preservation, include "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" (36 CFR 800.16(l)). The eligibility for inclusion in the National Register is determined by applying the following criteria, developed by the National Park Service as per provision of NHPA:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

For CEQA-compliance considerations, the State of California's Public Resources Code (PRC) establishes the definitions and criteria for "historical resources," which require similar protection to what NHPA Section 106 mandates for historic properties. "Historical resources," according to PRC §5020.1(j), "includes, but is not limited to, any object, building, site, area, place, record, or

manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California."

More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically significant by the lead agency (Title 14 CCR §15064.5(a)(1)-(3)). Regarding the proper criteria for the evaluation of historical significance, CEQA guidelines mandate that "generally a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

A local register of historical resources, as defined by PRC §5020.1(k), "means a list of properties officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution." For properties in the County of Riverside, the County maintains a list of officially designated Historic Landmarks, but the lead local agency for this undertaking, namely March JPA, does not maintain its own register of officially designated or recognized historical resources, nor has it implemented any additional regulations or guidelines to be applied to cultural resources under its jurisdiction.

DISCUSSION

In summary of the research results presented above, the earthen drainage channel recorded as Site 33-028200 during this study dates to the 1941-1953 era, most likely the early 1940s. Evidently excavated during the expansion of March Army Air Field, the channel is a peripheral feature associated with the establishment the large WWII-era military base, but does not demonstrate a unique or particularly close association with that event or with any other events (Criterion A/1) or persons (Criterion B/2) of recognized historic significance. Simple in design and utilitarian in character, the channel does not stand out as an important example of any style, type, period, region, or method of construction, nor is it known to represent the work of a prominent architect, designer, engineer, or builder (Criterion C/3). Finally, as a late-historic-period infrastructure feature of standard construction, it demonstrates little potential for any important historical/archaeological information (Criterion D/4).

Based on these considerations, and in light of the criteria listed above, the drainage channel at Site 33-028200 does not appear to meet any of the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources, and does not qualify as a "historic property" or a "historical resource." No other potential "historic properties" or "historical resources"

of either prehistoric or historical origin were identified throughout the various avenues of research. Therefore, the present study concludes that no "historic properties" or "historical resources" are present within to the APE.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the results of this study indicate that no "historic properties" or "historical resources" are known to be present within the APE, and the subsurface sediments in the APE appear to be low in sensitivity for potentially significant archaeological deposits. Based on these findings, and pursuant to 36 CFR 800.4(d)(1) and Calif. PRC §21084.1, CRM TECH presents the following recommendations to March JPA and USACE:

- No "historic properties" or "historical resources" will be affected by the proposed undertaking.
- No further cultural resources investigation will be necessary for the undertaking unless project plans undergo such changes as to include areas not covered by this study.
- If buried cultural materials are inadvertently discovered during earth-moving operations associated with the undertaking, all work in that area should be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the find.

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APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR, HISTORY
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.
2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (with Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR, ARCHAEOLOGY
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.
2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U. C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U. C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT HISTORIAN/ARCHITECTURAL HISTORIAN
Terri Jacquemain, M.A.

Education

2004 M.A., Public History and Historic Resource Management, University of California, Riverside.
2002 B.S., Anthropology, University of California, Riverside.

Professional Experience

2003- Historian/Report Writer, CRM TECH, Riverside/Colton, California.
- Writer/co-author of cultural resources reports for CEQA and NHPA Section 106 compliance;
- Historic context development, historical/archival research, oral historical interviews, consultation with local historical societies;
- Historic building surveys and recordation, research in architectural history.

2002-2003 Teaching Assistant, Religious Studies Department, University of California, Riverside.
1997-2000 Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997 Reporter, *The Press-Enterprise*, Riverside, California.

Memberships

California Council for the Promotion of History.
Friends of Public History, University of California, Riverside.

PROJECT ARCHAEOLOGIST
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004- Project Archaeologist, CRM TECH, Riverside/Colton, California.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

PROJECT ARCHAEOLOGIST
Salvadore Boites, M.A.

Education

2013	M.A., Applied Anthropology, California State University, Long Beach.
2003	B.A., Anthropology/Sociology, University of California, Riverside.

Professional Experience

2003-	Project Archaeologist, CRM TECH, Riverside/Colton, California.
2010-2011	Adjunct Instructor, Anthropology etc., Everest College, Anaheim, California.
2001-2002	Teaching Assistant, Moreno Elementary School, Moreno Valley, California.
1999-2003	Research Assistant, Anthropology Department, University of California, Riverside.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* Seventeen local Native American representatives were contacted during this study, representing a total of 16 tribal organizations (highlighted in the NAHC referral list); a sample letter is included in the appendix.

SACRED LANDS FILE & NATIVE AMERICAN CONTACTS LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Boulevard, Suite 100
West Sacramento, CA 95691
(916)373-3710
(916)373-5471 (Fax)
nahc@pacbell.net

Project: Proposed K-4 Parcel Project (CRM TECH No. 3347)

County: Riverside

USGS Quadrangle Name: Riverside East and Sunnymead, Calif.

Township 3 South **Range** 4 West SB **BM; Section(s)** 13 and 14

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The primary component of the project is to develop on approximately 35 acres located along the south side of Cactus Avenue between Veterans Way and Frederick Street within the March Joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California.

May 14, 2018

NOTE: The request for Sacred Land File records search was initiated for a property adjacent to the Cactus Avenue Drainage Channel Project APE, and the coverage is appropriate for the purpose of this study.

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

May 17, 2018

Nina Gallardo
CRM TECH

Sent by E-mail: ngallardo@crmtech.us

RE: Proposed K-4 Parcel (CRM TECH No. 3347) Project, near the Community of Edgemont; Riverside East and Sunnymead USGS Quadrangles, Riverside County, California

Dear Ms. Gallardo:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results however the area within the APE provided is sensitive for cultural resources. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

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Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264 — Luiseno
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264 — Luiseno
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

Cahuilla Band of Indians
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

Campo Band of Mission Indians
Ralph Goff, Chairperson
36190 Church Road, Suite 1 — Kumeyaay
Campo, CA, 91906
Phone: (619) 478 - 9046
Fax: (619) 478-5818
rgoff@campo-nsn.gov

Ewiiaapaayp Tribal Office
Robert Pinto, Chairperson
4054 Willows Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 6315
Fax: (619) 445-9126
wmicklin@leaningrock.net

Ewiiaapaayp Tribal Office
Michael Garcia, Vice Chairperson
4054 Willows Road — Kumeyaay
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michaelg@leaningrock.net

Jamul Indian Village
Erica Pinto, Chairperson
P.O. Box 612 — Kumeyaay
Jamul, CA, 91935
Phone: (619) 669 - 4785
Fax: (619) 669-4817
mohusky@jiv-nsn.gov

La Jolla Band of Luiseno Indians
Thomas Rodriguez, Chairperson
22000 Highway 76 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 3771

La Posta Band of Mission Indians
Gwendolyn Parada, Chairperson
8 Crestwood Road — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 478 - 2113
Fax: (619) 478-2125
LP13boots@aol.com

La Posta Band of Mission Indians
Javaughn Miller, Tribal Administrator
8 Crestwood Road — Kumeyaay
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Phone: (619) 478 - 2113
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jmiller@LPtribe.net

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Los Coyotes Band of Mission Indians
John Perada, Environmental Director
P. O. Box 189 — Cahuilla
Warner Springs, CA, 92086
Phone: (760) 782 - 0712
Fax: (760) 782-2730

Los Coyotes Band of Mission Indians
Shane Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712
Chapparosa@msn.com

Manzanita Band of Kumeyaay Nation
Angela Elliott Santos, Chairperson
P.O. Box 1302 — Kumeyaay
Boulevard, CA, 91905
Phone: (619) 766 - 4930
Fax: (619) 766-4957

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 849 - 8807
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dtorres@morongo-nsn.gov

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

Pauma Band of Luiseno Indians - Pauma & Yuima Reservation
Temet Aguilar, Chairperson
P.O. Box 369 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6000
Fax: (951) 695-1778
epreston@pechanga-nsn.gov

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resources Coordinator
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6306
Fax: (951) 506-9491
pmacarro@pechanga-nsn.gov

Ramona Band of Cahuilla Mission Indians
John Gomez, Environmental Coordinator
P. O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramonatribe.com

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairperson
P.O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramonatribe.com

Rincon Band of Mission Indians
Bo Mazzetti, Chairperson
1 West Tribal Road — Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
bomazzetti@aol.com

Rincon Band of Mission Indians
Jim McPherson, Tribal Historic Preservation Officer
1 West Tribal Road — Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
vwhipple@rincontribe.org

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Serrano
Phone: (503) 539 - 0933 — Tataviam
Fax: (503) 574-3308
ddyocum@comcast.net

San Manuel Band of Mission Indians
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov

San Pasqual Band of Mission Indians
Allen E. Lawson, Chairperson
P.O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
allenl@sanpasqualtribe.org

San Pasqual Band of Mission Indians
John Flores, Environmental Coordinator
P. O. Box 365 — Kumeyaay
Valley Center, CA, 92082
Phone: (760) 749 - 3200
Fax: (760) 749-3876
johnf@sanpasqualtribe.org

Santa Rosa Band of Mission Indians
Steven Estrada, Chairperson
P.O. Box 391820 — Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
mflaxbeard@santarosacahuilla-nsn.gov

Serrano Nation of Mission Indians
Goldie Walker, Chairperson
P.O. Box 343 — Serrano
Patton, CA, 92369
Phone: (909) 528 - 9027

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 — Cahuilla
San Jacinto, CA, 92581 — Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

Native American Heritage Commission
Native American Contact List
Riverside County
5/17/2018

Soboba Band of Luiseno Indians
Carrie Garcia, Cultural Resources Manager
P. O. Box 487 — Cahuilla
San Jacinto, CA, 92583 — Luiseno
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Fax: (951) 654-4198
carrieg@soboba-nsn.gov

Soboba Band of Luiseno Indians
Scott Cozart, Chairperson
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San Jacinto, CA, 92583 — Luiseno
Phone: (951) 654 - 2765
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Sycuan Band of the Kumeyaay Nation
Lisa Haws, Cultural Resources Manager
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 312 - 1935
lhaws@sycuan-nsn.gov

Sycuan Band of the Kumeyaay Nation
Cody J. Martinez, Chairperson
1 Kwaaypaay Court — Kumeyaay
El Cajon, CA, 92019
Phone: (619) 445 - 2613
Fax: (619) 445-1927
ssilva@sycuan-nsn.gov

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 — Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

Viejas Band of Kumeyaay Indians
Julie Hagen,
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
Fax: (619) 445-5337
jhagen@viejas-nsn.gov

Viejas Band of Kumeyaay Indians
Robert Welch, Chairperson
1 Viejas Grade Road — Kumeyaay
Alpine, CA, 91901
Phone: (619) 445 - 3810
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jhagen@viejas-nsn.gov

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This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed K-4 Parcel Project, Riverside County.

July 18, 2018

Patricia Garcia-Plotkin, Tribal Historic Preservation Officer
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA 92264

RE: An Undertaking Involving the Channel along Cactus Avenue
Approximately 1.5 Linear Miles
Moreno Valley Area, Riverside County, California
CRM TECH Contract #3375

Dear Ms. Garcia-Plotkin:

In May 2018, CRM TECH began a cultural resources assessment on a property near the City of Moreno Valley (APNs 297-150-006, -007, 297-150-038, 297-160-005, and 297-200-004; see attached map). In response to CRM TECH's inquiry, the Native American Heritage Commission reported that the Sacred Lands File search was completed for the Area of Potential Effects with negative results. On May 18, 2018, a letter was sent to you requesting your input on potential Native American cultural resources in or near that APE.

Currently there is a proposed undertaking that entails construction work on a channel situated along the south side of Cactus Avenue, from Elsworth Street to Heacock Street, a distance of approximately 1.5 miles (see attached map). As part of the cultural resources study for this undertaking, we are writing to request your input on potential Native American cultural resources in and near the current APE or any concerns you may have regarding the undertaking.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value in or near the APE, or any other information to consider during the cultural resources investigation. Any information or concerns may be forwarded to CRM TECH Native American liaison Nina Gallardo by telephone, facsimile, standard mail, or email (ngallardo@crmtech.us). Requests for documentation or information we cannot provide will be forwarded to our client and/or the lead agency, namely the March Joint Powers Authority.

Respectfully,

Sal Z. Boites
Project Archaeologist
CRM TECH

Project location map is attached

From: Cultural Department <culturaldirector@cahuilla.net>
Sent: Thursday, July 19, 2018 2:32 PM
To: sboites@crmtech.us
Subject: Re: Scoping letter

Hello,

The Cahuilla Band of Indians received your letter July 18, 2018 regarding An Undertaking Involving the Channel along Cactus Avenue in the City of Moreno Valley, Riverside County, CA. The Cahuilla band does not have knowledge of any cultural resources/sites within or near the project area. Although this project is outside the Cahuilla reservation boundary it is within the Cahuilla traditional land use area. Therefore we do have an interest in this project. We respectfully request to have tribal monitors be present during all ground disturbing activities as there is possibility of unearthing cultural resources during construction. We appreciate your help in preserving Tribal Cultural Resources in your project.

Respectfully,

BobbyRay Esparza
Cultural Coordinator
Cahuilla Band of Indians
Cell: (760)423-2773
Office: (951)763-5549
Fax:(951)763-2808

From: Jessica Mauck <JMauck@sanmanuel-nsn.gov>
Sent: Thursday, July 19, 2018 3:03 PM
To: sboites@crmtech.us
Subject: RE: Scoping letter

Hi Sal,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 19 July 2018. The proposed project area is located just outside of Serrano ancestral territory and, as such, SMBMI will not request consulting party status or elect to participate in the scoping, development, and/or review of documents created pursuant to these legal and regulatory mandates.

For your knowledge, I am the Tribe's CEQA point of contact and all information requests can be sent directly to me.

Regards,

Jessica Mauck, Cultural Resources Analyst
O: (909) 864-8933 x3249 M: (909) 725-9054
26569 Community Center Drive, Highland California 92346

From: ngallardo@crmtech.us
Sent: Monday, July 23, 2018 11:04 AM
To: jontiveros@soboba-nsn.gov; 'Jessica Valdez'
Subject: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Hello,

I am contacting you to see if the tribe would like to participate in the archaeological fieldwork for the above-referenced project. We will conduct a field inspection and recording on the channel along Cactus Avenue, just north of the parcel that we surveyed on June 1, 2018, with Soboba monitor Victoria Banda. Please let me know if the tribe will be interested in joining us for the fieldwork on the channel. A project location map and aerial map are attached to this e-mail.

We will contact you again when we have a specific time and date for the fieldwork.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH
1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

From: ngallardo@crmtech.us
Sent: Monday, July 23, 2018 11:10 AM
To: 'crs@pechanga-nsn.gov'; 'pmacarro@pechanga-nsn.gov'; 'eozdil@pechang-nsn.gov'
Subject: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Hello,

I am contacting you to see if the tribe would like to participate in the archaeological fieldwork for the above-referenced project. We will conduct a field inspection and recording on the channel along Cactus Avenue, just north of the parcel that we surveyed on June 1, 2018, with Pechanga monitor Leno Fernandez. Please let me know if the tribe will be interested in joining us for the fieldwork on the channel. A project location map and aerial map are attached to this e-mail.

We will contact you again when we have a specific time and date for the fieldwork.

Thank you for your time and input on this project.

Nina Gallardo
(909) 824-6400 (phone)
(909) 824-6405 (fax)
CRM TECH

1016 E. Cooley Drive, Ste. A/B
Colton, CA 92324

From: ngallardo@crmtech.us
Sent: Wednesday, July 25, 2018 10:11 AM
To: 'Jessica Valdez'
Subject: FW: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Hi Jessica,

Can we conduct this survey after 3373 survey on Thursday or Friday? Would this be feasible for the tribe to do this on the same day?

Nina

From: ngallardo@crmtech.us
Sent: Wednesday, July 25, 2018 10:11 AM
To: 'crs@pechanga-nsn.gov'; eozdil (eozdil@pechanga-nsn.gov)
Subject: FW: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Hello,

Can we conduct this survey after 3373 survey on Thursday or Friday? Would this be feasible for the tribe to do this on the same day?

Nina

From: Jessica Valdez <JValdez@soboba-nsn.gov>
Sent: Thursday, July 26, 2018 1:38 PM
To: ngallardo@crmtech.us
Cc: Joseph Ontiveros <jontiveros@soboba-nsn.gov>
Subject: RE: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Nina,

Yes, we can go ahead and piggy back the surveys tomorrow. Please provide us with the following details: start time, meeting location/address, as well as name and contact information for an on-site representative. Once we receive the specifics, we will be able to schedule a monitor accordingly.

Jessica Valdez, Cultural Resource Specialist
Soboba Band of Luiseño Indians
Cultural Resources Department
Office: (951)-654-5544 Ext: 4139
Fax: (951)-346-9088
JValdez@soboba-nsn.gov

From: ngallardo@crmtech.us
Sent: Thursday, July 26, 2018 2:54 PM
To: 'Jessica Valdez'
Subject: RE: Participation in Archaeological Fieldwork for the Channel along Cactus Avenue, near the City of Moreno Valley, Riverside (CRM TECH #3375)

Hi Jessica,

That's great. I spoke with Sal Boites, (559) 396-8896, who will be conducting both surveys tomorrow. He stated that he will start on the Cactus Channel project first (CRM TECH #3375), and he will be out there in the morning around 6:30 am on the southwest corner of Heacock Street and Cactus Avenue. After the Cactus Channel project, he will directly head to the 3373 Survey (northeast corner of Spruce Street and Rustin Avenue). Please let me know if you have any questions or there is any change in plans.

Thank for your time,

Nina Gallardo
CRM TECH

From: ngallardo@crmtech.us
Sent: Thursday, July 26, 2018 3:08 PM
To: 'tmendoza@pechanga-nsn.gov'
Subject: 3373 Spruce Rustin Survey tomorrow morning

Hi Tina,

Sal Boites, (559) 396-8896, will be conducting both surveys tomorrow. He stated that he will start on the Cactus Channel project first (CRM TECH #3375), and he will be out there in the morning around 6:30 am on the southwest corner of Heacock Street and Cactus Avenue. After the Cactus Channel project, he will directly head to the 3373 Survey (northeast corner of Spruce Street and Rustin Avenue).

Please have the monitor call Sal in the morning after 7:00 am, so he can give the monitor an approximate time when he will head over to the Spruce and Rustin survey. Please let me know if you have any questions or there is any change in plans.

Thanks for your time,

Nina Gallardo
CRM TECH

From: Jessica Mauck <JMauck@sanmanuel-nsn.gov>
Sent: Thursday, July 26, 2018 5:34 PM
To: ngallardo@crmtech.us
Subject: An Undertaking Involving the Channel along Cactus Avenue

Hi Nina,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 18 July 2018. The proposed project area is located just outside of Serrano ancestral territory and, as such, SMBMI will not request consulting party status or elect to participate in the scoping, development, and/or review of documents created pursuant to these legal and regulatory mandates.

Regards,

Jessica Mauck
Cultural Resources Analyst
O: (909) 864-8933 x3249 M: (909) 725-9054
26569 Community Center Drive, Highland California 92346

Subject: RE: Scoping letter
Date: 2018-07-30 12:05
From: Cultural Pauma <cultural@pauma-nsn.gov>
To: "sboites@crmtech.us" <sboites@crmtech.us>
Cc: "Dixon, Patti" <pdixon@palomar.edu>, Jeremy Zagarella <jzagarella@pauma-nsn.gov>

Mr. Boites,

Thank you for your email notice for Channel Project along Cactus Avenue in Moreno Valley. We are unaware of any Cultural sites or resources on or near the proposed project. Please contact us if there are any discoveries during the ground disturbance phase. If there are any questions please contact us.

Thank you,

Mr. Chris Devers
Cultural Liaison
Pauma Band of Luiseno Indians

MORONGO BAND OF MISSION INDIANS
TRIBAL HISTORIC PRESERVATION OFFICE
12700 PUMARRA RD BANNING, CA 92220
OFFICE 951-755-5059 FAX 951-572-6004

Date: 8/1/2018

Re:
CRM TECH CONTRACT #3375 – Cactus Avenue project

Dear,
Nina Gallardo
Project Archaeologist/Native American Liaison
CRM TECH

Thank you for contacting the Morongo Band of Mission Indians (MBMI) Cultural Heritage Department regarding the above referenced project(s). After conducting a preliminary review of the project, the tribe would like to respectfully issue the following comments and/or requests:

☐ The project is located outside of the Tribe's aboriginal territory and is not within an area considered to be a traditional use area or one in which the Tribe has cultural ties. We recommend contacting the appropriate tribe(s) who may have cultural affiliations to the project area. We have no further comments at this time.

☒ The project is located within the Tribe's aboriginal territory or in an area considered to be a traditional use area or one in which the Tribe has cultural ties. In order to further evaluate the project for potential impacts to tribal cultural resources, we would like to formally request the following:

- ☒ A thorough records search be conducted by contacting one of the California Historical Resources Information System (CHRIS) Archaeological Information Centers and a copy of the search results be provided to the tribe.
- ☒ Tribal monitor participation during the initial pedestrian field survey of the Phase I Study of the project and a copy of the results of that study. In the event the pedestrian survey has already been conducted, MBMI requests a copy of the Phase I study be provided to the tribe as soon as it can be made available.
- ☐ MBMI Tribal Cultural Resource Monitor(s) be present during all required ground disturbing activities pertaining to the project.

☐ The project is located with the current boundaries of the Morongo Indian Reservation. Please contact the Morongo Cultural Heritage Department for further details.

Please be aware that this letter is merely intended to notify your office that the tribe has received your letter requesting tribal consultation for the above mentioned project and is requesting to engage in consultation. Specific details regarding the tribe's involvement in the project must be discussed on a project by project basis during the tribal consultation process. This letter does not constitute "meaningful" tribal consultation nor does it conclude the consultation process. Under federal and state law, "meaningful" consultation is understood to be an ongoing government-to-government process and may involve requests for additional information, phone conferences and/or face-to-face meetings.

Sincerely,

Tribal Historic Preservation Office
Morongo Band of Mission Indians
Email: thpo@morongo-nsn.gov
Phone: (951) 755-5059

AUGUSTINE BAND OF CAHUILLA INDIANS

PO Box 846 84-481 Avenue 54 Coachella CA 92236
Telephone: (760) 398-4722
Fax (760) 369-7161
Tribal Chairperson: Amanda Vance
Tribal Vice-Chairperson: William Vance
Tribal Secretary: Victoria Martin

August 3, 2018

Sal Z. Boites
CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 923324

RE: **An Undertaking Involving the Channel along Cactus Avenue, Approximately 1.5 linear miles. City of Moreno Valley, Riverside County, California**
CRM TECH Contract #3375

Dear Mr. Boites-

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project, and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources has resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time we are unaware of specific cultural resources that may be affected by the proposed project. We encourage you to contact other Native American Tribes and individuals within the immediate vicinity of the project site that may have specific information concerning cultural resources that may be located in the area. We also encourage you to contract with a monitor who is qualified in Native American cultural resources identification and who is able to be present on-site full-time during the pre-construction and construction phase of the project. Please notify us immediately should you discover any cultural resources during the development of this project.

Very truly yours,

Victoria Martin
Tribal Secretary

AUG 10 2018

AGUA CALIENTE BAND OF CAHUILLA INDIANS

TRIBAL HISTORIC PRESERVATION

05-009-2018-001

August 08, 2018

[VIA EMAIL TO:ngallardo@crmtech.us]
CRM TECH
Ms. Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re: Cactus Avenue Channel/K-4 Parcel Development

Dear Ms. Nina Gallardo,

The Agua Caliente Band of Cahuilla Indians (ACBCI) appreciates your efforts to include the Tribal Historic Preservation Office (THPO) in the K-4 Parcel Development project. The project area is not located within the boundaries of the ACBCI Reservation. However, it is within the Tribe's Traditional Use Area. For this reason, the ACBCI THPO requests the following:

*A copy of the records search with associated survey reports and site records from the information center.

*Copies of any cultural resource documentation (report and site records) generated in connection with this project.

Again, the Agua Caliente appreciates your interest in our cultural heritage. If you have questions or require additional information, please call me at (760)699-6829. You may also email me at ACBCI-THPO@aguacaliente.net.

Cordially,

Katie Croft

Katie Croft
Cultural Resources Manager
Tribal Historic Preservation Office
AGUA CALIENTE BAND
OF CAHUILLA INDIANS

August 13, 2018

Nina Gallardo
Project Archaeologist/Native American Liaison
CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Re.: An Undertaking Involving the Channel along Cactus Avenue
Approximately 1.5 linear miles
City of Moreno Valley, Riverside, County, California
CRM TECH Contract #3375

Dear Ms. Gallardo:

Thank you for contacting the Cabazon Band of Mission Indians concerning cultural resource information relative to the above referenced project.

The project is located outside of the Tribe's current reservation boundaries. The Tribe has no specific archival information on the site indicating that it may be a sacred/religious site or other site of Native American traditional cultural value within the project area.

We look forward to continued collaboration in the preservation of cultural resources or areas of traditional cultural importance.

Best regards,

Judy Stapp
Director of Cultural Affairs

RECEIVED
AUG 15 2018
BY:

84-245 INDIO SPRINGS PARKWAY • INDIO, CALIFORNIA 92203-3499 • 760.342.2593 • FAX: 760.347.7880

RINCON BAND OF LUISEÑO INDIANS

Cultural Resources Department

1 W. Tribal Road · Valley Center, California 92082 ·
(760) 297-2635 Fax:(760) 692-1498

August 13, 2018

Nina Gallardo
CRM Tech Native American Liaison
1016 E. Cooley Drive, Suite A/B
Colton, CA 92082

Re: Moreno Valley Channel Project

Dear Mr. Smith,

This letter is written on behalf of the Rincon Band of Luiseño Indians. We have received your notification regarding the above referenced project and we thank you for the opportunity to provide information pertaining to cultural resources. The identified location is within the Territory of the Luiseño people, and is also within Rincon's specific area of Historic interest.

Embedded in the Luiseño territory are Rincon's history, culture and identity. We do not have knowledge of cultural resources within or near the proposed project area. However, this does not mean that none exist. We recommend that an archaeological record search be conducted and ask that a copy of the results be provided to the Rincon Band.

If you have additional questions or concerns please do not hesitate to contact our office at your convenience at (760) 297-2635.

Thank you for the opportunity to protect and preserve our cultural assets.

Sincerely,
Destiny Colocho
Tribal Historic Preservation Officer
Rincon Cultural Resources Department

Bo Mazzetti, Tribal Chairman | Tishmall Turner, Vice Chairwoman | Steve Stallings, Council Member | Laurie E. Gonzalez, Council Member | Alfonso Kolb, Council Member

SOBOBA BAND OF LUISEÑO INDIANS

EST. JUNE 19, 1883

August 23, 2018

Attn: Nina Gallardo, Project Archaeologist/NA Liaison
CRM TECH
1016 East Cooley Drive, Suite A/B
Colton, CA 92324

RE: An Undertaking Involving the Channel along Cactus Avenue – APNs 297-150-006, -007, 297-150-038, 297-160-005, 297-200-004) – City of Moreno Valley, Riverside County, CA – CRM TECH Contract # 3375

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your project. The information provided to us on said project has been assessed through our Cultural Resource Department, where it was concluded that although it is outside the existing reservation, the project area does fall within the bounds of our Tribal Traditional Use Areas. This project location is in proximity to known sites, is a shared use area that was used in ongoing trade between the tribes, and is considered to be culturally sensitive by the people of Soboba.

Soboba Band of Luiseño Indians is requesting the following:

1. To initiate a consultation with the project proponents and lead agency.

2. The transfer of information to the Soboba Band of Luiseno Indians regarding the progress of this project should be done as soon as new developments occur.

3. Soboba Band of Luiseño Indians continues to act as a consulting tribal entity for this project.

4. Working in and around traditional use areas intensifies the possibility of encountering cultural resources during the construction/excavation phase. For this reason the Soboba Band of Luiseño Indians requests that Native American Monitor(s) from the Soboba Band of Luiseño Indians Cultural Resource Department to be present during any ground disturbing proceedings. Including surveys and archaeological testing.

5. Request that proper procedures be taken and requests of the tribe be honored (Please see the attachment)

Multiple areas of potential impact were identified during an in-house database search. Specifics to be discussed in consultation with the lead agency.

Sincerely,

Joseph Ontiveros, Tribal Historic Preservation Officer
Soboba Band of Luiseño Indians
P.O. Box 487
San Jacinto, CA 92581
Phone (951) 654-5544 ext. 4137
Cell (951) 663-5279
jontiveros@soboba-nsn.gov

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Cultural Items (Artifacts). Ceremonial items and items of cultural patrimony reflect traditional religious beliefs and practices of the Soboba Band. The Developer should agree to return all Native American ceremonial items and items of cultural patrimony that may be found on the project site to the Soboba Band for appropriate treatment. In addition, the Soboba Band requests the return of all other cultural items (artifacts) that are recovered during the course of archaeological investigations. Where appropriate and agreed upon in advance, Developer's archeologist may conduct analyses of certain artifact classes if required by CEQA, Section 106 of NHPA, the mitigation measures or conditions of approval for the Project. This may include but is not limited or restricted to include shell, bone, ceramic, stone or other artifacts.

The Developer should waive any and all claims to ownership of Native American ceremonial and cultural artifacts that may be found on the Project site. Upon completion of authorized and mandatory archeological analysis, the Developer should return said artifacts to the Soboba Band within a reasonable time period agreed to by the Parties and not to exceed (30) days from the initial recovery of the items.

Treatment and Disposition of Remains.

A. The Soboba Band shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and grave goods shall be treated and disposed of with appropriate dignity.

B. The Soboba Band, as MLD, shall complete its inspection within twenty-four (24) hours of receiving notification from either the Developer or the NAHC, as required by California Public Resources Code § 5097.98 (a). The Parties agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes.

C. Reburial of human remains shall be accomplished in compliance with the California Public Resources Code § 5097.98 (a) and (b). The Soboba Band, as the MLD in consultation with the Developer, shall make the final discretionary determination regarding the appropriate disposition and treatment of human remains.

D. All parties are aware that the Soboba Band may wish to rebury the human remains and associated ceremonial and cultural items (artifacts) on or near, the site of their discovery, in an area that shall not be subject to future subsurface disturbances. The Developer should accommodate on-site reburial in a location mutually agreed upon by the Parties.

E. The term "human remains" encompasses more than human bones because the Soboba Band's traditions periodically necessitated the ceremonial burning of human remains. Grave goods are those artifacts associated with any human remains. These items, and other funerary remnants and their ashes are to be treated in the same manner as human bone fragments or bones that remain intact

Coordination with County Coroner's Office. The Lead Agencies and the Developer should immediately contact both the Coroner and the Soboba Band in the event that any human remains are discovered during implementation of the Project. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c).

Non-Disclosure of Location Reburials. It is understood by all parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agencies, will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r). Ceremonial items and items of cultural patrimony reflect traditional religious beliefs and practices of the Soboba Band. The Developer agrees to return all Native American ceremonial items and items of cultural patrimony that may be found on the project site to the Soboba Band for appropriate treatment. In addition, the Soboba Band requests the return of all other cultural items (artifacts) that are recovered during the course of archaeological investigations. Where appropriate and agreed upon in advance, Developer's archeologist may conduct analyses of certain artifact classes if required by CEQA, Section 106 of NHPA, the mitigation measures or conditions of approval for the Project. This may include but is not limited or restricted to include shell, bone, ceramic, stone or other artifacts.

SOBOBA BAND OF LUISEÑO INDIANS

Confidentiality: The entirety of the contents of this letter shall remain confidential between Soboba and the March Joint Powers Authority, as well as hired consultant (CRM TECH). No part of the contents of this letter may be shared, copied, or utilized in any way with any other individual, entity, municipality, or tribe, whatsoever, without the expressed written permission of the Soboba Band of Luiseño Indians.

TELEPHONE LOG

Name	Tribe/Affiliation	Telephone Contacts	Comments
Patricia Garcia-Plotkin, Tribal Historic Preservation Officer	Agua Caliente Band of Cahuilla Indians	11:07 am, August 1, 2018 9:12 am, August 3, 2018	Katie Croft, Cultural Resources Manager, responded in a letter dated August 8, 2018 (copy attached).
Amanda Vance, Chairperson	Augustine Band of Cahuilla Indians	11:18 am, August 1, 2018 9:14 am, August 3, 2018	On August 3, Heather Haines, Tribal Operations Manager, stated that the tribe had no comments regarding this undertaking. Later that day, Tribal Secretary Victoria Martin provided further comments in writing (copy attached).
Judy Stapp, Director of Cultural Affairs	Cabazon Band of Mission Indians	11:30 am, August 1, 2018 9:21 am, August 3, 2018	Ms. Stapp responded in a letter dated August 13, 2018 (copy attached).
Bobby Ray Esparza, Cultural Coordinator	Cahuilla Band of Indians	None	Mr. Esparza responded by e-mail on July 19, 2018 (copy attached).
Shane Chapparosa, Chairman	Los Coyotes Band of Mission Indians	11:33 am, August 1, 2018 9:23 am, August 3, 2018	Left voice messages; no response to date.
Raymond Huaute, Tribal Historic Preservation Officer	Morongo Band of Mission Indians	11:34 am, August 1, 2018	The Tribal Historic Preservation Office responded in a letter dated August 1, 2018 (copy attached).
Shasta Gaughen, Tribal Historic Preservation Officer	Pala Band of Mission Indians	11:42 am, August 1, 2018 9:24 am, August 3, 2018	Left voice messages; no response to date.
Chris Devers, Cultural Liaison	Pauma Band of Luiseno Indians	None	Mr. Devers responded by e-mail on July 30, 2018 (copy attached).
Paul Macarro, Cultural Resources	Pechanga Band of Luiseño Indians	None	Tuba Ebru Ozdil is the designated spokesperson for the tribe (see below).
Tuba Ebru Ozdil, Planning Specialist	Pechanga Band of Luiseño Indians	11:46 am, August 1, 2018	Ms. Ozdil stated that the tribe had no comments at this time.
John Gomez, Jr., Cultural Resource Coordinator	Ramona Band of Cahuilla Indians	12:20 pm, August 1, 2018 9:26 am, August 3, 2018	Left messages with the Tribal Administrator; no response to date.

Destiny Colocho, Director, Rincon Cultural Resources	Rincon Band of Luiseno Indians	12:28 pm, August 1, 2018 9:41 am, August 3, 2018	Ms. Colocho responded in a letter dated August 13, 2018 (copy attached).
Lee Clauss, Director of Cultural Resources	San Manuel Band of Mission Indians	None	Jessica Mauck, Cultural Resources Analyst, responded by e-mail on July 19 and 26, 2018 (copy attached).
Gabriella Rubalcava, Environmental Director	Santa Rosa Band of Cahuilla Indians	12:30 pm, August 1, 2018 9:44 am, August 3, 2018	Left voice messages; no response to date.
Goldie Walker, Chairperson	Serrano Nation of Indians	12:33 pm, August 1, 2018 9:55 am, August 3, 2018	Left voice messages; no response to date.
Joseph Ontiveros, Tribal Historic Preservation Office	Soboba Band of Luiseño Indians	12:37 pm, August 1, 2018 10:10 am, August 3, 2018	Jessica Valdez, Cultural Resource Specialist, stated that the tribe would respond in writing with any comments. No further response has been received.
Michael Mirelez, Cultural Resources Coordinator	Torres Martinez Desert Cahuilla Indians	12:41 pm, August 1, 2018 10:43 am, August 3, 2018	Left voice messages; no response to date.

APPENDIX 3

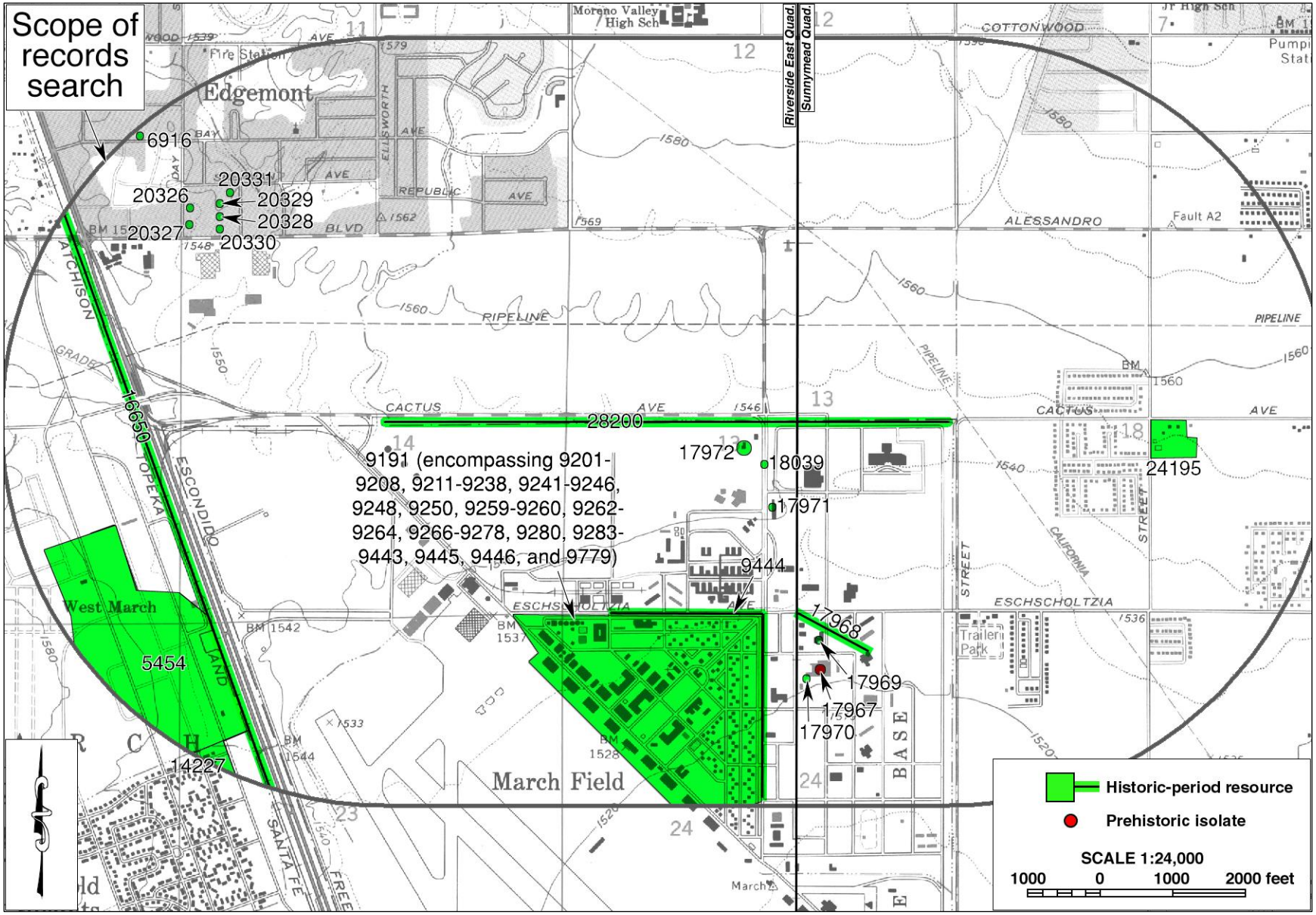
PREVIOUS STUDIES AND RECORDED CULTURAL RESOURCES WITHIN THE SCOPE OF THE RECORDS SEARCH

(Confidential)

RECORDED CULTURAL RESOURCES
WITHIN THE SCOPE OF THE RECORDS SEARCH
(See p. 57 for locations)

Resource Number	Description
33-005454	Concrete slab foundations from WWII-era Camp Haan
33-006916	Single-family residence, ca. 1938
33-009191	March Field Historic District
33-009201 to 33-009208	Buildings/structures in the March Field Historic District
33-009211 to 33-009238	Buildings/structures in the March Field Historic District
33-009241 to 33-009246	Buildings/structures in the March Field Historic District
33-009248	Building/structure in the March Field Historic District
33-009250	Building/structure in the March Field Historic District
33-009259 to 33-009260	Buildings/structures in the March Field Historic District
33-009262 to 33-009264	Buildings/structures in the March Field Historic District
33-009266 to 33-009278	Buildings/structures in the March Field Historic District
33-009280	Building/structure in the March Field Historic District
33-009283 to 33-009443	Buildings/structures in the March Field Historic District
33-009444	Stone-lined drainage canal
33-009445	Building/structure in the March Field Historic District
33-009446	Building/structure in the March Field Historic District
33-009779	Building/structure in the March Field Historic District
33-014227	Arnold Heights Elementary School
33-016650	Segment of the California Southern Railway
33-017967	Isolate: mano fragment
33-017968	Canal built by WPA
33-017969 to 33-017972	Buildings at March Medical Village Campus
33-018039	Former March Air Force Base main entrance
33-020326	Single-family residence, ca. 1947
33-020327	Single-family residence, ca. 1946
33-020328	Single-family residence, ca. 1946
33-020329	Single-family residence, ca. 1950
33-020330	Single-family residence, ca. 1950
33-020331	Single-family residence, ca. 1953
33-024195	Brown/Bridges Farm
33-028200*	Cactus Avenue Drainage Channel

* Recorded during this study



Locations of recorded cultural resources within the scope of the records search

APPENDIX 4

CALIFORNIA HISTORICAL RESOURCES INFORMATION SYSTEM RECORD FORMS

Site 33-028200 (CA-RIV-12721)

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 33-028200
HRI #
Trinomial CA-RIV-12721
NRHP Status Code 6Z
Other Listings
Review Code **Reviewer** **Date**

***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

P1. **Other Identifier:** Cactus Avenue Drainage Channel

***P2.** **Location:** ___ **Not for Publication** √ **Unrestricted** ***a. County** Riverside
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Riverside East and Sunnymead, Calif. **Date** 1980
T 3S **; R** 4W **; Sections** 13 **and** 14 **;** S.B. **B.M.**
Elevation: Approximately 1,520-1,555 feet above mean sea level (including the depth of the channel)

c. **Address** N/A **City** Moreno Valley **Zip** 92518

d. **UTM:** (Give more than one for large and/or linear resources) **Zone** 11 **;** A: 475060 **mE/** 3752207 **mN;**
B: 477462 **mE/** 3752237 **mN;**
UTM Derivation: ___ USGS Quad ___ GPS √ Google Earth

e. **Other Locational Data:** (e.g., parcel #, directions to resource, etc., as appropriate) On the northern edge of March Air Reserve Base, and along the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street

***P3a.** **Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The site consists of an approximately 1.5-mile segment of drainage channel along the southern side of Cactus Avenue and the northern edge of March Air Reserve Base. The unlined open earthen channel is built of natural material (hardened soil), and measures approximately 41-47 feet wide across the top, 13-18 feet wide across the bottom, and 6-24 feet deep, with steep, sloping sides that show signs of erosion caused by periodic flooding. It was excavated sometime between 1941 and 1953, most likely during the expansion of March Army Air Field (now March Air Reserve Base) in the early 1940s, to channel seasonal storm runoff from the north to a preexisting channel along Heacock Street to the east and around the perimeter of the base. As a typical and largely nondescript infrastructure feature, it demonstrates no distinctively historical characteristics.

***P3b.** **Resource Attributes:** (List attributes and codes) HP20. Canal/aqueduct

***P4.** **Resources Present:** ___ Building √ Structure ___ Object ___ Site ___ District ___ Element of District ___ Isolate ___ Other

P5a. **Photograph or Drawing** (Photograph required for buildings, structures, and objects.) (See Item L8a)

P5b. **Description of Photo:** (view, date, accession #)

***P6.** **Date Constructed/Age and Sources:** √ Historic ___ Prehistoric ___ Both 1941-1953

***P7.** **Owner and Address:** March Air Reserve Base, 2145 Graeber Street, March ARB, CA 92518

***P8.** **Recorded by:** (Name, affiliation, and address) Salvadore Z. Boites, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

***P9.** **Date Recorded:** July 27, 2018

***P10.** **Survey Type:** (Describe) Intensive-level survey for Section 106 and CEQA-compliance purposes

***P11.** **Report Citation:** (Cite survey report and other sources, or enter "none.") Bai "Tom" Tang, Michael Hogan, and Terri Jacquemain (2018): Identification and Evaluation of Historic Properties: Cactus Avenue Drainage Channel Improvement Project, March Air Reserve Base, Moreno Valley Area, Riverside County, California

***Attachments:** ___ None √ Location Map ___ Sketch Map ___ Continuation Sheet ___ Building, Structure, and Object Record ___ Archaeological Record ___ District Record √ Linear Resource Record ___ Milling Station Record ___ Rock Art Record ___ Artifact Record ___ Photograph Record ___ Other (List):

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # 33-028200
HRI #
Trinomial CA-RIV-12721

***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

L1. **Historic and/or Common Name:** Cactus Avenue Drainage Channel

L2a. **Portion Described:** ___ Entire Resource √ Segment ___ Point Observation **Designation:**

b. **Location of Point or Segment:** (Provide UTM coordinates, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.) Along the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street

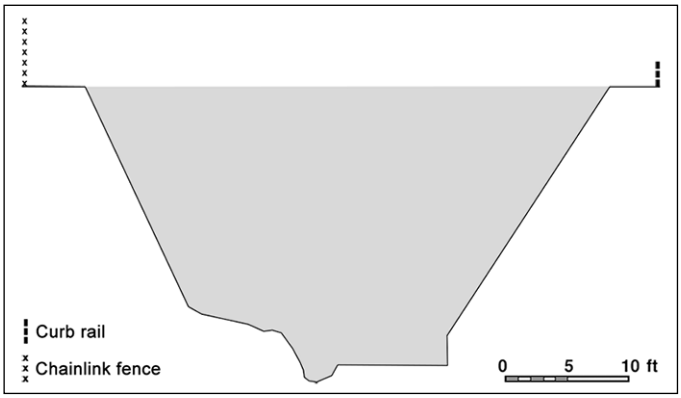
L3. **Description:** (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/ sections as appropriate.) See Item P3a

L4. **Dimensions:** (In feet for historic features and meters for pre-historic features)

a. **Top Width** 41-47 feet
b. **Bottom Width** 13-18 feet
c. **Height or Depth** 6-24 feet
d. **Length of Segment** 1.5 miles

L5. **Associated Resources:** Concrete drains

L4e. **Sketch of Cross-Section** (Include scale)
Facing: West



L6. **Setting** (Describe natural features, landscape characteristics, slope, etc. as appropriate) The site is situated in an urban setting between the perimeter fence of March Air Reserve Base and the Cactus Avenue right-of-way, at elevations of approximately 1,520-1,555 feet above mean sea level (including the depth of the channel).

L7. **Integrity Considerations:** The site is a nondescript open earthen ditch that has not been extensively documented in the past, and its historic integrity is different to assess.

L8a. **Photograph, Map or Drawing**



L8b. **Description of Photo, Map, or Drawing** (View, scale, etc.) Photo taken on July 27, 2018; view to the west

L9. **Remarks:**

L10. **Form Prepared by:** (Name, affiliation and address): Salvadore Z. Boites, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

L11. **Date:** July 27, 2018

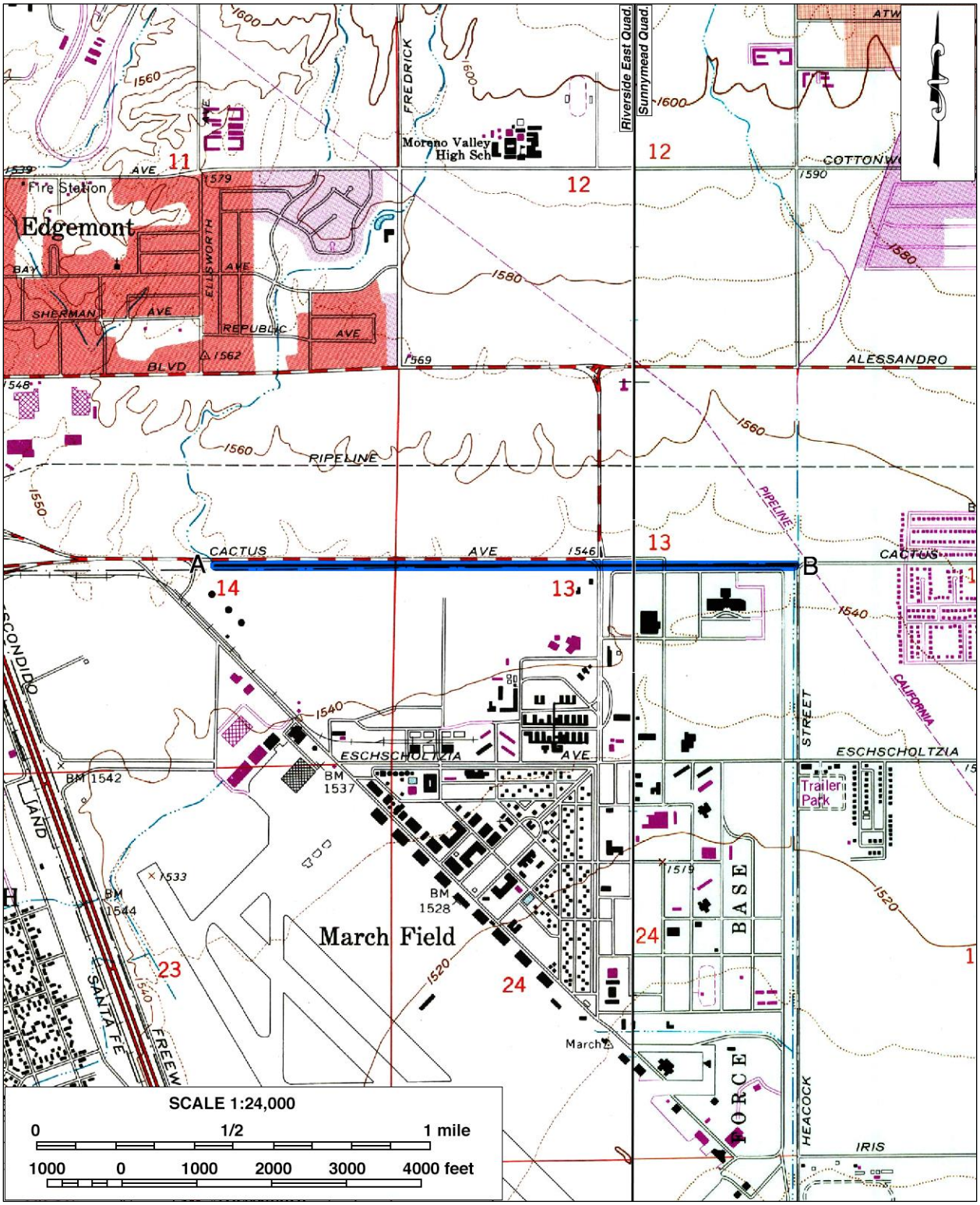
State of California - Natural Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 33-028200
HRI#
Trinomial CA-RIV-12721

Page 3 **of** 3 ***Resource Name or #** (Assigned by recorder) CRM TECH 3375-LF1

***Map Name:** Riverside East and Sunnymead ***Scale:** 1:24,000 ***Date of Map:** 1980



GEOTECHNICAL EXPLORATION
PROPOSED INDUSTRIAL WAREHOUSE SITE K-4
CACTUS AVENUE
UNINCORPORATED RIVERSIDE COUNTY, NEAR MORENO VALLEY, CALIFORNIA

Prepared for

MERIDIAN PARK, LLC
1156 North Mountain Avenue
Upland, California 91786

Project No. 11979.002

May 15, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

May 15, 2018

Project No. 11979.002

Meridian Park, LLC
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Timothy Reeves

Subject: Geotechnical Exploration
Proposed Industrial Warehouse Site K-4, Cactus Avenue
Unincorporated Riverside County, near Moreno Valley, California

In accordance with your request, we are pleased to provide this update geotechnical evaluation for the subject project summarizing our geotechnical findings, conclusions and recommendations regarding the design and construction of the proposed development. Based on the results of our findings and conclusions, it is our opinion that the site is suitable for the intended use provided the recommendations included in herein are implemented during design and construction phases of development. However, it should be noted that additional geotechnical evaluations and/or reviews might be required based on final site development and/or grading plans.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,

LEIGHTON CONSULTING, INC.





Simon I. Saiid, GE 2641
Principal Engineer





Robert F. Riha, CEG 192
Senior Principal Geologist

Distribution: (1) Addressee (PDF copy via email)
(1) Christopher McKee, P.E., DRC Engineering, Inc. (PDF via email)

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Appendices

Appendix A – Logs of Geotechnical Field Explorations
Appendix B – Results of Geotechnical Laboratory Tests
Appendix C – Site Specific Analysis
Appendix D – Earthwork and Grading Specifications
Appendix E – GBA - Important Information About This Geotechnical-Engineering Report

1.0 INTRODUCTION

1.1 Purpose and Scope

This geotechnical exploration is for the proposed commercial development referred to as Meridian K-4 Parcel, located generally south of Cactus Avenue between Veterans Way and extending east to Frederick Street, near Moreno Valley, in Unincorporated Riverside County, California (see Figure 1). Our scope of services for this exploration included the following:

- Review of available site-specific geologic information and Preliminary Site Plan by RGA.
- A site reconnaissance and excavation of nine (9) exploratory borings. Approximate locations of these geotechnical borings are depicted on the *Boring Location Map (Figure 2)*. The logs of exploratory borings are presented in Appendix A.
- Geotechnical laboratory testing of selected soil samples collected during this exploration. Test results are presented in Appendix B.
- Geotechnical engineering analyses performed or as directed by a California registered Geotechnical Engineer (GE) and reviewed by a California Certified Engineering Geologist (CEG).
- Preparation of this report which presents our geotechnical conclusions and recommendations regarding the proposed structures.

This report is not intended to be used as an environmental assessment (Phase I or other), or foundation plan review.

1.2 Site and Project Description

The site is located generally south of Cactus Avenue between Veterans Way and extending east to Fredrick Street, in the County of Riverside, California (see Figure 1, Site Location Map). Topographically, the site is relatively flat, draining gently in a southeastern direction. The site is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. The County Assessor Parcel Numbers (APNs) for this site are 297-160-005-8, 297-200-400-0, 297-150-006-8, -007-9, and -038-7. An approximately 152,000 square feet area of stockpiled soil was observed in the southern portion of the site, adjacent to the transformer station.

We understand that site development (see Figure 2) includes a proposed 718,000 square feet industrial building along with associated improvements such as parking stalls and loading docks. Grading plans were not provided as of the date of this report; however, we

anticipate cut and fill grading of less than 10 feet to create finish site grades. Structural loads are expected to be less than 250 kips per column load and 10 kips/LF of continuous wall footing. If site development plans significantly differ from those described herein, the report should be subject to further review and evaluation.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration consisted of the excavation of nine (9) hollow stem borings located generally in areas of planned building to provide basis for foundation and pavement design. During exploration, disturbed/bulk samples were collected for further laboratory testing and evaluation. Approximate locations of these and previous filed explorations are depicted on the *Geotechnical Map* (see Figure 2). Sampling was conducted by a staff geologist from our firm. After logging and sampling, the excavations were loosely backfilled with spoils generated during excavation. The exploration logs from this exploration are provided in Appendix A.

2.2 Laboratory Testing

Laboratory tests were performed on representative bulk samples to provide a basis for development of earthwork control and foundation design. The laboratory testing program included maximum density and moisture content relationship, expansion index, R-value and soluble sulfate content. The results of our laboratory testing from this and previous explorations are presented in Appendix B.

3.0 GEOTECHNICAL AND GEOLOGIC FINDINGS

3.1 Regional Geology

The site is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. This province is characterized by steep, elongated ranges and valleys that trend northwestward. More specifically, the proposed site is located within the relatively stable Perris Block.

The Perris Block, approximately 20 miles by 50 miles in extent, is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the southwest. The Perris Block has had a complex tectonic history, apparently undergoing relative vertical land-movements of several thousand feet in response to movement on the Elsinore and San Jacinto Fault Zones. Thin sedimentary and volcanic materials locally mantle crystalline bedrock, consisting of the Val Verde Tonalite (Kvt) and lesser amounts of Cretaceous granitic dikes (Kg).

3.2 Site Specific Geology

3.2.1 Earth Materials

Our field exploration, observations, and review of the pertinent literature indicate that the site include is underlain by localized artificial fill and older alluvium. A more detailed description of each unit is provided on the logs of borings in Appendix A.

- **Undocumented Artificial Fill:** Undocumented artificial fill is generally associated with existing Cactus Avenue and a large stockpile. Localized pockets of artificial fill that were not identified during our exploration may also be encountered elsewhere on this site below surface.
- **Older Alluvium:** Older alluvial soils were encountered in all borings. As encountered, these soils generally consist of medium dense to very dense silty to clayey sand (SM/SC) and localized layers of sandy silty to sandy clay (ML/CL). This older alluvium is expected to generally possess a low expansion potential (EI<51) and slight collapse potential (<1%).

3.3 Groundwater and Surface Water

Groundwater was encountered during this exploration at a depth of approximately 19 feet (LB-2) below existing ground surface (bgs) and 23 feet bgs (LB-4). Historic groundwater data, as reported by Department of Water Resource (DWR) data for Well 338995N1171958W001 located approximately 5 miles east of the subject site, reflect a groundwater elevation of 1,470 feet (about 82 feet below site elevation) in April 2017. According to West San Jacinto Groundwater Management Plan, 2016 Annual Report, the groundwater elevation in the subject site vicinity are at the range of 1,520 feet msl (about 32 feet below site elevation). Surface water was not observed onsite during our exploration.

3.4 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional fault systems such as the San Andreas, San Jacinto, and Elsinore Fault Zones. Based on published geologic hazard maps, this site is not located within a currently designated Alquist-Priolo (AP) Earthquake Fault Zone; nor is located within a County Fault Zone.

3.5 Seismic Coefficients per 2016 CBC

Strong ground shaking can be expected at the site during moderate to severe earthquakes in this general region. This is common to virtually all of Southern California. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The site-specific seismic coefficients provided in this section are based on an interactive tool/program currently available on USGS website. Based on ASCE 7-10 as the Design Code Reference Document and site Class **D**, the seismic coefficients for this site are as listed in the following table:

Table 1. 2016 CBC Seismic Coefficients

CBC Categorization/Coefficient		Design Value (g)
Site Longitude (-117.26195)	Site Latitude (33.90902)	
Site Class Definition	D	
Mapped Spectral Response Acceleration at 0.2s Period, S_s		**1.50**
Mapped Spectral Response Acceleration at 1s Period, S_1		**0.60**
Short Period Site Coefficient at 0.2s Period, F_a		**1.00**
Long Period Site Coefficient at 1s Period, F_v		**1.50**
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}		**1.50**
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}		**0.90**
Design Spectral Response Acceleration at 0.2s Period, S_{DS}		***1.00***
Design Spectral Response Acceleration at 1s Period, S_{D1}		***0.60***

* g- Gravity acceleration

The results of the analysis also indicate that the adjusted Peak Ground Acceleration (PGA_M) for this site is 0.5g.

3.6 Secondary Seismic Hazards

Ground shaking can induce "secondary" seismic hazards such as liquefaction, dynamic densification, lateral spreading, flooding, seiche/tsunami, collapsible soils, and ground rupture, as discussed in the following subsections:

3.6.1 Dynamic Settlement (Liquefaction and/or Dry Settlement)

Riverside County Geologic Hazards maps indicate that the site is located in a zone of high liquefaction potential (see Figure 4). However, liquefaction-induced or dynamic dry settlement is not expected to be a significant hazard at this site due to the absence of near surface saturated sand layers and underlying dense older alluvium. Our analysis of dynamic settlement due to ground shaking based on PGA of 0.5g with a moment magnitude of 7.2 Mw is estimated to be less than 1 inch (see Appendix C). This settlement is expected to be generally global and over a large area. As such, the seismic differential settlement is not expected to exceed 0.5-inch in a 40-foot horizontal distance within this site.

3.6.2 Lateral Spreading

Due to a relatively flat terrain and dense underlying older alluvium, lateral spreading is not considered a geologic hazard on this site.

3.6.3 Flooding

The site is not within a flood plain and potential for flooding is considered very low for this site.

3.6.4 Seiche and Tsunami

Due to the site location and lack of nearby open bodies of water, the possibility of the affects due to seiches or tsunami is considered very low.

3.6.5 Collapsible Soils

Laboratory testing indicates that the onsite soils (older alluvium) are expected to possess a slight collapse potential (<1%). Based on the remedial grading recommendations to remove and compact the near surface soils (Section 4.2.1), this geologic hazard on this site is considered very low.

3.6.6 Expansive Soils

Limited laboratory testing indicated that onsite soils generally possess a low expansion potential (EI<51). The mitigation for this geologic hazard is presented in Section 4.2.4 of this report.

3.6.7 Ground Rupture

Since this site is not located within a mapped Fault Zone, the possibility of ground surface-fault-rupture is very low at this site.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on the results of this exploration, it is our opinion that the site is suitable for the proposed development from a geotechnical viewpoint. Grading of the site should be in accordance with our recommendations included in this report and future recommendations and evaluations made during construction by the geotechnical consultant.

4.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D as well as the following recommendations. The recommendations contained in Appendix D, are general grading specifications provided for typical grading projects and some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D.

The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place fill properly in accordance with the recommendations of this report, the specifications in Appendix D, applicable County Grading Ordinances, notwithstanding the testing and observation of the geotechnical consultant during construction.

4.2.1 Site Preparation and Remedial Grading

Prior to grading, the proposed structural improvement areas (i.e. all-structural fill areas, pavement areas, buildings, etc.) should be cleared of surface and subsurface pipelines and obstructions. Heavy vegetation, roots and debris should be disposed of offsite. Any onsite wells or septic waste system should be removed or abandoned in accordance with the Riverside Country Department of Environmental Health. Voids created by removal of buried/unsuitable materials should be backfilled with properly compacted soil in general accordance with the recommendations of this report.

Building Area: To reduce the potential for excessive differential settlement, the depth of removal should extend a minimum of 6 feet BGS or 4 feet below footings, whichever is deeper.

Pavement/Street Areas: The depth of removal should extend a minimum of 3 feet BGS or 2 feet below finish subgrade, whichever is deeper.

The removal limit should be established by a 1:1 (horizontal:vertical) projection from the edge of fill soils supporting structural fill or settlement-sensitive structures downward and outward to competent material identified by the geotechnical consultant. This may require remedial grading that extends beyond the limits of design grading. Removal will also include benching into competent material as the fills rise. Areas adjacent to existing property limits or protected habitat areas may require special considerations and monitoring. Steeper temporary slopes in these areas may be considered.

After completion of the recommended removal of unsuitable soils and prior to fill placement, the exposed surface should be scarified to a minimum depth of 8-inches, moisture conditioned as necessary to optimum moisture content and compacted using heavy compaction equipment to an unyielding condition. All structural fill should be compacted throughout to 90 percent of the ASTM D 1557 laboratory maximum density, at or slightly above optimum moisture.

4.2.2 Structural Fills

The onsite soils are generally suitable for re-use as compacted fill, provided they are free of debris and organic matter. Fills placed within 10 feet of finish pad grades or slope faces should contain no rocks over 12 inches in maximum dimension. In addition, encountered expansive clayey soils layers (EI>51), if any, should be placed at a depth greater than 3 feet below finished grades.

Areas to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 8 inches, conditioned to at least optimum moisture content, and recompacted. Fill soils should be placed at a minimum of 90 percent relative compaction (based on ASTM D1557) at or above optimum moisture content. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in thickness.

Fill slope keyways will be necessary at the toe of all fill slopes and at fill-over-cut contacts. Keyway schematics, including dimensions and subdrain recommendations, are provided in Appendix D. All keyways should be excavated into dense bedrock or dense older alluvium as determined by the geotechnical engineer. The cut portions of all slope and keyway excavations should be geologically mapped and approved by a geologist prior to fill placement.

Fills placed on slopes steeper than 5:1 (horizontal:vertical) should be benched into dense soils (see Appendix D for benching detail). Benching should be of sufficient depth to remove all loose material. A minimum bench height of 2 feet into approved material should be maintained at all times.

4.2.3 Import Soils

Import soils and/or borrow sites, if needed, should be evaluated by us prior to import. Import soils should be uncontaminated, granular in nature, free of organic material (loss on ignition less-than 2 percent), have very low expansion potential (E<21) and have a low corrosion impact to the proposed improvements.

4.2.4 Utility Trenches

Utility trenches should be backfilled with compacted fill in accordance with the *Standard Specifications for Public Works Construction,* ("Greenbook"), 2018 Edition. Fill material above the pipe zone should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D 1557) by mechanical means only. Site soils may generally be suitable as trench backfill provided these soils are screened of rocks over 1½ inches in diameter and organic matter. If imported sand is used as backfill, the upper 3 feet in building and pavement areas should be compacted to 95 percent. The upper 6 inches of backfill in all pavement areas should be compacted to at least 95 percent relative compaction.

Where granular backfill is used in utility trenches adjacent to moisture sensitive subgrades and foundation soils, we recommend that a cut-off "plug" of impermeable material be placed in these trenches at the perimeter of buildings, and at pavement edges adjacent to irrigated landscaped areas. A "plug" can consist of a 5-foot long section of clayey soils with more than 35-percent passing the No. 200 sieve, or a Controlled Low Strength Material (CLSM) consisting of one sack of Portland-cement plus one sack of bentonite per cubic-yard of sand. CLSM should generally conform to requirements of the "Greenbook". This is intended to reduce the likelihood of water permeating trenches from landscaped areas, then seeping along permeable trench backfill into the building and pavement subgrades, resulting in wetting of moisture sensitive subgrade earth materials under buildings and pavements.

Excavation of utility trenches should be performed in accordance with the project plans, specifications and the *California Construction Safety Orders* (latest Edition). The contractor should be responsible for providing a "competent person" as defined in Article 6 of the *California Construction Safety Orders*. Contractors should be advised that sandy soils (such as fills

generated from the onsite alluvium) could make excavations particularly unsafe if all safety precautions are not properly implemented. In addition, excavations at or near the toe of slopes and/or parallel to slopes may be highly unstable due to the increased driving force and load on the trench wall. Spoil piles from the excavation(s) and construction equipment should be kept away from the sides of the trenches. Leighton Consulting, Inc. does not consult in the area of safety engineering.

4.2.5 Shrinkage

The volume change of excavated onsite soils upon recompaction is expected to vary with materials, density, insitu moisture content, and location and compaction effort. The in-place and compacted densities of soil materials vary and accurate overall determination of shrinkage and bulking cannot be made. Therefore, we recommend site grading include, if possible, a balance area or ability to adjust grades slightly to accommodate some variation. Based on our geotechnical laboratory results, we expect recompaction shrinkage (when recompacted to an average 92 percent of ASTM D1557) and estimate the following earth volume changes will occur during grading, and for the older alluvium, the shrinkage is expected to be in the 5 to 15% range.

4.2.6 Drainage

All drainage should be directed away from structures and pavements by means of approved permanent/temporary drainage devices. Adequate storm drainage of any proposed pad should be provided to avoid wetting of foundation soils. Irrigation adjacent to buildings should be avoided when possible. As an option, sealed-bottom planter boxes and/or drought resistant vegetation should be used within 5-feet of buildings.

4.3 Foundation Design

4.3.1 Design Parameters – Spread/Continuous Shallow Footings

Footings should be embedded at least 12-inches below lowest adjacent grade for the proposed structure. Footing embedment should be measured from lowest adjacent finished grade, considered as the top of interior slabs-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower. Footings located adjacent to utility trenches or vaults should be embedded below an imaginary 1:1 (horizontal:vertical) plane projected upward and outward from the bottom edge of the trench or vault, up towards the footing.

- **Bearing Capacity**: For footings on newly placed, properly compacted fill soil, an allowable vertical bearing capacity of 2,000 pounds-per-square-foot (psf) should be used. These footings should have a minimum base

width of 18 inches for continuous wall footings and a minimum bearing area of 3 square feet (1.75-ft by 1.75-ft) for pad foundations. The bearing pressure value may be increased by 250 psf for each additional foot of embedment or each additional foot of width to a maximum vertical bearing value of 3,500 psf. Additionally, these bearing values may be increased by one-third when considering short-term seismic or wind loads. A modulus of subgrade reaction, K of 200 PCI may be used to relative dense bedrock or onsite soil compacted to minimum 90% relative compaction.

- **Lateral loads**: Lateral loads may be resisted by friction between the footings and the supporting subgrade. A maximum allowable frictional resistance of 0.35 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against foundations poured neat against properly compacted granular fill. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 350 pounds-per-cubic-foot (pcf) be used in design. These friction and passive values have already been reduced by a factor-of-safety of 1.5.

4.3.2 Settlement Estimates

For settlement estimates, we assumed that column loads will be no larger than 250 kips, with bearing wall loads not exceeding 10 kips per foot of wall. If greater column or wall loads are required, we should re-evaluate our foundation recommendation, and re-calculate settlement estimates.

Buildings located on compacted fill soils as required per Section 4.2.1 above should be designed in anticipation of 1 inch of total static settlement and 0.5-inch of static differential settlement within a 40-foot horizontal run.

4.4 Vapor Retarder

It has been a standard of care to install a moisture-vapor retarder underneath all slabs where moisture condensation is undesirable. Moisture vapor retarders may retard but not totally eliminate moisture vapor movement from the underlying soils up through the slabs. Moisture vapor transmission may be additionally reduced by use of concrete additives. Leighton Consulting, Inc. does not practice in the field of moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified person/firm be engaged/consulted with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person/firm should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

However, based on our experience, the standard of practice in Southern California has evolved over the last 15 to 20 years into a construction of a vapor retarder system that generally consisted of a membrane (such as 15-mil thick), underlain by a capillary break consisting of 4 inches of clean ½-inch-minimum gravel or 2-inch sand layer (SE>30). The structural engineer/architect or concrete contractor often require a sand layer be placed over the membrane (typically 2-inch thick layer) to help in curing and reduction of curling of concrete. If such sand layer is placed on top of the membrane, the contractor should not allow the sand to become wet prior to concrete placement (e.g., sand should not be placed if rain is expected).

In conclusion, the construction of the vapor barrier/retarder system is dependent on several variables which cannot be all geotechnically evaluated and/or tested. As such, the design of this system should be a design team/owner decision taking into consideration finish flooring materials and manufacture's installation requirements of proposed membrane. Moreover, we recommend that the design team also follow ACI Committee 302 publication for "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" (ACI 302.2R-06) which includes a flow chart that assists in determining if a vapor barrier/retarder is required and where it is to be placed.

4.5 Retaining Walls

Retaining wall earth pressures are a function of the amount of wall yielding horizontally under load. If the wall can yield enough to mobilize full shear strength of backfill soils, then the wall can be designed for "active" pressure. If the wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance. Retaining walls backfilled with non-expansive soils can be designed using the following equivalent fluid pressures:

Table 2. Retaining Wall Design Earth Pressures (Static, Drained)

Loading Conditions	Equivalent Fluid Density (pcf)	
	Level Backfill	2:1 Backfill
Active	36	55
At-Rest	55	85
Passive*	350	150 (2:1, sloping down)

* This assumes level condition in front of the wall will remain for the duration of the project, not to exceed 3,500 psf at depth.

Unrestrained (yielding) cantilever walls should be designed for the active equivalent-fluid weight value provided above for very low to low expansive soils that are free draining. In the design of walls restrained from movement at the top (non-yielding) such as basement or elevator pit/utility vaults, the at-rest equivalent fluid weight value should be used. Total depth of retained earth for design of cantilever walls should be measured as the vertical distance below the ground surface measured at the wall face for stem design, or measured at the heel of the footing for overturning and sliding calculations. Should a sloping backfill other than a 2:1 (horizontal:vertical) be constructed above the wall (or a backfill is loaded by an adjacent surcharge load), the equivalent fluid weight values provided above should be re-evaluated on an individual case basis by us. Non-standard wall designs should also be reviewed by us prior to construction to check that the proper soil parameters have been incorporated into the wall design.

All retaining walls should be provided with appropriate drainage. The outlet pipe should be sloped to drain to a suitable outlet. Wall backfill should be non-expansive (EI $\leq$ 21) sands compacted by mechanical methods to a minimum of 90 percent relative compaction (ASTM D 1557). Clayey site soils should not be used as wall backfill. Walls should not be backfilled until wall concrete attains the 28-day compressive strength and/or as determined by the Structural Engineer that the wall is structurally capable of supporting backfill. Lightweight compaction equipment should be used, unless otherwise approved by the Structural Engineer.

4.6 Sulfate Attack

Based on past experience in this area, the onsite soils are expected to possess negligible sulfate content. Type II concrete or equivalent may be used. Further testing should be performed at the completion of site grading to confirm such conditions.

4.7 Preliminary Pavement Design

Our preliminary pavement design is based on an R-value of 16 and the Caltrans Highway Design Manual. For planning and estimating purposes, the pavement sections are calculated based on Traffic Indexes (TI) as indicated in Table below:

Table 3. Asphalt Pavement Sections

General Traffic Condition	Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base* (inches)
Automobile Parking Lanes	4.5	3.0	6.5
	5.0	4.0	5.5
Truck Access & Driveways	6.0	4.0	9.5
	6.5	4.0	13.0

Appropriate Traffic Index (TI) should be selected or verified by the project civil engineer and actual R-value of the subgrade soils will need to be verified after completion of site grading to finalize the pavement design. Pavement design and construction should also conform to applicable local, county and industry standards. The Caltrans pavement section design calculations were based on a pavement life of approximately 20 years with periodic flexible pavement maintenance.

Where applicable, we recommend that a minimum of 7 inches of PCC pavement be used in high impact load areas or if to be subjected to truck traffic. The PCC pavement should be placed on a minimum 6-inch aggregate base. The PCC pavement may be placed directly on a compacted subgrade with an R-Value of 40 or higher. The PCC pavement should have a minimum of 28-day compressive strength of 3250 psi. Other requirements of Caltrans Standard Specifications regarding mixing and placing of concrete should be followed.

The upper 6 inches of the subgrade soils should be moisture-conditioned to near optimum moisture content, compacted to at least 95 percent relative compaction (ASTM D1557) and kept in this condition until the pavement section is constructed. Minimum relative compaction requirements for aggregate base should be 95 percent of the maximum laboratory density as determined by ASTM D1557. If applicable, aggregate base should conform to the “Standard Specifications for Public Works Construction” (green book) current edition or Caltrans Class 2 aggregate base.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity and pavement failure may result. Moisture control measures such as deepened curbs or other moisture barrier materials may be used to prevent the subgrade soils from becoming saturated. The use of concrete cutoff or edge barriers should be considered when pavement is planned adjacent to either open (unfinished) or irrigated landscaped areas.

5.0 GEOTECHNICAL CONSTRUCTION SERVICES

Geotechnical review is of paramount importance in engineering practice. Poor performances of many foundation and earthwork projects have been attributed to inadequate construction review. We recommend that Leighton Consulting, Inc. be provided the opportunity to review the grading plan and foundation plan(s) prior to bid.

Reasonably-continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction. Geotechnical conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting, Inc. during construction, and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- After completion of site demolition and clearing,
- During over-excavation of compressible soil,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction, and
- When any unusual conditions are encountered.

Additional geotechnical exploration and analysis may be required based on final development plans, for reasons such as significant changes in proposed structure locations/footprints. We should review grading (civil) and foundation (structural) plans, and comment further on geotechnical aspects of this project.

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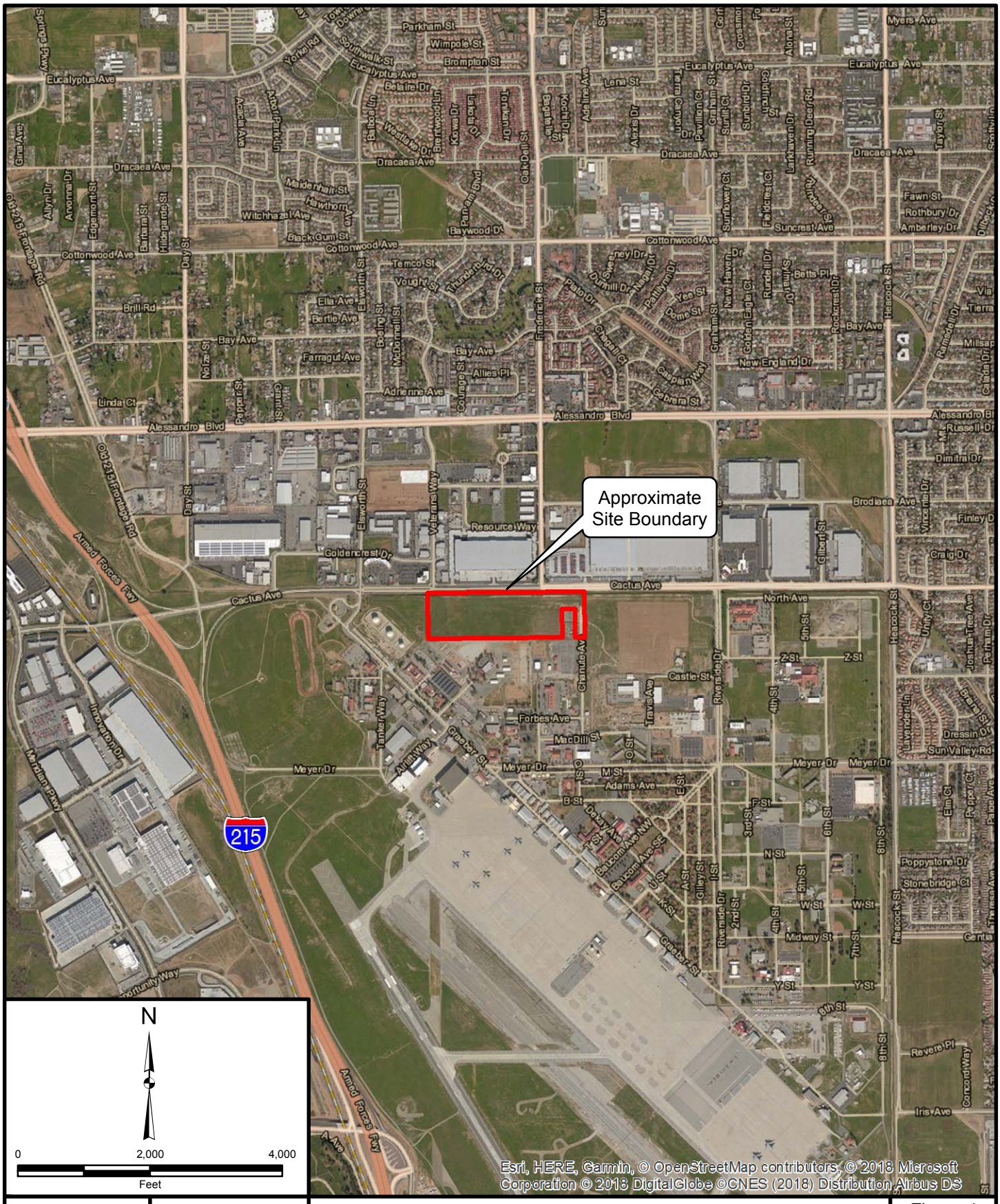
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6.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that we (Leighton Consulting, Inc.) will provide geotechnical observation and testing during construction as the Geotechnical Engineer of Record for this project. Please refer to Appendix E, GBA's *Important Information About This Geotechnical-Engineering Report*, prepared by the Geoprofessional Business Association (GBA) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed maintenance building, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2,000 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

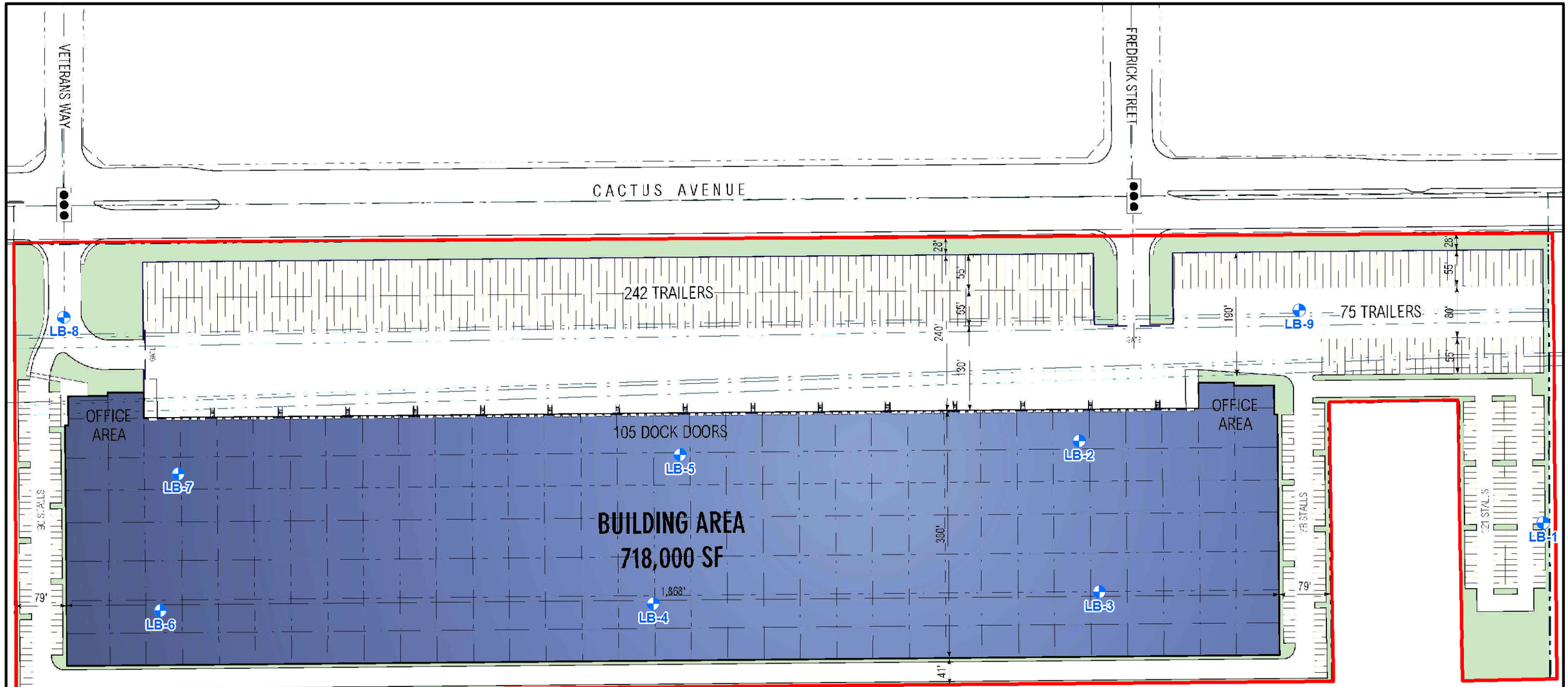
SITE LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 1

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F01_SLM_2018-05-15.mxd on 5/15/2018 11:43:36 AM



N

0 150 300

Feet

Legend

- Approximate Boring Location
- Approximate Site Boundary

Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 150 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

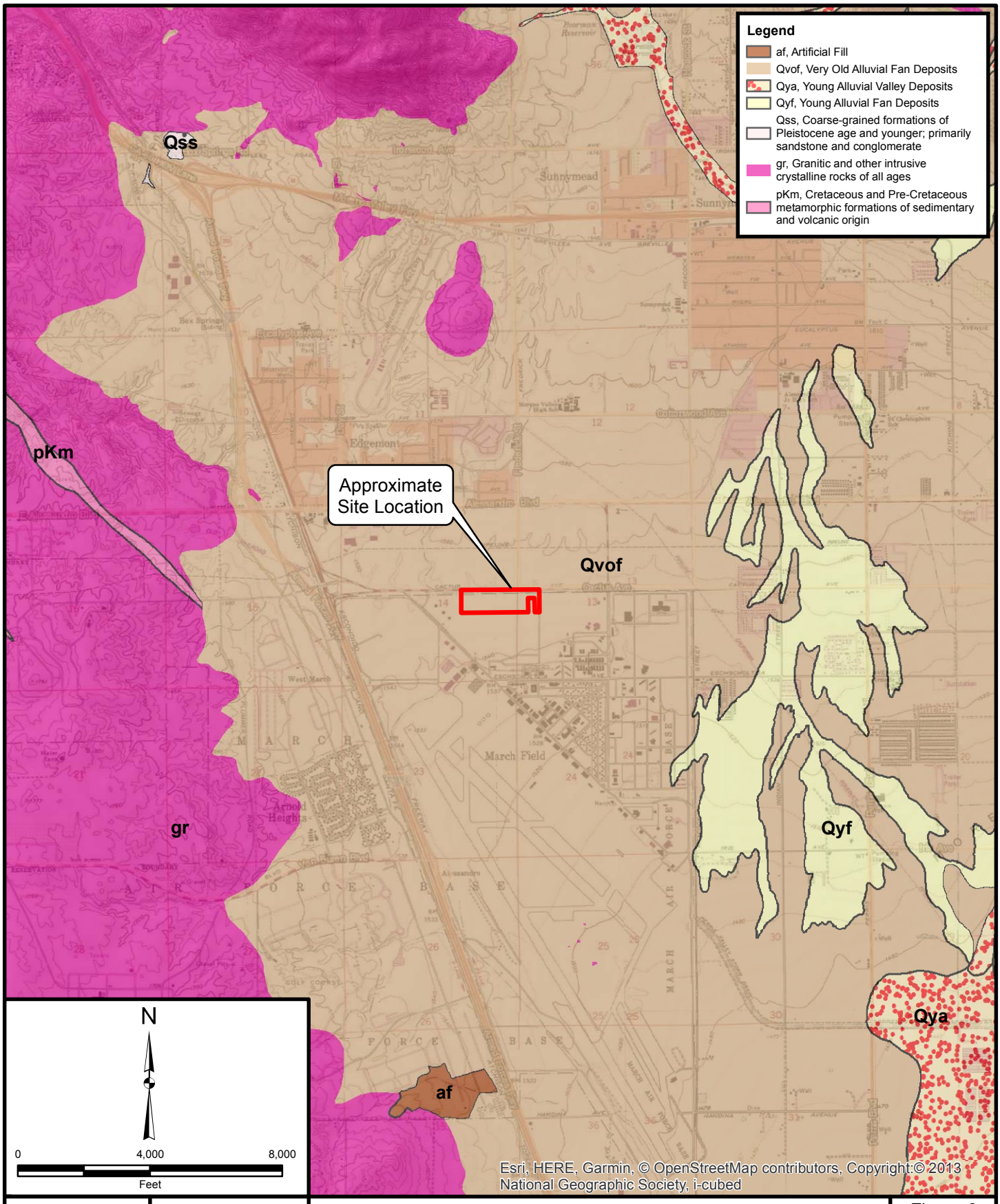
BORING LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 2

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F02_BLM_2018-04-23.mxd on 4/23/2018 11:09:05 AM



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 4,000 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

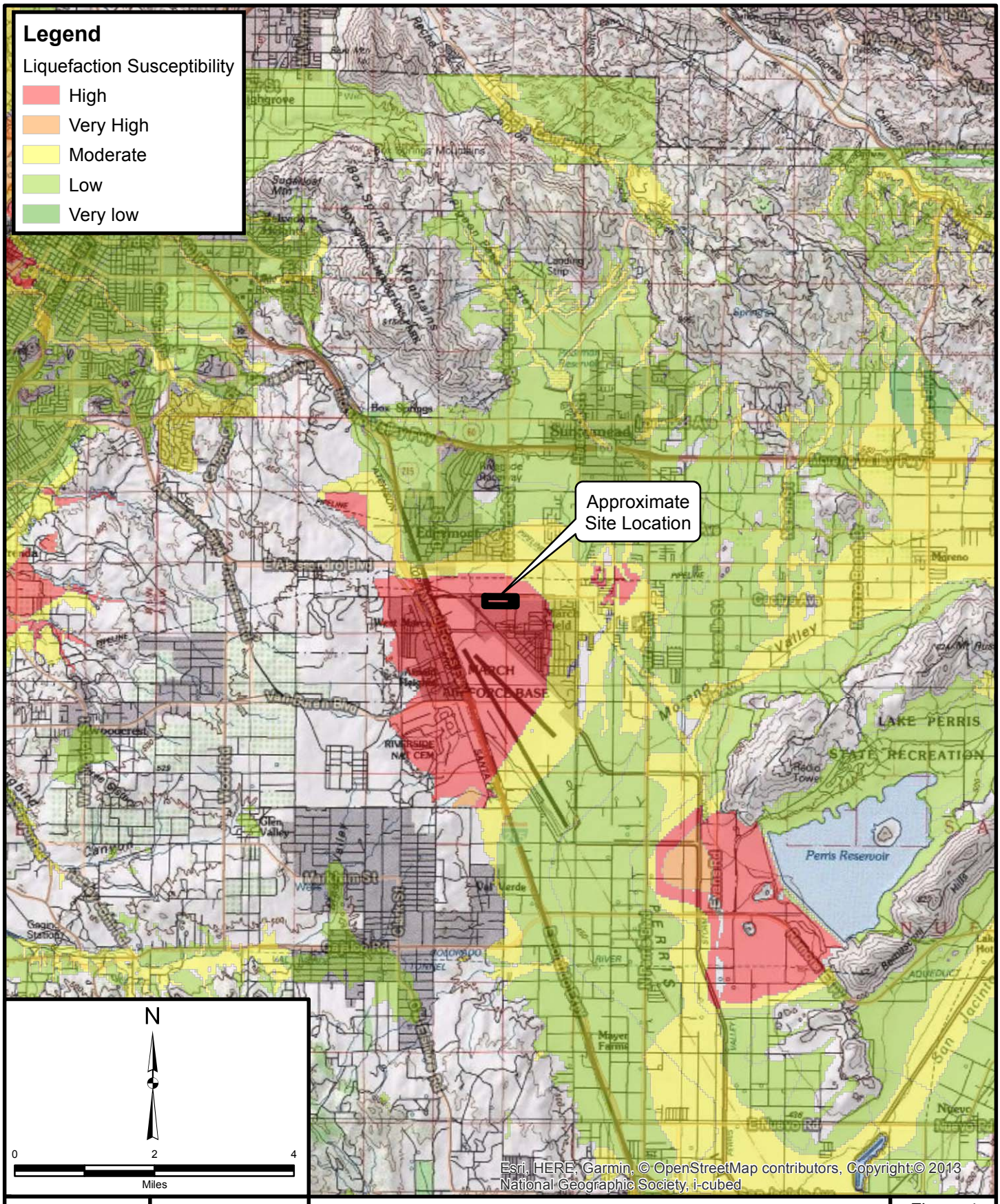
REGIONAL GEOLOGY MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 3

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F03_RGM_2018-04-23.mxd on 4/23/2018 11:08:53 AM



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2 miles	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

LIQUEFACTION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 4

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F04_LFM_2018-04-23.mxd on 4/23/2018 11:10:47 AM

APPENDIX A

LOGS OF EXPLORATORY BORINGS

Encountered earth materials were logged and sampled in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Representative soil samples were transported to our in-house Temecula laboratory for geotechnical testing. After logging and sampling, our borings were backfilled with spoils generated during drilling.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on these logs. Subsurface conditions at other locations may differ from conditions occurring at these logged locations. Passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on these logs represent an approximate boundary between sampling intervals and soil types; and transitions may be gradual.

GEOTECHNICAL BORING LOG LB-1

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, loose, light brown, dry, fine sand, some gravel (MD: 133.3 @ 8.0)	MD
1550				R-1	31 50-3"	109	7	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, moist, fine to medium sand, few gravel, slightly porours	
	5			R-2	35 50-2"	112	7	SM	SILTY SAND with GRAVEL, very dense, light reddish brown, moist, fine to coarse sand, trace clay	
1545										
	10			R-3	49 50-5"				very dense, reddish brown, moist, fine to coarse sand with fine gravel, some interbedded clay layers	
1540										
	15			R-4	10 36 50-4"				very dense, reddish brown, moist, fine to medium sand, trace clay, some coarse sand and fine gravel	
1535									Drilled to 15' Sampled to 16.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	20									
1530										
	25									
1525										
	30									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-2

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry to moist, fine sand, few gravel	
1550				R-1	15 50-5"	115	5		very dense, light yellowish brown, dry, fine to medium sand, some caliche, slightly porous	
	5			R-2	50-6"	95	8		very dense, light yellowish brown, dry to moist, fine to medium sand, subangular, trace clay, some gravel (sample disturbed)	
1545										
	10			R-3	39 50-6"	106	13	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, dry, fine to medium sand, few coarse sand and gravel	
1540										
	15			R-4	24 50-5"			SP-SM	Poorly graded SAND with SILT, very dense, brown, moist, fine to medium sand, trace gravel, micaceous	
1535										
	20			R-5	12 17 30			SM	SILTY SAND, dense, dark reddish brown, moist to wet, fine to medium sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater at 18.7' Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-3

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				CL-ML	**Quaternary Older Alluvium (Qoa):** SILTY CLAY with sand, stiff, light yellowish brown, dry to moist, fine sand, trace gravel (54% fines, EI = 36)	SA, EI, CO
1550										
	5			R-1	50-6"	104	7	SM	SILTY SAND, very dense, light reddish brown, dry to moist, fine to medium sand, some interbedded clay layers, trace fine gravel (sample disturbed)	
1545										
	10			R-2	34 50-3"	112	11		very dense, light yellowish brown, dry to moist, fine sand, some interbedded clay layers, caliche	
1540										
	15			R-3	18 50-6"			SC-SM	SILTY, CLAYEY SAND, very dense, reddish brown, moist, fine to medium sand, some caliche, trace fine gravel	
1535										
	20			R-4	14 40 45				dense, dark reddish brown, moist, fine to medium sand, few coarse sand	
1530									Drilled to 20' Sampled to 20.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light yellowish brown, dry, fine to medium sand, some clay	
1550				R-1	34 50-2"	123	9		very dense, strong brown, moist, fine to medium sand, some interbedded clay	
	5			R-2	50-6"				very dense, reddish brown, moist, fine to medium sand, few coarse sand	
1545										
	10			R-3	30 50-5"				very dense, reddish brown, dry to moist, fine sand, trace fine gravel, some caliche (sample disturbed)	
1540										
	15			R-4	13 22 30	116	15	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine to medium sand, trace coarse sand	
1535										
	20			R-5	13 28 50			SM	SILTY SAND, dense, dark olive brown, moist to wet, fine to medium sand, some mica	
1530										
	25			R-6	7 14 25	112	18	SC	CLAYEY SAND, dense, dark grayish brown, moist to wet, fine sand, few caliche	
1525										
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-7	11 13 16	84	34	CL	SANDY CLAY, stiff, brown, moist, fine sand, caliche	
1520										
	35			R-8	10 21 30				dense, reddish brown, moist, fine to coarse sand, some weathered gravel	
1515										
	40			R-9	10 19 34	116	15	SM	SILTY SAND, dense, olive brown, moist, fine sand, trace fine gravel, micaceous	
1510										
	45			R-10	13 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, grayish brown, moist, fine sand, some coarse sand and fine gravel, micaceous	
1505										
	50			R-11	26 50-5"				very dense, light olive brown, moist, fine to medium sand, some fine gravel	
1500									Drilled to 50' Sampled to 51' Groundwater at 23' Backfilled with soil cuttings (4/19/18)	
	55									
1495										
	60									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-5

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry, fine sand, few gravel	
1550				R-1	50-5.5"	98	8		very dense, brown, dry to moist, fine sand, some interbedded clay layers	
	5			R-2	35 50-4"				very dense, light reddish brown, dry to moist, fine to medium sand, some clay, trace gravel	
1545										
	10			R-3	16 35 50	120	13		dense, reddish brown, moist, fine sand, some mica	
1540										
	15			R-4	15 21 50	121	12	SC	CLAYEY SAND, dense, reddish brown, moist, fine to coarse sand, some gravel, weathered (CO = 0.14)	CO
1535										
	20			R-5	11 27 37			SC-SM	SILTY, CLAYEY SAND, dense, dark reddish brown, moist, fine sand, micaceous	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SOIL DESCRIPTION: This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-6

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, moist, fine sand, some medium sand and clay (EI = 26, MD: 130.4 @ 9.0)	EI, MD
1550										
	5			R-1	12 50-4"	93	9		very dense, light reddish brown, dry, fine to medium sand, some clay (sample disturbed)	
1545										
	10			R-2	17 50-6"				very dense, light brown, moist, fine sand, some caliche	
1540										
	15			R-3	35 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, olive brown, moist, fine to medium sand, some gravel	
1535										
	20			R-4	6 10 19	97	26	CL	SANDY CLAY, stiff, dark reddish brown, moist, fine sand, some mica	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-7

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, reddish brown, dry to moist, fine sand, some clay	
1550				R-1	21 29 47	124	8	SC	CLAYEY SAND, very dense, reddish brown, dry to moist, fine to medium sand, some weathered gravel	
	5			R-2	22 27 46	118	7	SM	SILTY SAND, very dense, reddish brown, dry to moist, fine to medium sand, few fine gravel, weathered	
1545										
	10			R-3	29 50-6"				very dense, light olive brown, dry to moist, fine to medium sand, some weathered gravel, few caliche	
1540										
	15			R-4	18 50-6"			SM	very dense, olive brown, moist, fine sand, micaceous, some caliche	
1535										
	20			R-5	12 31 43			SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, some coarse sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-8

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
1552	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light brown, dry, fine sand, few gravel, some clay (EI = 26)	EI
1550				R-1	12 14 28	114	9	SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, few gravel	
	5			R-2	34 50-5"	101	13	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine sand, some interbedded clay layers (sample disturbed)	
1545										
	10			R-3	28 29 50			SP-SM	Poorly graded SAND with SILT, dense, yellowish brown, dry to moist, fine sand, some coarse sand and fine gravel	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-9

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC	**Quaternary Older Alluvium (Qoa):** SILTY, CLAYEY SAND, dense, light yellowish brown, dry, fine sand, some fine gravel (RV = 16)	RV
1550				R-1	30 50-6"	118	7		very dense, light reddish brown, dry to moist, fine sand, trace fine gravel	
	5			R-2	24 28 30	117	4	SM	SILTY SAND, dense, dark reddish brown, dry to moist, fine to coarse sand with fine gravel	
1545										
	10			R-3	24 30 50				very dense, dark reddish brown, moist, fine to coarse sand, few gravel, some clay layers	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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APPENDIX B

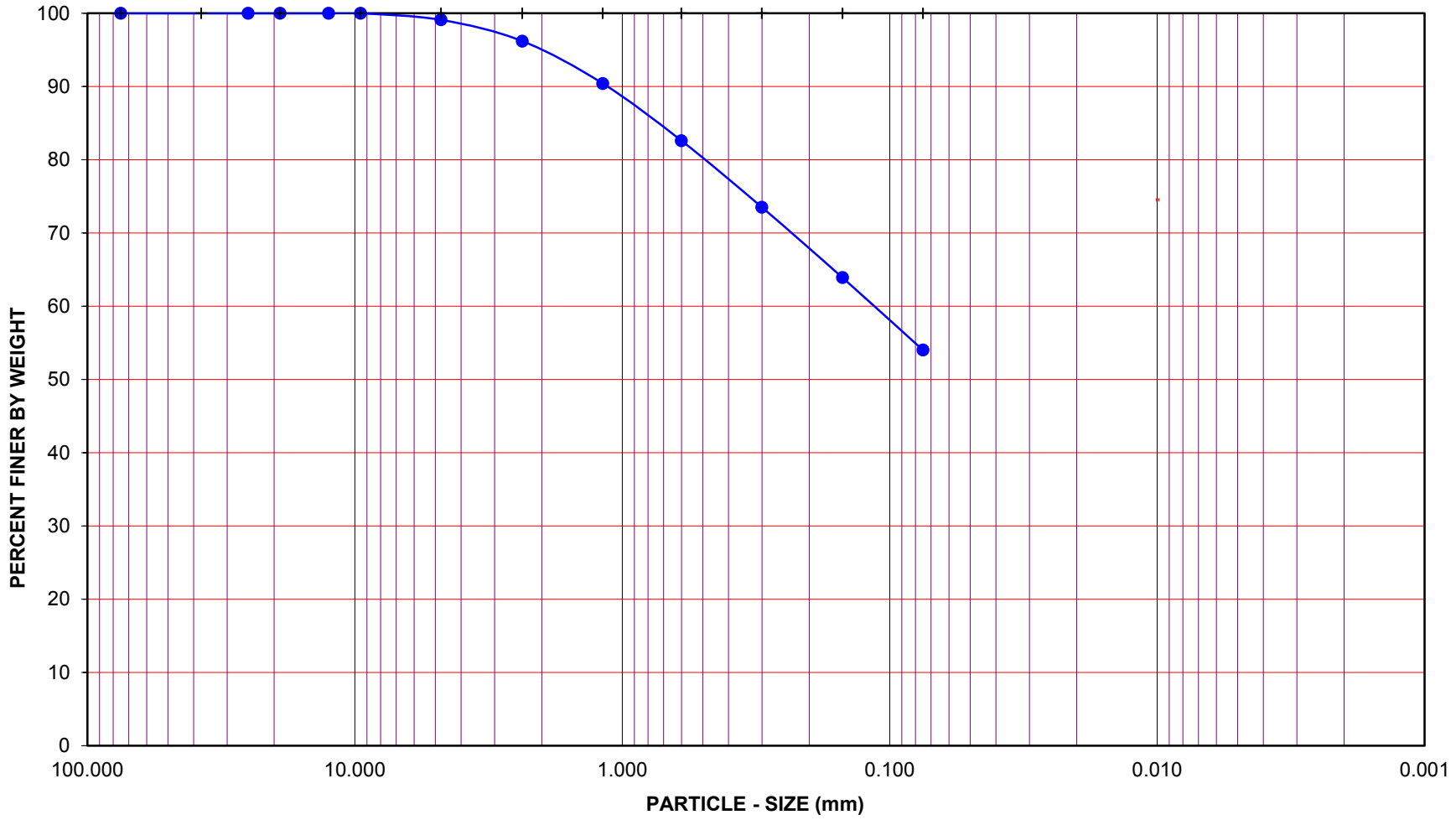
RESULTS OF GEOTECHNICAL LABORATORY TESTING

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Meridian Site K-4

Project No.: 11979.002

Boring No.: LB-3 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : s(ML)

Soil Identification: Sandy Silty Clay s(CL-ML), Reddish Brown.

GR:SA:FI : (%) 1 : 45 : 54

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PARTICLE - SIZE DISTRIBUTION ASTM D 6913

May-18

Sieve; LB-3, B-1 (4-19-18)

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-3	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Sandy Silty Clay s(CL-ML), Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	3328.6
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3328.6
Weight Soil Retained on #4 Sieve	7.8
Percent Passing # 4	99.8

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0393
Wt. Comp. Soil + Mold (gm.)	612.3	651.0
Wt. of Mold (gm.)	199.1	199.1
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	349.6	651.0
Dry Wt. of Soil + Cont. (gm.)	324.8	379.1
Wt. of Container (gm.)	49.6	199.1
Moisture Content (%)	9.0	19.2
Wet Density (pcf)	124.6	131.2
Dry Density (pcf)	114.3	110.0
Void Ratio	0.474	0.532
Total Porosity	0.322	0.347
Pore Volume (cc)	66.6	74.7
Degree of Saturation (%) [S meas]	**51.2**	**97.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5393
5/2/18	10:00	1.0	1420	0.5393

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	39.3
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**39**

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-6	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	9128.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	9128.7
Weight Soil Retained on #4 Sieve	35.7
Percent Passing # 4	99.6

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0264
Wt. Comp. Soil + Mold (gm.)	600.7	633.7
Wt. of Mold (gm.)	180.7	180.7
Specific Gravity (Assumed)	2.70	2.70
Container No.	9	9
Wet Wt. of Soil + Cont. (gm.)	430.7	633.7
Dry Wt. of Soil + Cont. (gm.)	407.2	387.1
Wt. of Container (gm.)	130.7	180.7
Moisture Content (%)	8.5	17.0
Wet Density (pcf)	126.7	133.1
Dry Density (pcf)	116.8	113.8
Void Ratio	0.444	0.482
Total Porosity	0.307	0.325
Pore Volume (cc)	63.6	69.1
Degree of Saturation (%) [S meas]	**51.7**	**95.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5264
5/2/18	10:00	1.0	1420	0.5264

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	26.4
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-8	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	2553.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	2553.7
Weight Soil Retained on #4 Sieve	11.7
Percent Passing # 4	99.5

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0258
Wt. Comp. Soil + Mold (gm.)	615.2	643.9
Wt. of Mold (gm.)	200.6	200.6
Specific Gravity (Assumed)	2.70	2.70
Container No.	8	8
Wet Wt. of Soil + Cont. (gm.)	350.0	643.9
Dry Wt. of Soil + Cont. (gm.)	325.2	380.4
Wt. of Container (gm.)	50.0	200.6
Moisture Content (%)	9.0	16.5
Wet Density (pcf)	125.1	130.4
Dry Density (pcf)	114.7	111.9
Void Ratio	0.469	0.507
Total Porosity	0.319	0.337
Pore Volume (cc)	66.1	71.5
Degree of Saturation (%) [S meas]	**51.8**	**88.1**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5258
5/2/18	10:00	1.0	1420	0.5258

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	25.8
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-1	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5629	5724	5642			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2090	2185	2103			
Wet Weight of Soil + Cont. (g)	2235.9	2380.3	2250.3			
Dry Weight of Soil + Cont. (g)	2112.1	2214.0	2052.6			
Weight of Container (g)	152.1	200.2	159.4			
Moisture Content (%)	6.3	8.3	10.4			
Wet Density (pcf)	138.0	144.2	138.8			
Dry Density (pcf)	129.8	133.2	125.7			

Maximum Dry Density (pcf) **133.3** **Optimum Moisture Content (%)** **8.0**

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

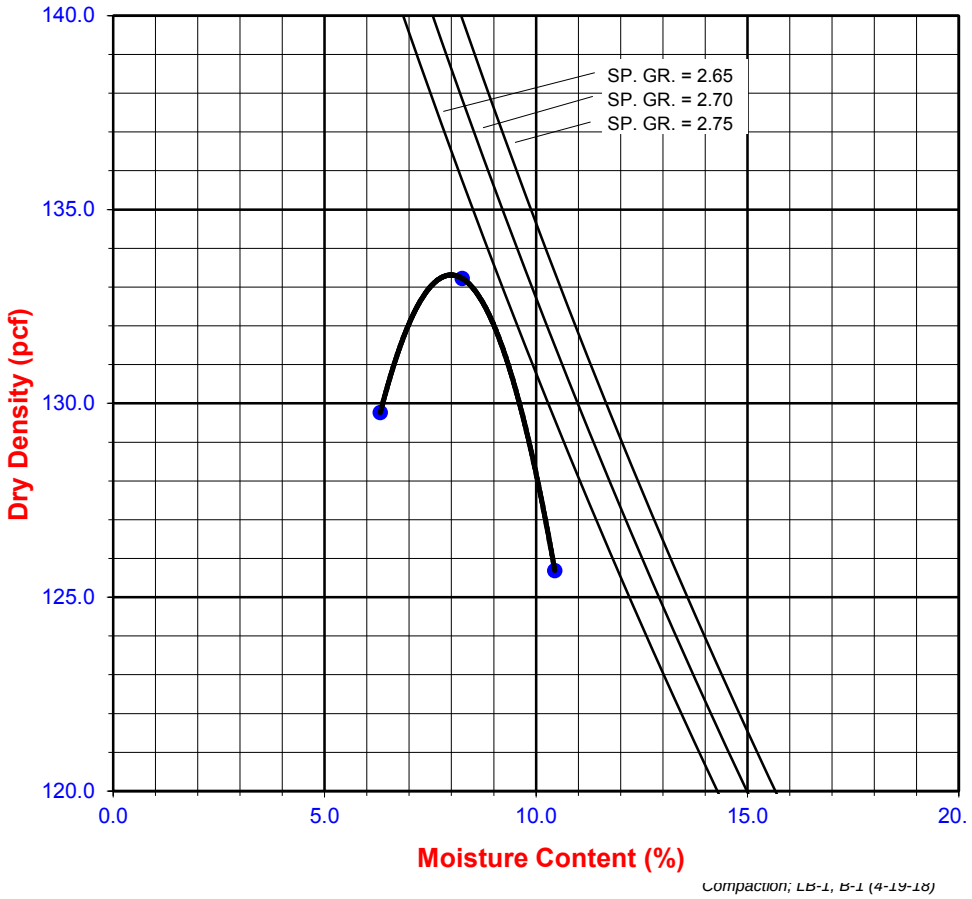
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-6	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5566	5687	5659			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2027	2148	2120			
Wet Weight of Soil + Cont. (g)	2144.1	2187.6	2252.2			
Dry Weight of Soil + Cont. (g)	2013.3	2014.1	2047.1			
Weight of Container (g)	118.3	44.0	144.3			
Moisture Content (%)	6.9	8.8	10.8			
Wet Density (pcf)	133.8	141.8	139.9			
Dry Density (pcf)	125.2	130.3	126.3			

Maximum Dry Density (pcf) 130.4 **Optimum Moisture Content (%)** 9.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

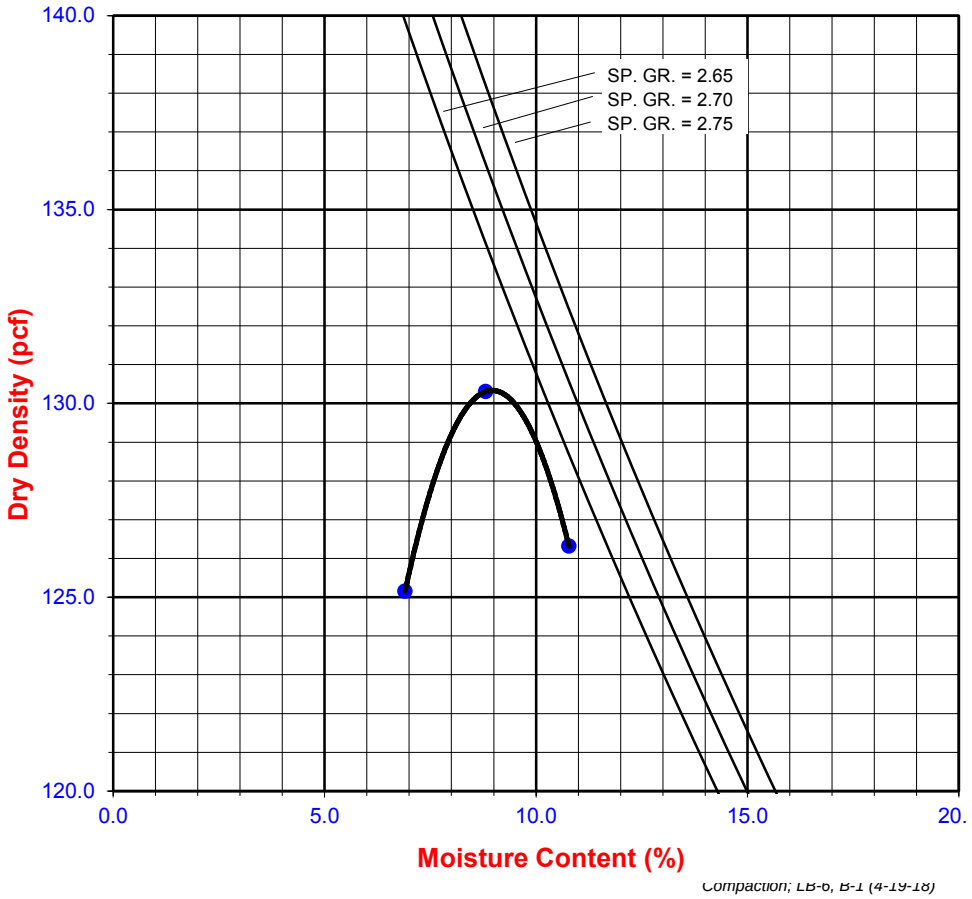
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546) -- Method 'B'

Project Name: Meridian K-4 Site
Project No.: 11979.002
Boring No.: **LB-5**
Sample No.: **R-4**
Sample Description: Clayey Sand (SC), Reddish Brown.

Tested By: M. Vinet Date: 5/3/18
Checked By: M. Vinet Date: 5/4/18
Sample Type: IN SITU
Depth (ft.) 15.0

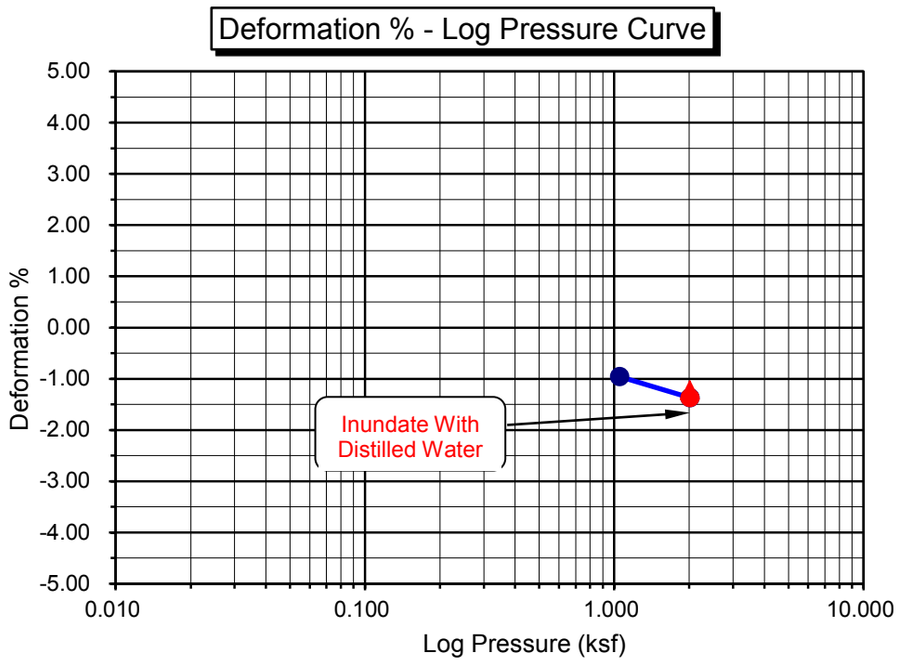
Source and Type of Water Used for Inundation: Arrowhead (Distilled)
** Note: Loading After Wetting (Inundation) not Performed Using this Test Method.

Initial Dry Density (pcf):	121.8
Initial Moisture (%):	12.4
Initial Height (in.):	1.0000
Initial Dial Reading (in):	0.0000
Inside Diameter of Ring (in):	2.416

Final Dry Density (pcf):	123.4
Final Moisture (%) :	14.0
Initial Void ratio:	0.3834
Specific Gravity (assumed):	2.70
Initial Degree of Saturation (%):	87.3

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
1.050	0.0096	0.9904	0.00	-0.96	0.3701	-0.96
2.013	0.0137	0.9863	0.00	-1.37	0.3644	-1.37
H2O	0.0123	0.9877	0.00	-1.23	0.3663	-1.23

Percent Swell / Settlement After Inundation = 0.14



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SOIL RESISTIVITY TEST

DOT CA TEST 643

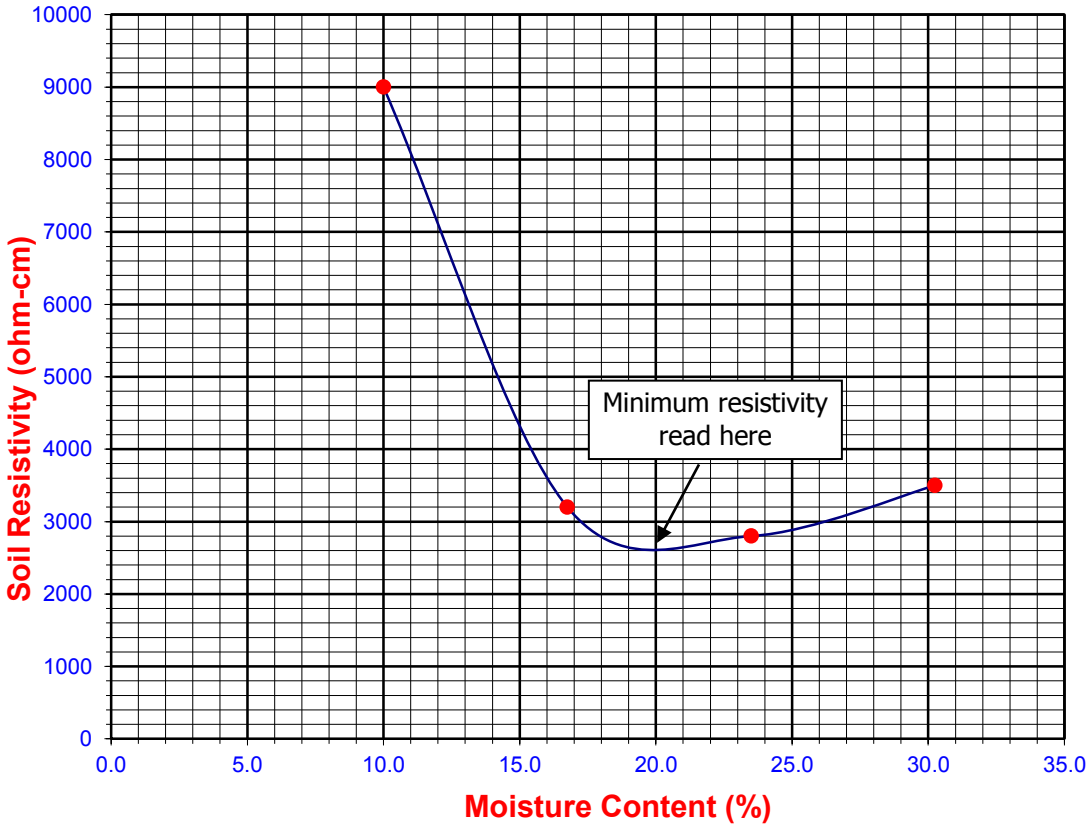
Project Name:	Meridian Site K-4		Tested By :	M. Vinet	Date: 05/03/18
Project No. :	11979.002		Data Input By:	M. Vinet	Date: 05/04/18
Boring No.:	LB-3		Depth (ft.) :	0 - 5.0	
Sample No. :	B-1				
Soil Identification:*	s(CL-ML)				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	40	10.00	9000	9000
2	67	16.75	3200	3200
3	94	23.50	2800	2800
4	121	30.25	3500	3500
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	1.00
Initial Soil Wt. (g) (Wt)	400.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2600	**20.0**	**99**	**20**	**6.01**	**21.0**



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R-VALUE TEST RESULTS

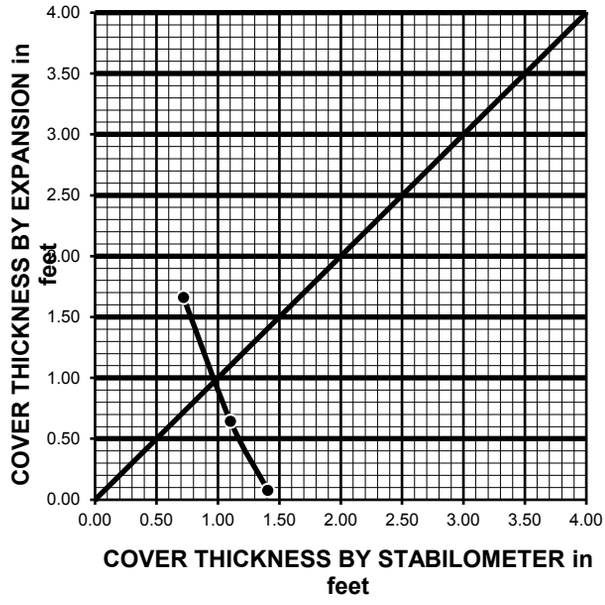
ASTM D 2844

Project Name:	Meridian Site K-4	Date:	5/1/18
Project Number:	11979.002	Technician:	F. Mina
Boring Number:	LB-9	Depth (ft.):	0 - 5.0
Sample Number:	B-1	Sample Location:	N/A
Sample Description:	Clayey Sand (SC), Dark Reddish Brown		

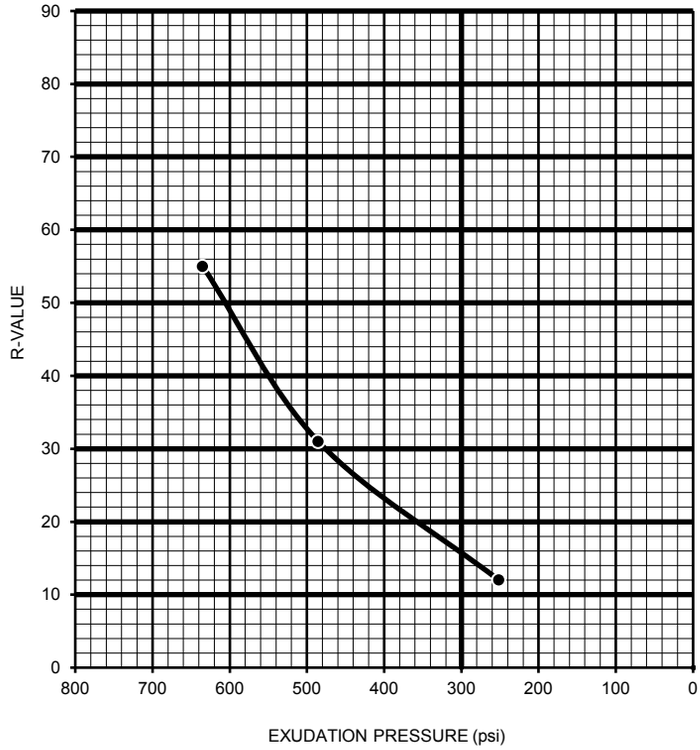
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	11.5	12.6	14.7
HEIGHT OF SAMPLE, Inches	2.40	2.59	2.61
DRY DENSITY, pcf	121.5	120.1	114.7
COMPACTOR AIR PRESSURE, psi	200	175	75
EXUDATION PRESSURE, psi	635	485	251
EXPANSION, Inches x 10exp-4	44	17	2
STABILITY Ph 2,000 lbs (160 psi)	46	90	124
TURNS DISPLACEMENT	4.53	4.69	5.24
R-VALUE UNCORRECTED	58	29	12
R-VALUE CORRECTED	55	31	12

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.72	1.10	1.41
EXPANSION PRESSURE THICKNESS, ft.	1.66	0.64	0.08

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	38
R-VALUE BY EXUDATION:	16
EQUILIBRIUM R-VALUE:	16

APPENDIX C

SITE SPECIFIC ANALYSIS

USGS Design Maps Summary Report

User–Specified Input

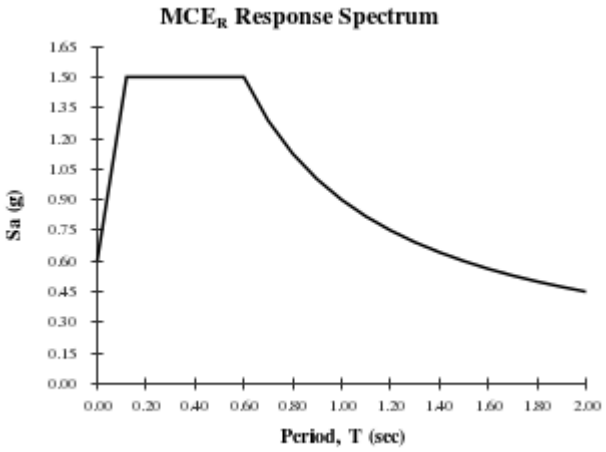
Report Title	11979.002 Wed April 18, 2018 22:12:57 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.90902°N, 117.26195°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

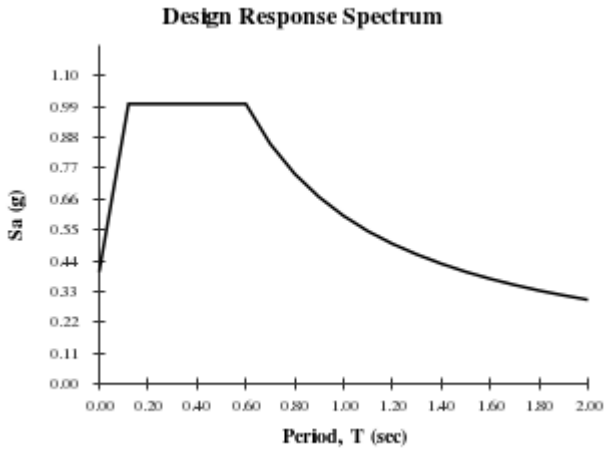


USGS–Provided Output

S_S =	1.500 g	S_{MS} =	1.500 g	S_{DS} =	1.000 g
S_1 =	0.600 g	S_{M1} =	0.900 g	S_{D1} =	0.600 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.90902°N, 117.26195°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 1.500 g
From Figure 22-2 [2]	S_1 = 0.600 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content *w* ≥ 40%, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.500 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.600 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.500 = 1.500$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.600 = 0.900$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

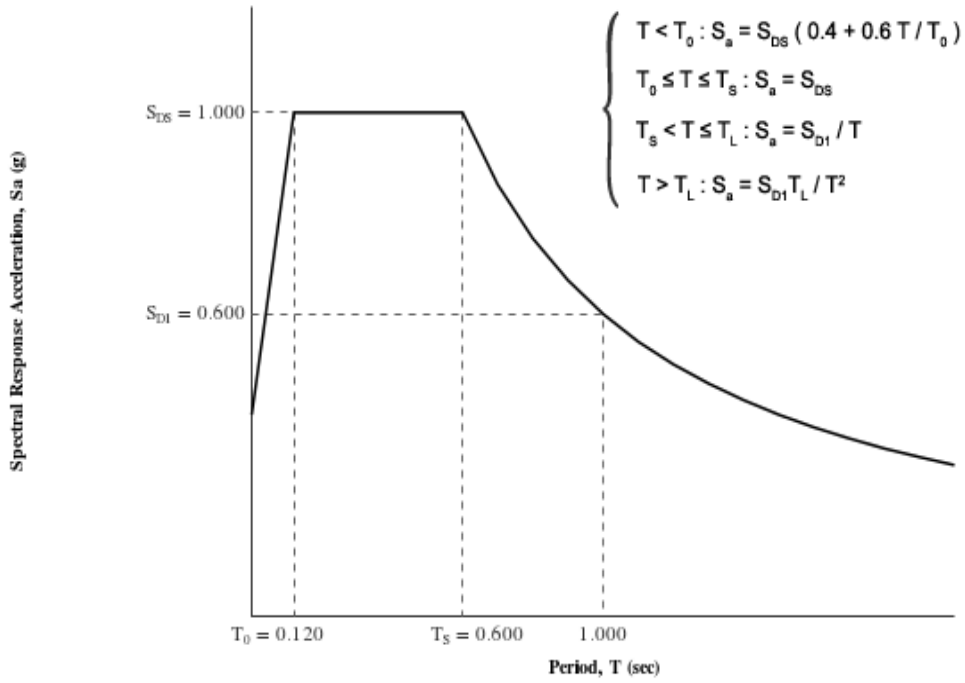
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.500 = 1.000$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.900 = 0.600$ g

Section 11.4.5 — Design Response Spectrum

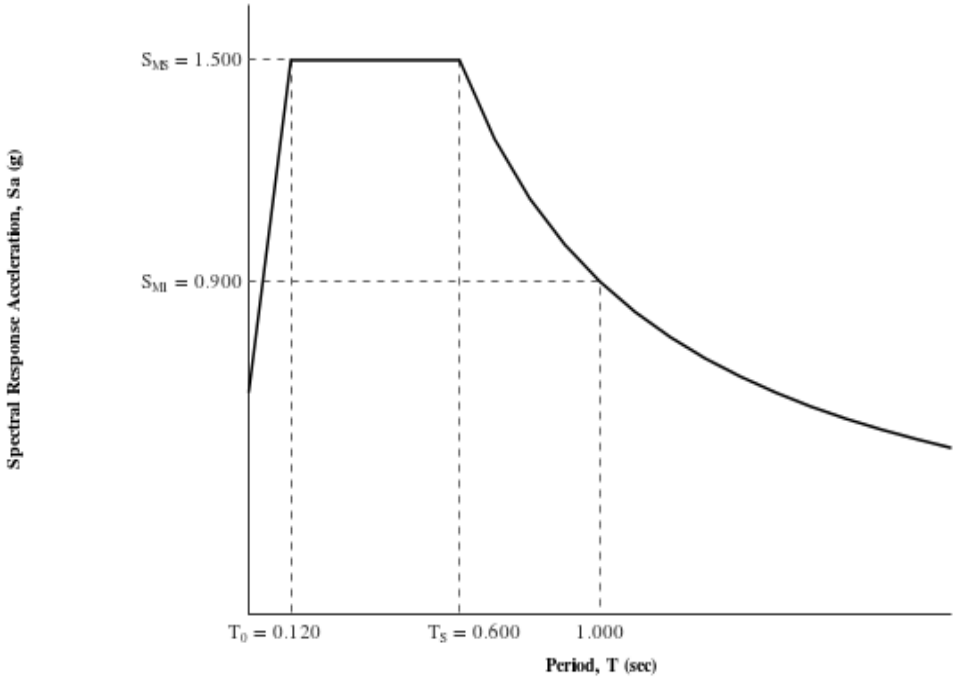
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.534

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.534 = 0.534$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.534 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.059

From Figure 22-18 [6] C_{R1} = 1.027

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.000 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.600 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

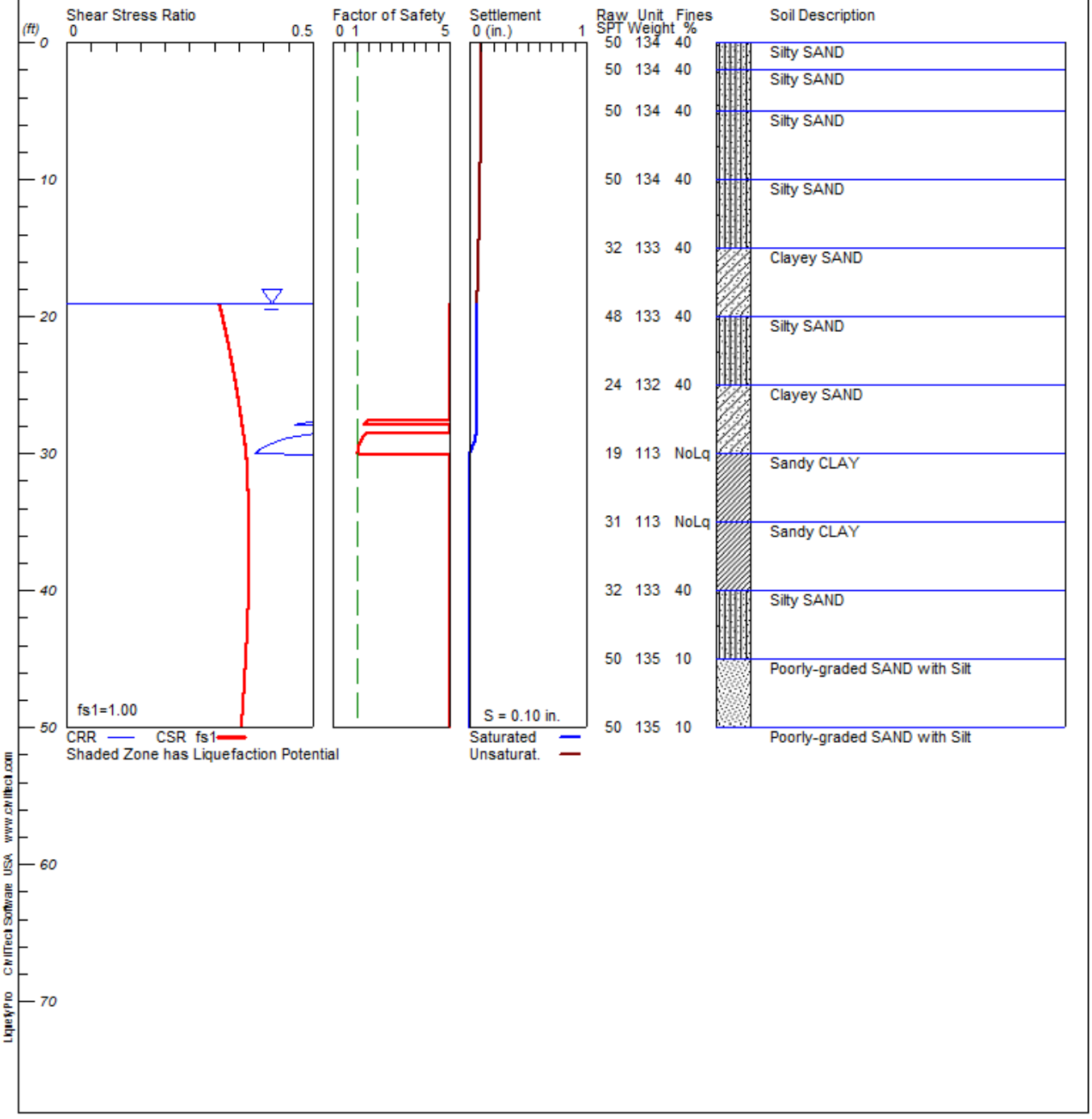
1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

DRY SETTLEMENT ANALYSIS

K-4 Warehouse

Hole No.=LB-4 Water Depth=19 ft Surface Elev.=1552

Magnitude=7.2
Acceleration=0.5g



Leighton | **11979.002** | **Plate A-1**

****

LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: P:\Leighton - Infocus\11000 - 11999\11979 Meridian Site K-4\002 Geot Exploration\Analyses\Liquefy LB-4.liq
Title: K-4 Warehouse
Subtitle: 11979.002

Surface Elev.=1552
Hole No.=LB-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 19.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration= 0.5 g
Earthquake Magnitude= 7.20

Input Data:
Surface Elev.=1552
Hole No.=LB-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 19.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.20
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	50.00	134.00	40.00
2.00	50.00	134.00	40.00
5.00	50.00	134.00	40.00
10.00	50.00	134.00	40.00
15.00	32.00	133.00	40.00
20.00	48.00	133.00	40.00
25.00	24.00	132.00	40.00
30.00	19.00	113.00	NoLiq
35.00	31.00	113.00	NoLiq

40.00	32.00	133.00	40.00
45.00	50.00	135.00	10.00
50.00	50.00	135.00	10.00

Output Results:

Settlement of Saturated Sands=0.06 in.
Settlement of Unsaturated Sands=0.04 in.
Total Settlement of Saturated and Unsaturated Sands=0.10 in.
Differential Settlement=0.050 to 0.066 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.22	0.32	5.00	0.06	0.04	0.10
1.00	2.22	0.32	5.00	0.06	0.04	0.10
2.00	2.22	0.32	5.00	0.06	0.04	0.10
3.00	2.22	0.32	5.00	0.06	0.04	0.10
4.00	2.22	0.32	5.00	0.06	0.03	0.10
5.00	2.22	0.32	5.00	0.06	0.03	0.10
6.00	2.22	0.32	5.00	0.06	0.03	0.09
7.00	2.22	0.32	5.00	0.06	0.03	0.09
8.00	2.22	0.32	5.00	0.06	0.03	0.09
9.00	2.22	0.32	5.00	0.06	0.03	0.09
10.00	2.22	0.32	5.00	0.06	0.03	0.09
11.00	2.22	0.32	5.00	0.06	0.02	0.09
12.00	2.22	0.32	5.00	0.06	0.02	0.08
13.00	2.22	0.32	5.00	0.06	0.02	0.08
14.00	2.22	0.31	5.00	0.06	0.02	0.08
15.00	2.22	0.31	5.00	0.06	0.01	0.08
16.00	2.22	0.31	5.00	0.06	0.01	0.07
17.00	2.22	0.31	5.00	0.06	0.01	0.07
18.00	2.22	0.31	5.00	0.06	0.00	0.07
19.00	2.22	0.31	5.00	0.06	0.00	0.06
20.00	2.22	0.32	5.00	0.06	0.00	0.06
21.00	2.22	0.32	5.00	0.06	0.00	0.06
22.00	2.22	0.33	5.00	0.06	0.00	0.06
23.00	2.22	0.33	5.00	0.06	0.00	0.06
24.00	2.22	0.34	5.00	0.06	0.00	0.06
25.00	2.22	0.34	5.00	0.06	0.00	0.06
26.00	2.22	0.35	5.00	0.06	0.00	0.06
27.00	2.22	0.35	5.00	0.06	0.00	0.06
28.00	2.22	0.36	5.00	0.06	0.00	0.06
29.00	0.43	0.36	1.20	0.04	0.00	0.04
30.00	0.38	0.37	1.04	0.00	0.00	0.00
31.00	2.00	0.37	5.00	0.00	0.00	0.00
32.00	2.00	0.37	5.00	0.00	0.00	0.00
33.00	2.00	0.37	5.00	0.00	0.00	0.00
34.00	2.00	0.37	5.00	0.00	0.00	0.00
35.00	2.00	0.37	5.00	0.00	0.00	0.00
36.00	2.00	0.37	5.00	0.00	0.00	0.00
37.00	2.00	0.37	5.00	0.00	0.00	0.00
38.00	2.00	0.37	5.00	0.00	0.00	0.00
39.00	2.00	0.37	5.00	0.00	0.00	0.00
40.00	2.00	0.37	5.00	0.00	0.00	0.00
41.00	2.17	0.37	5.00	0.00	0.00	0.00
42.00	2.16	0.37	5.00	0.00	0.00	0.00
43.00	2.15	0.37	5.00	0.00	0.00	0.00
44.00	2.14	0.37	5.00	0.00	0.00	0.00
45.00	2.14	0.36	5.00	0.00	0.00	0.00
46.00	2.13	0.36	5.00	0.00	0.00	0.00
47.00	2.12	0.36	5.00	0.00	0.00	0.00
48.00	2.12	0.36	5.00	0.00	0.00	0.00

49.00	2.11	0.36	5.00	0.00	0.00	0.00
50.00	2.10	0.36	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

APPENDIX D

EARTHWORK AND GRADING SPECIFICATIONS

APPENDIX D

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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D-1.0 GENERAL

D-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

D-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

D-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide

Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

D-2.0 PREPARATION OF AREAS TO BE FILLED

D-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that

are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

D-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section D-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

D-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

D-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

D-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

D-3.0 FILL MATERIAL

D-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

D-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

D-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section D-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than ($\leq$) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

D-4.0 FILL PLACEMENT AND COMPACTION

D-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section D-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

D-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

D-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than (≥) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at-least (≥) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than (>) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

D-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

D-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

D-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

D-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, then observed and reviewed by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

D-6.0 TRENCH BACKFILLS

D-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2009 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

D-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

D-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

APPENDIX E

GBA - IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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GEOTECHNICAL ADDENDUM REPORT
K4 MORENO VALLEY STORM DRAIN
CACTUS AVENUE
UNINCORPORATED RIVERSIDE COUNTY
NEAR MORENO VALLEY, CALIFORNIA

Prepared for

MERIDIAN PARK, LLC
1156 North Mountain Avenue
Upland, California 91786

Project No. 11979.002

October 12, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

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Project No. 11979.002

Meridian Park, LLC
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Timothy Reeves

Subject: Geotechnical Addendum Report
K4 Moreno Valley Storm Drain - Cactus Avenue
Unincorporated Riverside County, near Moreno Valley, California

In accordance with your authorization, this addendum report is to provide our preliminary geotechnical recommendations for design and construction of the proposed K4 Moreno Valley Storm Drain associated with the proposed K4 Warehouse Project located along Cactus Avenue, in Moreno Valley area, California. Our recommendations are based primarily on field observations during our recent site visit and the results of our subsurface exploration performed for the K4 Warehouse site.

Based on the results of our evaluation, the proposed storm drain is feasible from a geotechnical perspective provided our recommendations included in this report are properly implemented during design and construction. The soil conditions along the proposed alignment generally consist of alluvial deposits. The site is not located within an Alquist-Priolo or Riverside County Earthquake Fault Zone.

The opportunity to be of service is sincerely appreciated. If you should have questions, please do not hesitate to call our office.

Respectfully submitted,
LEIGHTON CONSULTING, INC.



Simon I. Saiid, GE 2641
Principal Engineer



Robert F. Riha, CEG 1921
Senior Principal Geologist

Distribution: (2) Addressee (plus one electronic copy/CD)

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1.0 INTRODUCTION

1.1 Site and Project Description

As indicated on Figure 1, the proposed K4 Storm Drain is located along the south side of Cactus Avenue between Elsworth Street and Heacock Street. The total alignment is approximately 7,850 linear feet, which is currently an open earthen channel with a depth of 5 to 6 feet below adjacent ground surface with variable slopes gradient. According to the provided conceptual plans (DRC, 2018), the K4 Storm Drain will connect to an existing earthen channel along the west of Heacock Street and have a typical soils cover ranging from 3 feet to 8 feet. According to provided plans, this RCB storm drain will vary in size as follows:

- Double-cell box (9'Wx5'H) between Stations 62+46 and 88+47
- Double-cell box (8'Wx7'H) between Stations 36+06 and 62+46
- Single box (14'Wx8'H) between Stations 10+00 and 36+06

1.2 Purpose and Scope of Evaluation

The purpose of our evaluation is to (1) evaluate geotechnical engineering characteristics of the soil at the project site based on existing information, and (2) provide geotechnical recommendations for design and construction of the proposed storm drain. This report does not address the potential for encountering hazardous materials. Important information about limitations of geotechnical reports, in general, is presented in Appendix B, *GBA Important Information about This Geotechnical Report.*

1.3 Field Exploration

Based on recent site reconnaissance and review of our soils report for the K4 Warehouse project (Leighton, 2018), the soils conditions along the alignment are expected to consist of dense older alluvium with surficial and local younger/recent sediments. Approximate locations of our field exploration borings at the K-4 site are depicted on Figure 2, Boring Location Map.

1.4 Laboratory Testing

No laboratory testing was performed as part of this addendum report. Our analyses were based solely on the results of our laboratory testing performed during our subsurface exploration for the Warehouse project (Leighton, 2018) and included in Appendix A.

2.0 SUMMARY OF GEOTECHNICAL FINDINGS

A summary of our findings from research of pertinent literature and field exploration performed for the K4 Warehouse project (Leighton, 2018) is discussed in this section.

2.1 Overall Site Geology

As shown on the *Regional Geology Map* (Figure 3), the site is primarily located within Quaternary-age very old fan deposits (Qvof).

2.2 Subsurface Conditions

Based on the results of our geotechnical exploration, the alignment of the proposed storm drain is expected to be underlain by the following:

- ***Recent Sediments/Young Alluvium***: These are likely generated during past cycles of flooding within this earthen channel. Based on our visual observations, these sediments generally consist of fine sands and silt and are expected to be loose and possess low expansion (EI<51).
- ***Older Alluvium*****:** The older alluvial deposits are expected to consist of medium dense to very dense silty to clayey sand (SM/SC) and localized layers of sandy silty to sandy clay (ML/CL). This older alluvium is expected to generally possess a low expansion potential (EI<51) and slight collapse potential (<1%).

2.3 Excavation Characteristics

Relatively easy to moderate excavation using heavy grading equipment is expected within the proposed depth of excavation. Grading and/or trench excavation characteristics using conventional excavators or earthmoving equipment may vary based on the specific equipment used. It is important that a contractor with excavation experience in similar conditions should be consulted for the proper excavation method, equipment, and production rate based on the findings of this report. Caving of excavations in the non-cohesive sands should be anticipated.

2.4 Surface and Groundwater

Surface water was observed along certain portions of the alignment during our site visit, from approximately Station 57+00 to 69+00. In addition, areas between Station 69+00 and 79+00 appeared to be overly saturated, mainly at the storm drain inlet connections. Groundwater was encountered during our exploration for K4 Warehouse site at a depth of approximately 19 feet (LB-2) below existing

ground surface (bgs) and 23 feet bgs (LB-4). Historic groundwater data, as reported by Department of Water Resource (DWR) data for Well 338995N1171958W001 located approximately 5 miles east of the subject site, reflect a groundwater elevation of 1,470 feet (about 82 feet below site elevation) in April 2017. According to West San Jacinto Groundwater Management Plan, 2016 Annual Report, the groundwater elevation in the subject site vicinity are at the range of 1,520 feet msl (about 32 feet below site elevation). In addition, groundwater conditions can fluctuate seasonally and can be encountered during construction.

2.5 Faulting and Seismicity

The subject site, like the rest of Southern California, are located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity on this site is movement along the northwest-trending regional fault systems such as the San Andreas and San Jacinto. Based on our review of published geologic map (Hart, 2007), the subject site is not included within an Earthquake Fault Zone per the Alquist-Priolo Earthquake Fault Zoning Act.

For the purpose of structural design, seismic coefficients based on the 2016 California Building Code (CBC) are provided below. These seismic coefficients were calculated based on a software program, available on the United States Geological Survey website), which follows the procedures, included in American Society of Civil Engineers (ASCE) Publication ASCE 7-10 and Chapter 16 of 2016 CBC.

Table 1. CBC Site Categorization and Seismic Coefficients

Categorization /Coefficient	Values
Site Longitude (decimal degrees)	-117.2592
Site Latitude (decimal degrees)	33.9101
Site Class Definition	D
Mapped Spectral Response Acceleration at 0.2s Period, S_s	1.50g
Mapped Spectral Response Acceleration at 1s Period, S_1	**0.60g**
Short Period Site Coefficient at 0.2s Period, F_a	1.0
Long Period Site Coefficient at1s Period, F_v	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.50g
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.90g
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	***1.00g***
Design Spectral Response Acceleration at 1s Period, S_{D1}	***0.60g***

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 General

Construction of the proposed RCB storm drain is feasible from a geotechnical viewpoint provided that the following recommendations are incorporated into the design and construction phases of development. The encountered alluvium should be considered CalOSHA Type C soil, and sloped excavations will be required to protect workers in the excavations, if shoring and/or shields are not used. Geotechnical recommendations for design and construction of the proposed pipelines are presented below.

3.2 Earthwork Considerations

Earthwork associated with the proposed pipeline should be performed in accordance with applicable RCFC&WCD/District Specifications, "Standard Specifications for Public Works Construction" (Green Book, latest edition) and the recommendations included in the text of this report.

3.2.1. Trench Excavation

Based on the results of our exploratory borings, the onsite fill and younger/older alluvium should generally be easy to excavate with conventional earthmoving equipment.

Excavation should be performed in accordance with the project plans, specifications, and applicable OSHA requirements. The contractor should be responsible for providing the "competent person" required by OSHA standards. Contractors should be advised that sandy soil (such as existing, onsite fill and alluvium) could make excavations particularly unsafe, and hence necessary safety precautions should be taken.

3.2.2. Subgrade Preparation

Medium dense to dense silty sand and clayey sand are expected below the bottom of the proposed storm drain. The exposed grade should be suitable for foundation support. However, depending on actual field conditions encountered during construction, localized over-excavation may be required if loose or expansive soils (EI>51) are encountered. The resulting voids or over-excavations (not to exceed 2 feet) should be properly backfilled with suitable soil.

3.2.3. Fill and Backfill

The onsite undocumented fill and alluvium within the proposed excavation depths are generally suitable as fill soil provided they are relatively free of rocks over 6 inches in diameter and organic matter. Backfill materials should be placed in thin lifts, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum dry density or as required per District standard specifications.

3.3 Recommended Soil Parameters

3.3.1. Soil Erodibility (K) factor

Based on the results of our laboratory testing (grain size analysis), the Soil Erodibility Factor (K) is expected to range from 0.15 to 0.35 per the Erickson/USDA nomograph. These values are applicable to the on-site alluvium and locally derived silty sand sediments.

3.3.2. Rankine's Factor (K)

Based on the results of our laboratory testing (shear strength), a Rankine's ratio of active lateral pressure to vertical unit pressure (K) of 0.33 may be used for pipe D-Load calculations. This value is applicable to the on-site alluvium and locally derived soil.

3.3.3. Sliding Friction (μ')

Based on the results of our laboratory testing (shear strength), a coefficient of sliding friction (μ'), between backfill soil and trench walls of 0.58 may be used for pipe D-Load calculations. This value is applicable to the on-site alluvium and locally derived fill soil.

3.4 Lateral Earth Pressures

3.4.1. Lateral Pressure

Soil's resistance ability to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the concrete and the subgrade soil may be computed using a coefficient of friction of 0.35. The passive resistance may be computed using an equivalent fluid pressure of 300 pounds-per-cubic-foot (pcf), assuming there is constant contact between concrete and undisturbed soil. These friction and passive values have already been reduced by a factor-of-

safety of 1.5, and can be increased by one-third when considering short-duration wind or seismic loads.

3.4.2. Other Soil Parameters for Design

Structural design of pipes requires proper evaluation of possible loads acting on the pipe, including dead and live or transient loads. Stresses and strains induced in a buried pipe depend on many factors, including the type of pipe, depth and width of trench, bedding and embedment conditions, soil density, angle of internal friction, coefficient of passive earth pressure, and coefficient of friction at the interface between the backfill and in-situ soil. We recommend the following soil parameters for the proposed concrete pipe design:

Table 2. Soil Parameters for Pipe Design

Soil Parameters	Recommended Values
Average Compacted fill moist unit weight, (pcf)	120-130
Angle of internal friction of soil (degrees)	33
Soil cohesion, c (psf)	200
Sliding friction between concrete pipe and native soil	0.38
Coefficient of active earth pressure/Rankine, Ka	0.33
Coefficient of earth pressure at rest, Ko	0.50

3.5 Temporary Cut Slopes

The contractor is responsible for temporary slopes and trenches excavated at the site and the design of required temporary shoring. Shoring, bracing and benching should be performed by the contractor in accordance with the current edition of the *California Construction Safety Orders*, see:
http://www.dir.ca.gov/title8/sb4a6.html

During construction, exposed soil conditions should be regularly evaluated to check that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and geotechnical consultant should be maintained to facilitate construction while providing safe excavations. The existing alluvial soil encountered is classified as OSHA soil Type C. Unshored temporary cut slopes should be no steeper than 1½:1 (horizontal:vertical), for a height no-greater-than (≤) 20 feet (*California Construction Safety Orders*, Appendix B to Section 1541.1, Table B-1). Dense cohesive older alluvium may be considered as OSHA soil Type B and temporary slopes can be cut at 1:1 gradient

provided further field verification and testing performed during construction. These recommended temporary cut slopes assume a level ground surface for a distance equal to one-and-a-half (x1.5) the depth of excavation. For steeper temporary slopes, deeper excavations, and/or where slopes terrain exists within close proximity to excavation (<1.5xdepth), appropriate shoring methods or flatter slopes may be required to protect the workers in the excavation and adjacent improvements. Such methods should be implemented by the contractor and reviewed by the geotechnical consultant.

3.6 Temporary Shoring

If the sloped open cut excavation is not feasible based on requirements above and due to existing structures, excavations should be supported by a temporary shoring system such as cross-braced hydraulic shoring, conventional shields, sheet piles, or soldier piles and wood lagging. The choice should be left to the contractor's judgment since economic considerations and/or the individual contractor's construction experience may be important factors. The contractor and shoring designer should also perform additional geotechnical studies as necessary to refine the means-and-methods of shoring construction.

The support of adjacent existing structures during excavation and construction (including pavements) without distress is the contractor's responsibility. In addition, it should be the contractor's responsibility to undertake a pre-construction survey with benchmarks and photographs of the adjacent properties. Shoring systems should be designed by a California licensed civil or structural engineer. As preliminary design guidelines, we present the following geotechnical parameters for shoring design. The following lateral earth pressures are recommended for temporary shoring supporting the anticipated alignment soil types with level ground behind the shoring. Passive pressure also may be used to compute lateral soil resistance, if necessary, for sheet piles. Earth pressures provided are ultimate values and a safety factor should be applied as appropriate.

Table 3. Static Lateral Earth Pressures

Conditions[1]	Static Equivalent Fluid Weight (pcf)
Active (cantilever)	37
At-Rest (braced)	55
Passive[2]	300

1. For temporary excavations only, with level backfill, not including surcharges
2. Passive equivalent fluid pressure may be doubled for isolated soldier piles spaced at least 2½ diameters on-center. Passive resistance should not exceed 3,500 pounds-per-square-foot (psf)

Determination of appropriate design conditions (active or at-rest) depends on shoring flexibility. If a rotation of more than 0.001 radian (0.06 degrees) is allowed, active pressure conditions apply; otherwise, at-rest condition governs.

Surcharge loads (dead or live) should be added to the indicated lateral earth pressures and should be applied uniformly, if such loads are within a horizontal distance that is less-than the exposed shoring height. The corresponding lateral earth pressure will approximately be 33-percent of the vertical surcharge for active conditions, and 50-percent for at-rest conditions. Surcharge pressures from concentrated loads should be evaluated after geometric constraints and loading conditions are evaluated on individual basis.

3.7 Dewatering during Trenching and Pipeline Construction

Based on the results of our exploration, groundwater was not encountered and thus not expected to be a geotechnical concern during construction. However, if encountered during excavations, groundwater control, such as dewatering, will be required to limit instability of the excavation bottom, side and face, and aid construction and soil backfill. Groundwater due to perched saturated conditions can be dewatered utilizing sump-pumps. Dewatering or other suitable methods for stabilizing the excavation bottom may be selected by the contractor based on actual groundwater conditions encountered and based on the contractor's chosen means-and-methods of construction. The method selected by the contractor should be able to effectively mitigate for bottom heave or stabilize subgrade soil during construction and backfilling.

3.8 Additional Geotechnical Services

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many construction projects is such that differing soil or geologic conditions can be present within relatively small distances between borings and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are only valid if Leighton Consulting, Inc. has the opportunity to observe subsurface conditions during construction, to confirm that our preliminary data are representative for the site. Geotechnical observation and testing should be provided by Leighton Consulting, Inc. during backfill and when unusual conditions are encountered.

4.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This investigation was performed with the understanding that the subject site is proposed for development as described in Section 1.1 of this report. The client is referred to Appendix B regarding important information provided by the Geoprofessional Business Council (GBC) on geotechnical engineering studies and reports and their applicability.

This report was prepared for Meridian Park, LLC based on Meridian Park, LLC needs, directions, and requirements at the time of our investigation. This report is not authorized for use by, and is not to be relied upon by any party except Meridian Park, LLC , and its successors and assigns as owner of the property, with whom Leighton Consulting, Inc. has contracted for the work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.

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Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2,000 '	Date: October 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

K4 Moreno Valley Storm Drain
Cactus Avenue
Unincorporated Riverside County, California

Figure 1

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F01_SLM_2018-10-12.mxd on 10/12/2018 9:38:09 AM



Legend

- LB-9 — Approximate Boring Location
- P-3 — Approximate Percolation Test Location
- Approximate Site Boundary

Project: 11979.002	Eng/Geol: SIS/RFR
Scale: 1 " = 200 '	Date: October 2018
Base Map: Sheet A1-02, K-4 Parcel by RGA.	
Author: Leighton Geomatics (mmurphy)	

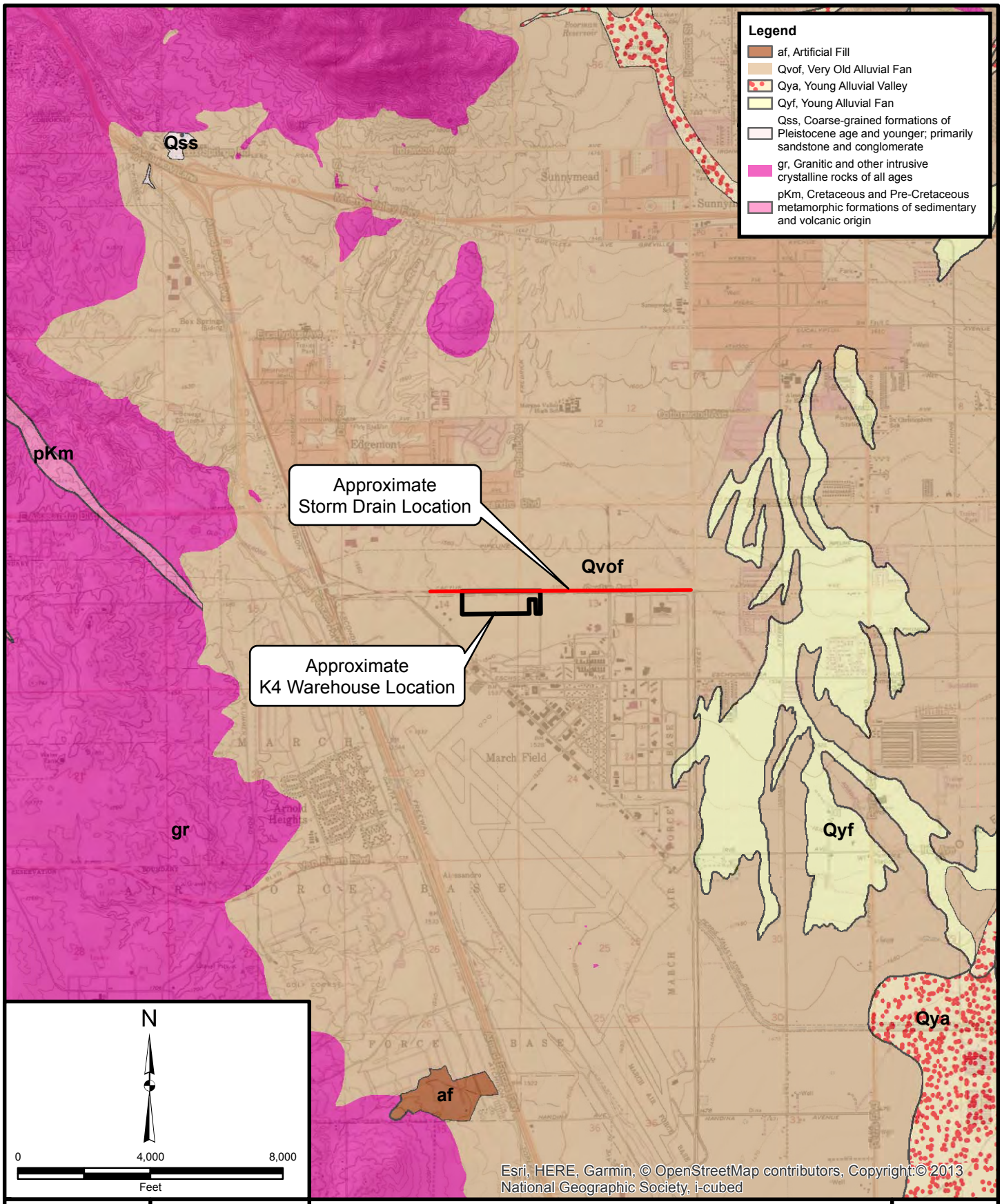
BORING LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 2

Leighton

Map Saved as P:\Drafting\11979\002\Maps\11979-002_F02_BLM_2018-07-27.mxd on 7/27/2018 10:43:41 AM



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 4,000 '	Date: October 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

REGIONAL GEOLOGY MAP

K4 Moreno Valley Storm Drain
Cactus Avenue
Unincorporated Riverside County, California

Figure 3

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F03_RGM_2018-04-23.mxd on 10/12/2018 9:41:00 AM

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APPENDIX A

Logs of Previous Exploratory Borings and Laboratory Testing

Relatively undisturbed soil samples were obtained at selected intervals within the borings using a California ring sampler, with 2.42-inch inside diameter brass rings, driven into the soil with a 140-pound hammer falling 30-inches in general accordance with ASTM Test Method D3550. The numbers of blows required for each 6 inches of drive penetration were noted in the field and are recorded on the boring logs. Unless otherwise indicated, the blows per foot recorded on the boring logs represent the number of blows required to drive 18 inches in 6 inch increments. In addition, disturbed bag (or bulk) samples were also obtained from soil cuttings. Types of samples obtained from each location are shown on the boring logs at corresponding depths. Our borings were backfilled with soil cuttings obtained during the drilling. Representative soil samples obtained from these subsurface explorations were transported to our Temecula geotechnical laboratory for evaluation and appropriate testing.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

GEOTECHNICAL BORING LOG LB-1

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, loose, light brown, dry, fine sand, some gravel (MD: 133.3 @ 8.0)	MD
1550				R-1	31 50-3"	109	7	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, moist, fine to medium sand, few gravel, slightly porours	
	5			R-2	35 50-2"	112	7	SM	SILTY SAND with GRAVEL, very dense, light reddish brown, moist, fine to coarse sand, trace clay	
1545										
	10			R-3	49 50-5"				very dense, reddish brown, moist, fine to coarse sand with fine gravel, some interbedded clay layers	
1540										
	15			R-4	10 36 50-4"				very dense, reddish brown, moist, fine to medium sand, trace clay, some coarse sand and fine gravel	
1535									Drilled to 15' Sampled to 16.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	20									
1530										
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-2

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry to moist, fine sand, few gravel	
1550				R-1	15 50-5"	115	5		very dense, light yellowish brown, dry, fine to medium sand, some caliche, slightly porous	
	5			R-2	50-6"	95	8		very dense, light yellowish brown, dry to moist, fine to medium sand, subangular, trace clay, some gravel (sample disturbed)	
1545										
	10			R-3	39 50-6"	106	13	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, dry, fine to medium sand, few coarse sand and gravel	
1540										
	15			R-4	24 50-5"			SP-SM	Poorly graded SAND with SILT, very dense, brown, moist, fine to medium sand, trace gravel, micaceous	
1535										
	20			R-5	12 17 30			SM	SILTY SAND, dense, dark reddish brown, moist to wet, fine to medium sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater at 18.7' Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-3

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				CL-ML	**Quaternary Older Alluvium (Qoa):** SILTY CLAY with sand, stiff, light yellowish brown, dry to moist, fine sand, trace gravel (54% fines, EI = 36)	SA, EI, CO
1550										
	5			R-1	50-6"	104	7	SM	SILTY SAND, very dense, light reddish brown, dry to moist, fine to medium sand, some interbedded clay layers, trace fine gravel (sample disturbed)	
1545										
	10			R-2	34 50-3"	112	11		very dense, light yellowish brown, dry to moist, fine sand, some interbedded clay layers, caliche	
1540										
	15			R-3	18 50-6"			SC-SM	SILTY, CLAYEY SAND, very dense, reddish brown, moist, fine to medium sand, some caliche, trace fine gravel	
1535										
	20			R-4	14 40 45				dense, dark reddish brown, moist, fine to medium sand, few coarse sand	
1530									Drilled to 20' Sampled to 20.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light yellowish brown, dry, fine to medium sand, some clay	
1550				R-1	34 50-2"	123	9		very dense, strong brown, moist, fine to medium sand, some interbedded clay	
	5			R-2	50-6"				very dense, reddish brown, moist, fine to medium sand, few coarse sand	
1545										
	10			R-3	30 50-5"				very dense, reddish brown, dry to moist, fine sand, trace fine gravel, some caliche (sample disturbed)	
1540										
	15			R-4	13 22 30	116	15	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine to medium sand, trace coarse sand	
1535										
	20			R-5	13 28 50			SM	SILTY SAND, dense, dark olive brown, moist to wet, fine to medium sand, some mica	
1530		▼								
	25			R-6	7 14 25	112	18	SC	CLAYEY SAND, dense, dark grayish brown, moist to wet, fine sand, few caliche	
1525										
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-7	11 13 16	84	34	CL	SANDY CLAY, stiff, brown, moist, fine sand, caliche	
1520										
	35			R-8	10 21 30				dense, reddish brown, moist, fine to coarse sand, some weathered gravel	
1515										
	40			R-9	10 19 34	116	15	SM	SILTY SAND, dense, olive brown, moist, fine sand, trace fine gravel, micaceous	
1510										
	45			R-10	13 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, grayish brown, moist, fine sand, some coarse sand and fine gravel, micaceous	
1505										
	50			R-11	26 50-5"				very dense, light olive brown, moist, fine to medium sand, some fine gravel	
1500									Drilled to 50' Sampled to 51' Groundwater at 23' Backfilled with soil cuttings (4/19/18)	
	55									
1495										
	60									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-5

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry, fine sand, few gravel	
1550				R-1	50-5.5"	98	8		very dense, brown, dry to moist, fine sand, some interbedded clay layers	
	5			R-2	35 50-4"				very dense, light reddish brown, dry to moist, fine to medium sand, some clay, trace gravel	
1545										
	10			R-3	16 35 50	120	13		dense, reddish brown, moist, fine sand, some mica	
1540										
	15			R-4	15 21 50	121	12	SC	CLAYEY SAND, dense, reddish brown, moist, fine to coarse sand, some gravel, weathered (CO = 0.14)	CO
1535										
	20			R-5	11 27 37			SC-SM	SILTY, CLAYEY SAND, dense, dark reddish brown, moist, fine sand, micaceous	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SOIL DESCRIPTION: This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-6

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, moist, fine sand, some medium sand and clay (EI = 26, MD: 130.4 @ 9.0)	EI, MD
1550										
	5			R-1	12 50-4"	93	9		very dense, light reddish brown, dry, fine to medium sand, some clay (sample disturbed)	
1545										
	10			R-2	17 50-6"				very dense, light brown, moist, fine sand, some caliche	
1540										
	15			R-3	35 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, olive brown, moist, fine to medium sand, some gravel	
1535										
	20			R-4	6 10 19	97	26	CL	SANDY CLAY, stiff, dark reddish brown, moist, fine sand, some mica	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-7

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, reddish brown, dry to moist, fine sand, some clay	
1550				R-1	21 29 47	124	8	SC	CLAYEY SAND, very dense, reddish brown, dry to moist, fine to medium sand, some weathered gravel	
	5			R-2	22 27 46	118	7	SM	SILTY SAND, very dense, reddish brown, dry to moist, fine to medium sand, few fine gravel, weathered	
1545										
	10			R-3	29 50-6"				very dense, light olive brown, dry to moist, fine to medium sand, some weathered gravel, few caliche	
1540										
	15			R-4	18 50-6"			SM	very dense, olive brown, moist, fine sand, micaceous, some caliche	
1535										
	20			R-5	12 31 43			SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, some coarse sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-8

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light brown, dry, fine sand, few gravel, some clay (EI = 26)	EI
1550				R-1	12 14 28	114	9	SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, few gravel	
	5			R-2	34 50-5"	101	13	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine sand, some interbedded clay layers (sample disturbed)	
1545										
	10			R-3	28 29 50			SP-SM	Poorly graded SAND with SILT, dense, yellowish brown, dry to moist, fine sand, some coarse sand and fine gravel	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-9

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC	**Quaternary Older Alluvium (Qoa):** SILTY, CLAYEY SAND, dense, light yellowish brown, dry, fine sand, some fine gravel (RV = 16)	RV
1550				R-1	30 50-6"	118	7		very dense, light reddish brown, dry to moist, fine sand, trace fine gravel	
	5			R-2	24 28 30	117	4	SM	SILTY SAND, dense, dark reddish brown, dry to moist, fine to coarse sand with fine gravel	
1545										
	10			R-3	24 30 50				very dense, dark reddish brown, moist, fine to coarse sand, few gravel, some clay layers	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

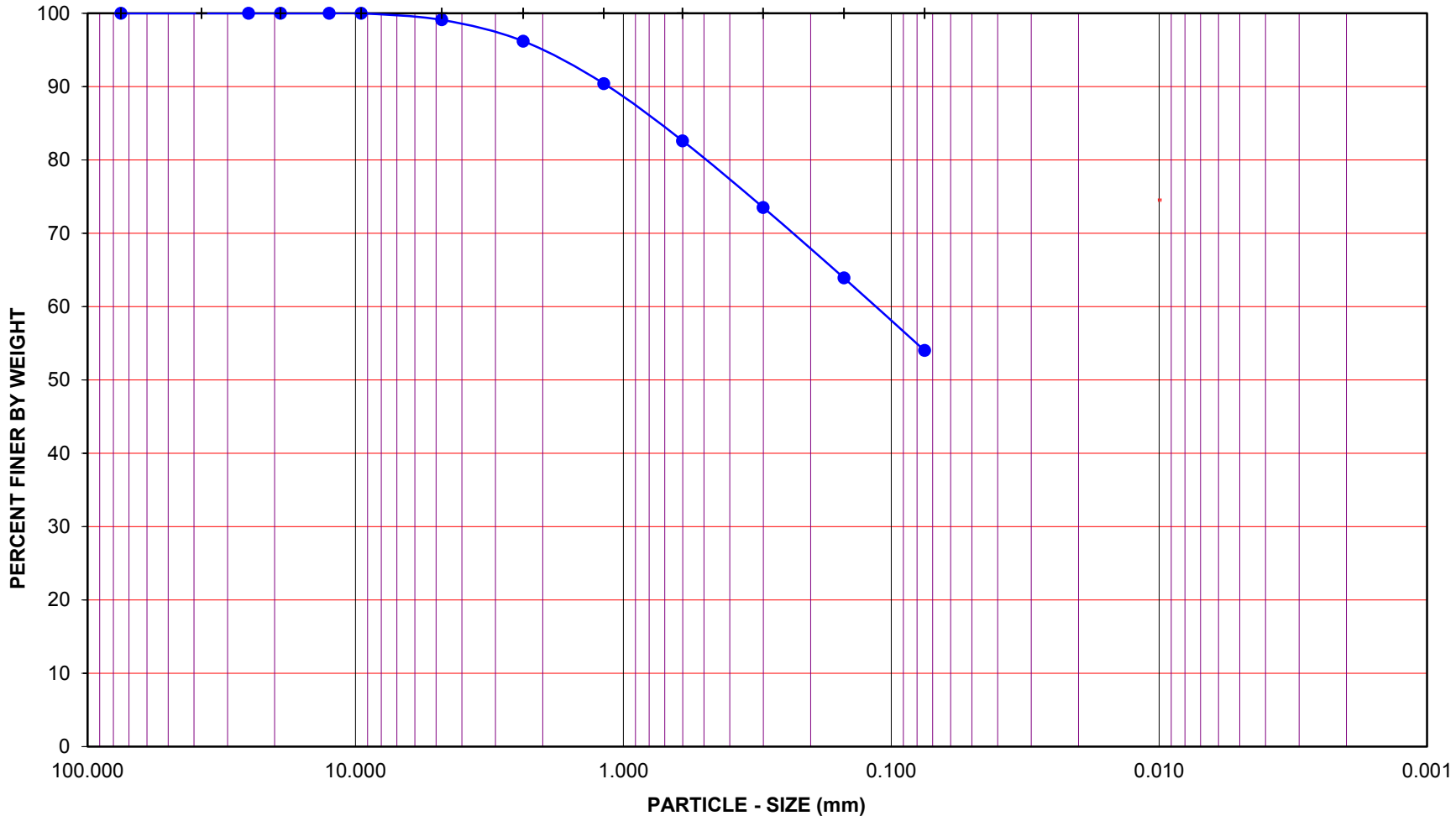


*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING — U.S. STANDARD SIEVE NUMBER — HYDROMETER

3.0" 1 1/2" 3/4" 3/8" #4 #8 #16 #30 #50 #100 #200



Project Name: Meridian Site K-4

Project No.: 11979.002

Boring No.: LB-3 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : s(ML)

Soil Identification: Sandy Silty Clay s(CL-ML), Reddish Brown.

GR:SA:FI : (%) 1 : 45 : 54

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PARTICLE - SIZE DISTRIBUTION ASTM D 6913

May-18

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-3	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Sandy Silty Clay s(CL-ML), Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	3328.6
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3328.6
Weight Soil Retained on #4 Sieve	7.8
Percent Passing # 4	99.8

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0393
Wt. Comp. Soil + Mold (gm.)	612.3	651.0
Wt. of Mold (gm.)	199.1	199.1
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	349.6	651.0
Dry Wt. of Soil + Cont. (gm.)	324.8	379.1
Wt. of Container (gm.)	49.6	199.1
Moisture Content (%)	9.0	19.2
Wet Density (pcf)	124.6	131.2
Dry Density (pcf)	114.3	110.0
Void Ratio	0.474	0.532
Total Porosity	0.322	0.347
Pore Volume (cc)	66.6	74.7
Degree of Saturation (%) [S meas]	**51.2**	**97.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5393
5/2/18	10:00	1.0	1420	0.5393

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	39.3
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**39**

Rev. 03-08

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-6	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	9128.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	9128.7
Weight Soil Retained on #4 Sieve	35.7
Percent Passing # 4	99.6

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0264
Wt. Comp. Soil + Mold (gm.)	600.7	633.7
Wt. of Mold (gm.)	180.7	180.7
Specific Gravity (Assumed)	2.70	2.70
Container No.	9	9
Wet Wt. of Soil + Cont. (gm.)	430.7	633.7
Dry Wt. of Soil + Cont. (gm.)	407.2	387.1
Wt. of Container (gm.)	130.7	180.7
Moisture Content (%)	8.5	17.0
Wet Density (pcf)	126.7	133.1
Dry Density (pcf)	116.8	113.8
Void Ratio	0.444	0.482
Total Porosity	0.307	0.325
Pore Volume (cc)	63.6	69.1
Degree of Saturation (%) [S meas]	**51.7**	**95.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5264
5/2/18	10:00	1.0	1420	0.5264

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	26.4
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

Rev. 03-08

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-8	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	2553.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	2553.7
Weight Soil Retained on #4 Sieve	11.7
Percent Passing # 4	99.5

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0258
Wt. Comp. Soil + Mold (gm.)	615.2	643.9
Wt. of Mold (gm.)	200.6	200.6
Specific Gravity (Assumed)	2.70	2.70
Container No.	8	8
Wet Wt. of Soil + Cont. (gm.)	350.0	643.9
Dry Wt. of Soil + Cont. (gm.)	325.2	380.4
Wt. of Container (gm.)	50.0	200.6
Moisture Content (%)	9.0	16.5
Wet Density (pcf)	125.1	130.4
Dry Density (pcf)	114.7	111.9
Void Ratio	0.469	0.507
Total Porosity	0.319	0.337
Pore Volume (cc)	66.1	71.5
Degree of Saturation (%) [S meas]	**51.8**	**88.1**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5258
5/2/18	10:00	1.0	1420	0.5258

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	25.8
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

Rev. 03-08

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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-1	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5629	5724	5642			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2090	2185	2103			
Wet Weight of Soil + Cont. (g)	2235.9	2380.3	2250.3			
Dry Weight of Soil + Cont. (g)	2112.1	2214.0	2052.6			
Weight of Container (g)	152.1	200.2	159.4			
Moisture Content (%)	6.3	8.3	10.4			
Wet Density (pcf)	138.0	144.2	138.8			
Dry Density (pcf)	129.8	133.2	125.7			

Maximum Dry Density (pcf) 133.3 **Optimum Moisture Content (%)** 8.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

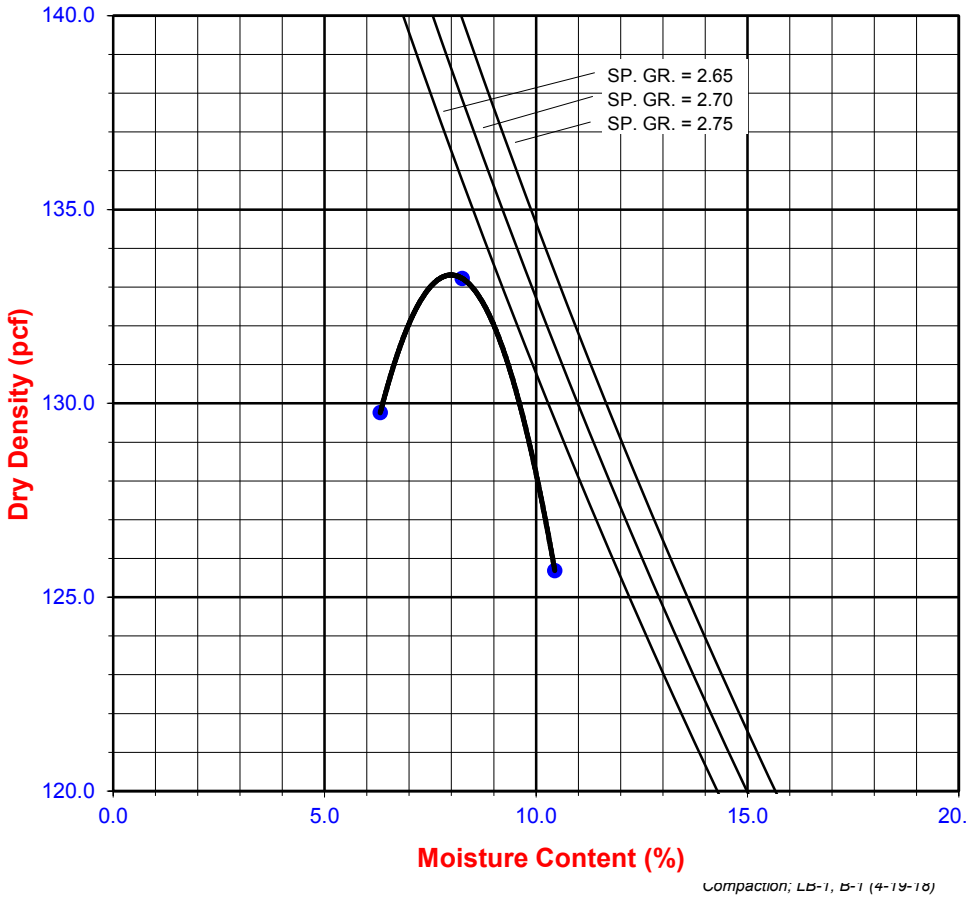
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-6	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5566	5687	5659			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2027	2148	2120			
Wet Weight of Soil + Cont. (g)	2144.1	2187.6	2252.2			
Dry Weight of Soil + Cont. (g)	2013.3	2014.1	2047.1			
Weight of Container (g)	118.3	44.0	144.3			
Moisture Content (%)	6.9	8.8	10.8			
Wet Density (pcf)	133.8	141.8	139.9			
Dry Density (pcf)	125.2	130.3	126.3			

Maximum Dry Density (pcf) 130.4 **Optimum Moisture Content (%)** 9.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

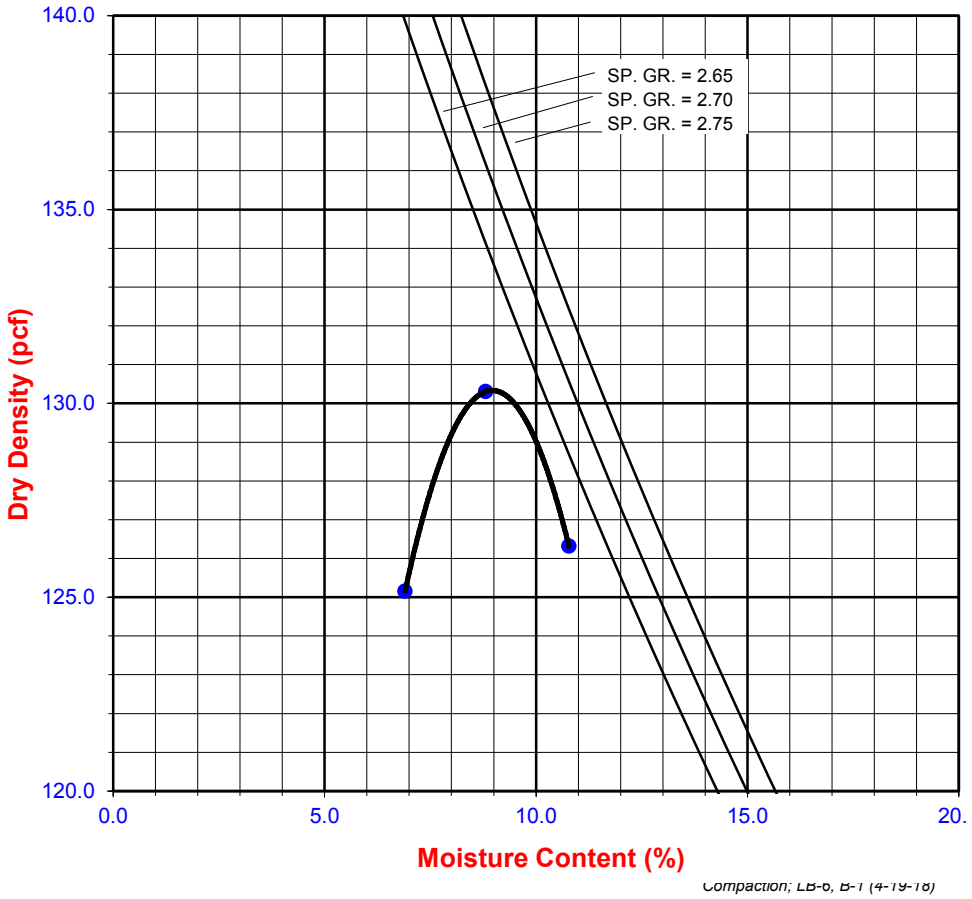
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546) -- Method 'B'

Project Name: Meridian K-4 Site
Project No.: 11979.002
Boring No.: **LB-5**
Sample No.: **R-4**
Sample Description: Clayey Sand (SC), Reddish Brown.

Tested By: M. Vinet Date: 5/3/18
Checked By: M. Vinet Date: 5/4/18
Sample Type: IN SITU
Depth (ft.) 15.0

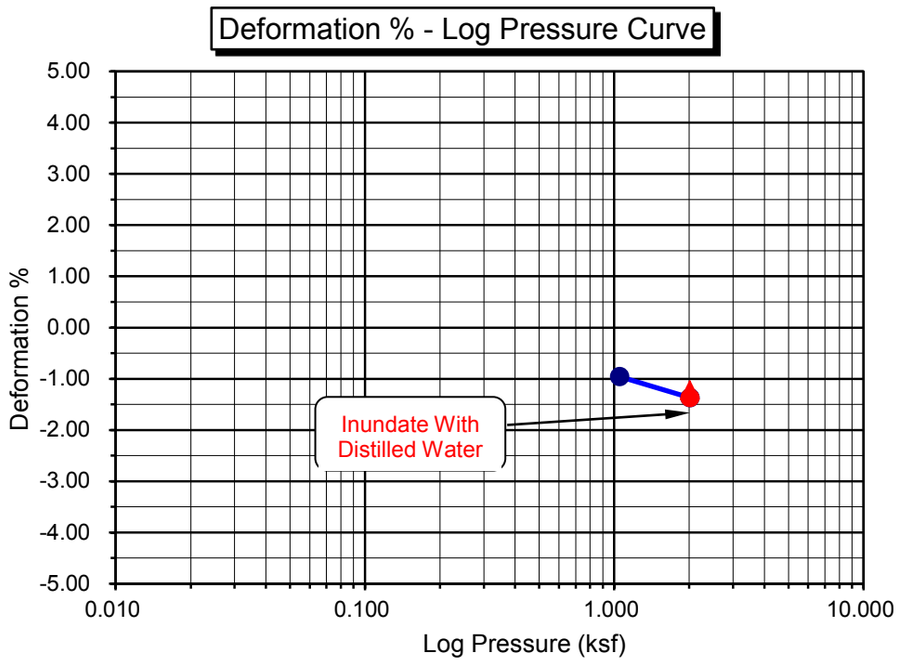
Source and Type of Water Used for Inundation: Arrowhead (Distilled)
** Note: Loading After Wetting (Inundation) not Performed Using this Test Method.

Initial Dry Density (pcf):	121.8
Initial Moisture (%):	12.4
Initial Height (in.):	1.0000
Initial Dial Reading (in):	0.0000
Inside Diameter of Ring (in):	2.416

Final Dry Density (pcf):	123.4
Final Moisture (%) :	14.0
Initial Void ratio:	0.3834
Specific Gravity (assumed):	2.70
Initial Degree of Saturation (%):	87.3

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
1.050	0.0096	0.9904	0.00	-0.96	0.3701	-0.96
2.013	0.0137	0.9863	0.00	-1.37	0.3644	-1.37
H2O	0.0123	0.9877	0.00	-1.23	0.3663	-1.23

Percent Swell / Settlement After Inundation = 0.14



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SOIL RESISTIVITY TEST

DOT CA TEST 643

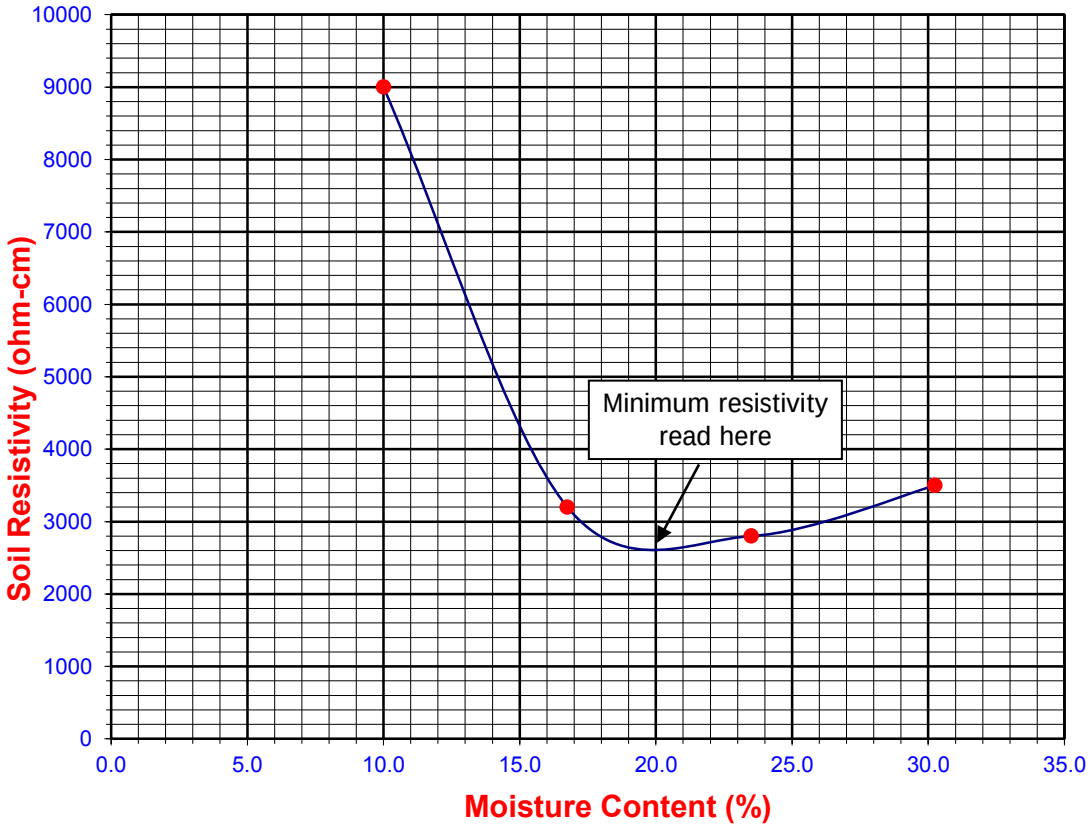
Project Name:	Meridian Site K-4		Tested By :	M. Vinet	Date: 05/03/18
Project No. :	11979.002		Data Input By:	M. Vinet	Date: 05/04/18
Boring No.:	LB-3		Depth (ft.) :	0 - 5.0	
Sample No. :	B-1				
Soil Identification:*	s(CL-ML)				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	40	10.00	9000	9000
2	67	16.75	3200	3200
3	94	23.50	2800	2800
4	121	30.25	3500	3500
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	1.00
Initial Soil Wt. (g) (Wt)	400.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2600	**20.0**	**99**	**20**	**6.01**	**21.0**



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R-VALUE TEST RESULTS

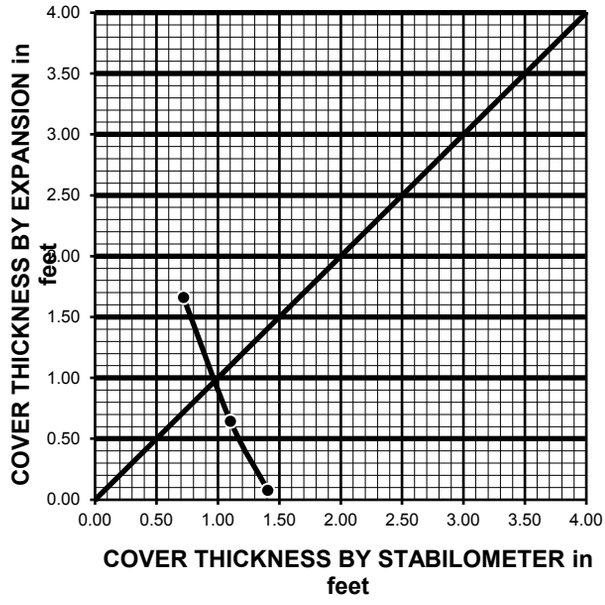
ASTM D 2844

Project Name:	Meridian Site K-4	Date:	5/1/18
Project Number:	11979.002	Technician:	F. Mina
Boring Number:	LB-9	Depth (ft.):	0 - 5.0
Sample Number:	B-1	Sample Location:	N/A
Sample Description:	Clayey Sand (SC), Dark Reddish Brown		

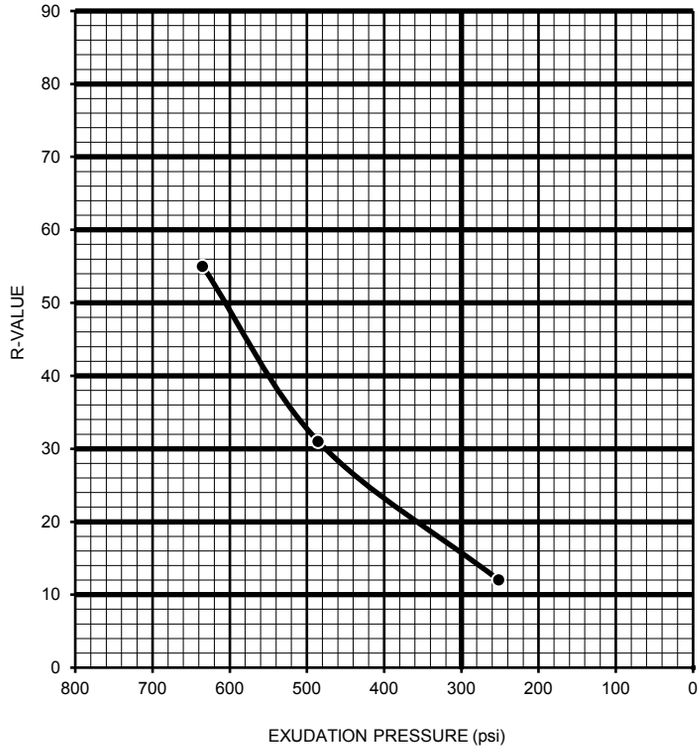
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	11.5	12.6	14.7
HEIGHT OF SAMPLE, Inches	2.40	2.59	2.61
DRY DENSITY, pcf	121.5	120.1	114.7
COMPACTOR AIR PRESSURE, psi	200	175	75
EXUDATION PRESSURE, psi	635	485	251
EXPANSION, Inches x 10exp-4	44	17	2
STABILITY Ph 2,000 lbs (160 psi)	46	90	124
TURNS DISPLACEMENT	4.53	4.69	5.24
R-VALUE UNCORRECTED	58	29	12
R-VALUE CORRECTED	55	31	12

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.72	1.10	1.41
EXPANSION PRESSURE THICKNESS, ft.	1.66	0.64	0.08

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	38
R-VALUE BY EXUDATION:	16
EQUILIBRIUM R-VALUE:	16

APPENDIX B

GBA Important Information about This Geotechnical Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT

K-4 PARCEL AND CACTUS AVENUE DRAINAGE CHANNEL IMPROVEMENT PROJECT

March Air Reserve Base, Moreno Valley Area
Riverside County, California

For Submittal to:

March Joint Powers Authority
14205 Meridian Parkway, #140
Riverside, CA 92518

Prepared for:

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Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

January 22, 2019

CRM TECH Contract #3424
Approximately 35 Acres and 1.5 linear miles
USGS Riverside East and Sunnymead, Calif., 7.5' (1:24,000) Quadrangles
Section 13 and 14, T3S R4W, San Bernardino Baseline and Meridian

EXECUTIVE SUMMARY

Between June 2018 and January 2019, at the request of Lewis Retail Centers, CRM TECH performed a paleontological resource assessment for the proposed K-4 Parcel Project and the Cactus Avenue Drainage Channel Improvement Project on the northern edge of March Air Reserve Base near the City of Moreno Valley, Riverside County, California. The K-4 Parcel Project consist of the construction of an approximately 718,000-square-foot industrial warehouse with 289 automobile parking stalls and 317 truck trailer parking stalls on 35 acres of undeveloped land in Assessor's Parcel Numbers 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004, and the Cactus Avenue Drainage Channel Improvement Project entails the conversion of an approximately 1.5-mile segment of earthen drainage channel to an underground concrete culvert, along with minor improvements such as extending a number of existing storm drains. The combined project area is located on the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street, in Sections 13 and 14 of T3S R4W, San Bernardino Baseline and Meridian. The maximum depth of excavation required for the projects, or the vertical extent of anticipated project impact, will not exceed 10 feet.

The present study is part of the environmental review process for these projects, as required by the March Joint Powers Authority (JPA) in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The purpose of the study is to provide the JPA and the pertinent federal agencies with the necessary information and analysis to determine whether the proposed projects would adversely affect any significant, nonrenewable paleontological resources and to design a paleontological mitigation program, if necessary. In order to identify any paleontological localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during the projects, CRM TECH initiated a records search at the Western Science Center in Hemet, conducted a literature review, and carried out a systematic field survey of the project area. Findings from these research procedures indicate that the projects' potential to impact paleontological resources appears to be low in the surface soils but high in the undisturbed subsurface deposits of older Quaternary age.

Based on these findings, CRM TECH recommends that a mitigation program be developed and implemented for the proposed projects to prevent potential impact on significant, nonrenewable paleontological resources or reduce such impact to a level less than significant. As the primary component of the mitigation program, all earth-moving operations above the depth of three feet should be monitored periodically to identify the sediments being impacted, and any earth-moving operations reaching beyond the depth of three feet will require continuous monitoring for potential paleontological remains. Under this condition, CRM TECH further recommends that the proposed projects may be cleared to proceed in compliance with CEQA and NEPA provisions on paleontological resources.

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INTRODUCTION

Between June 2018 and January 2019, at the request of Lewis Retail Centers, CRM TECH performed a paleontological resource assessment for the proposed K-4 Parcel Project and the Cactus Avenue Drainage Channel Improvement Project on the northern edge of March Air Reserve Base near the City of Moreno Valley, Riverside County, California (Figure 1). The K-4 Parcel Project consist of the construction of an approximately 718,000-square-foot industrial warehouse with 289 automobile parking stalls and 317 truck trailer parking stalls on 35 acres of undeveloped land in Assessor's Parcel Numbers 297-150-006, 297-150-007, 297-150-038, 297-160-005, and 297-200-004, and the Cactus Avenue Drainage Channel Improvement Project entails the conversion of an approximately 1.5-mile segment of earthen drainage channel to an underground concrete culvert, along with minor improvements such as extending a number of existing storm drains. The combined project area is located on the south side of Cactus Avenue between Graeber/Elsworth Street and Heacock Street, in Sections 13 and 14 of T3S R4W, San Bernardino Baseline and Meridian (Figures 2, 3). The maximum depth of excavation required for the projects, or the vertical extent of anticipated project impact, will not exceed 10 feet.

The present study is part of the environmental review process for these projects, as required by the March Joint Powers Authority (JPA) in compliance with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The purpose of the study is to provide the JPA and the pertinent federal agencies with the necessary information and analysis to determine whether the proposed projects would adversely affect any significant, nonrenewable paleontological resources and to design a paleontological mitigation program, if necessary. In order to identify any

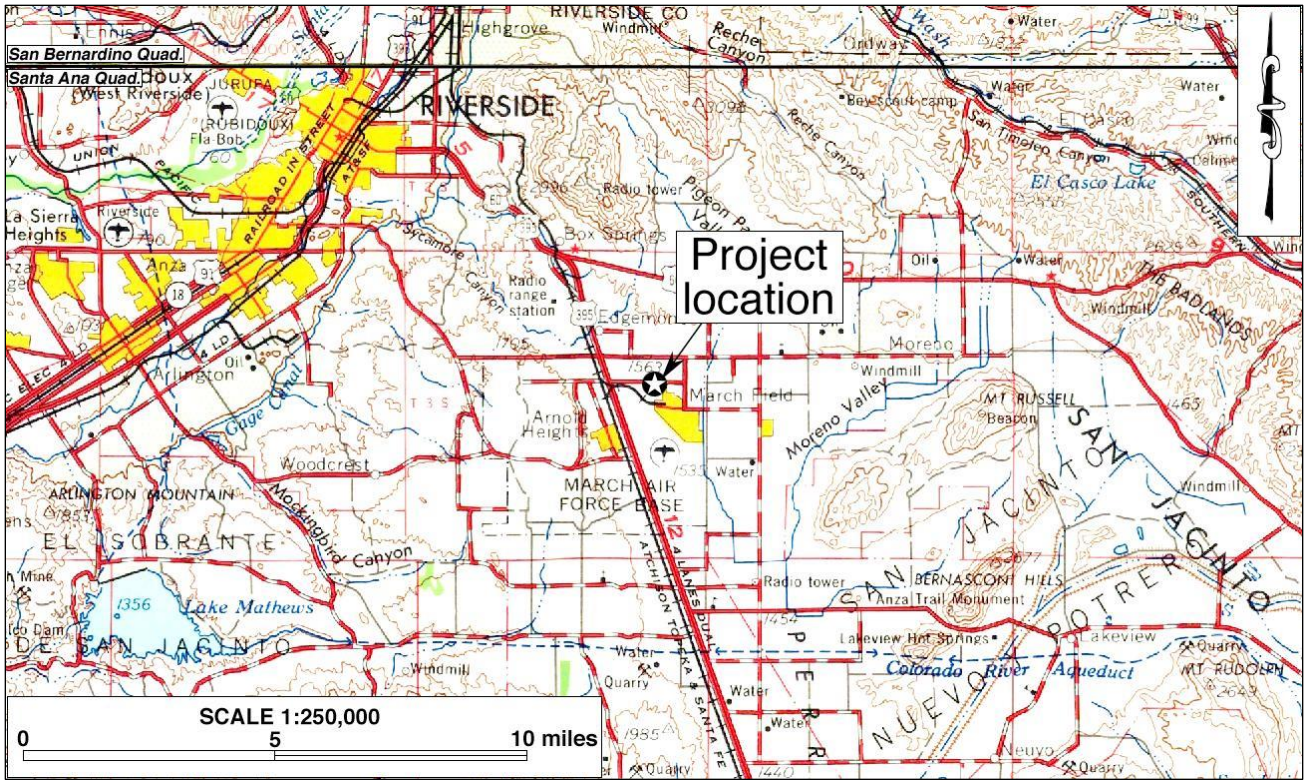


Figure 1. Project vicinity. (Based on USGS San Bernardino and Santa Ana quadrangles, 1969/1979 edition)

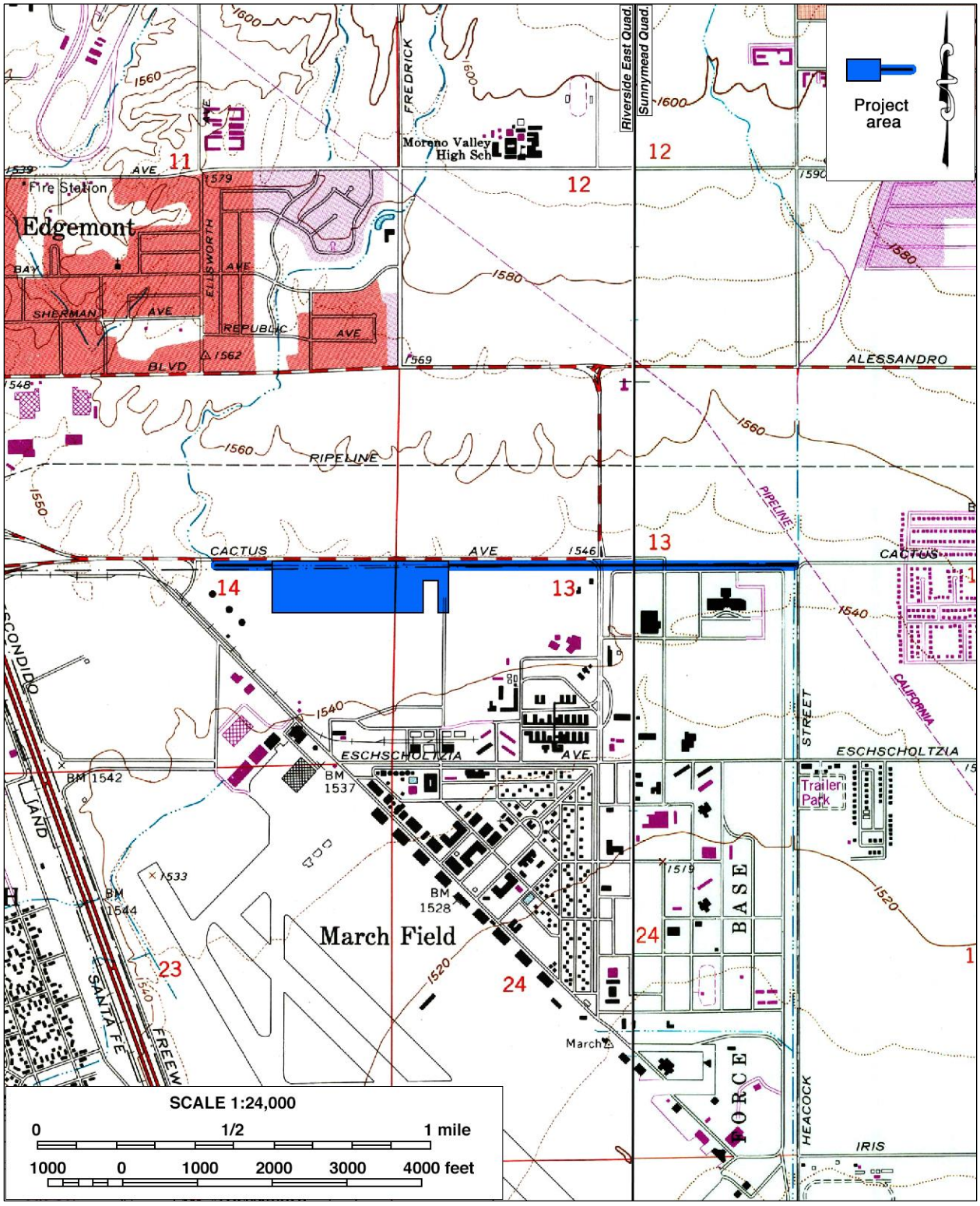


Figure 2. Project area. (Based on USGS Riverside and Sunnymead, Calif., 7.5' quadrangles, 1980 edition)



Figure 3. Aerial view of the project area.

paleontological localities that may exist in or near the project area and to assess the possibility for such resources to be encountered during the projects, CRM TECH initiated a records search at the Western Science Center in Hemet, conducted a literature review, and carried out a systematic field survey of the project area. The following report is a complete account of the methods, results, and final conclusion of this study. Personnel who participated in the study are named in the appropriate sections below, and their qualifications are provided in Appendix 1.

PALEONTOLOGICAL RESOURCES

DEFINITION

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically regarded as older than approximately 12,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene (circa 2.6 million to 12,000 years B.P.) glaciation and the beginning of the current Holocene epoch (circa 12,000 years B.P. to the present).

Common fossil remains include marine shells; the bones and teeth of fish, amphibians, reptiles, and mammals; leaf assemblages; and petrified wood. Fossil traces, another type of paleontological resource, include internal and external molds (impressions) and casts created by these organisms. These items can serve as important guides to the age of the rocks and sediments in which they are contained, and may prove useful in determining the temporal relationships between rock deposits from one area and those from another as well as the timing of geologic events. They can also provide information regarding evolutionary relationships, development trends, and environmental conditions.

Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or because of human disturbances; however, they generally lay buried beneath the surficial soils. Thus, the absence of fossils on the surface does not preclude the possibility of their being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found in the subsurface.

SIGNIFICANCE CRITERIA

According to guidelines proposed by Eric Scott and Kathleen Springer (2003) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

1. The fossils provide information on the evolutionary relationships and developmental trends exhibited among organisms, living or extinct;

2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or the interactions between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; and/or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

PALEONTOLOGICAL SENSITIVITY

The fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical and biological factors. Skeletal tissue with a high percentage of mineral matter is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, however, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of certain parts of the organisms themselves. As a consequence, paleontologists are unable to know with certainty, the quantity of fossils or the quality of their preservation that might be present within any given geologic unit.

Sedimentary units that are paleontologically sensitive are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations within which they are enclosed and, with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine the formation's potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

The paleontological sensitivity for a geologic formation is determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. Determinations of paleontologic sensitivity must consider not only the potential for yielding vertebrate fossils but also the potential of yielding a few significant fossils that may provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology issued a set of standard guidelines intended to assist paleontologists to assess and mitigate any adverse effects/impacts to nonrenewable paleontological resources. The guidelines defined four categories of paleontological sensitivity for geologic units that might be impacted by a proposed project, as listed below (Society of Vertebrate Paleontology 2010:1-2):

- **High Potential**: Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered.
- **Undetermined Potential**: Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment.
- **Low Potential**: Rock units that are poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances.
- **No Potential**: Rock units that have no potential to contain significant paleontological resources, such as high-grade metamorphic rocks and plutonic igneous rocks.

SETTING

March Air Reserve Base is located in a valley floor area in the northern portion of the Peninsular Ranges geomorphic province, which is bounded on the north by the Transverse Ranges province, on the northeast by the Colorado Desert province, and on the west by the Pacific Ocean (Jenkins 1980:40-41; Harms 1996:150). The Peninsular Ranges province extends southward to the southern tip of Baja California (Jahns 1954:Plate 3). The natural landscape in the Transverse Ranges province features a host of inland valleys divided by groups of rolling hills and rocky knolls. The mild Mediterranean climate of the region is typical of inland southern California lowlands, characterized by hot and dry summers and mild and wet winters. The average annual rainfall in the region is approximately 10 inches, the majority of which typically falls seasonally between December and March.

The project area lies on the edge of a high portion of the Perris Block, which was defined by English (1926) as a region between the San Jacinto and Elsinore-Chino fault zones and consisting of a series of tectonically controlled valleys and ridges. The block is bounded on the north by the Cucamonga (San Gabriel) Fault and on the south by a vaguely delineated boundary near the southern end of the Temecula Valley (*ibid*.). The structural blocks are considered to have been active since Pliocene time (Woodford et al. 1971:3421). The Pliocene- and Pleistocene-age non-marine sedimentary rocks found filling the valley areas have produced vertebrate fossils, as well as plant and invertebrate fossil remains (Mann 1955:13).

The project area consists of five parcels of vacant land on the northern perimeter of March Air Reserve Base as well as the right-of-way of the earthen drainage channel across other parcels on the south side of Cactus Avenue between its intersections with Graeber/Elsworth Street and Heacock Street (Figure 3). The terrain in the project area is relatively level except for the channel, with a slight incline to the west, and the elevations range approximately between 1,520 feet and 1,550 feet above mean sea level, including the depth of the channel (Figure 4). Several power transmission lines and stockpiles of imported soil are found in the eastern portion of the K-4 Parcel project site, near a substation located immediately outside the project boundary.

The ground surface in the project vicinity has been disturbed extensively in the past and appears to have been cleared of much of the vegetation recently, except in the drainage channel. Several manholes in the project area suggest the presence of underground utility lines. Surface soil consists mostly of a hardpacked brown silty-clay loam, and vegetation growth, concentrated mainly in the western portion of project area, features solely typical small grasses and shrubs, often in dense growth at the bottom of the channel (Figure 4).



Figure 4. Typical landscapes in the project area. *Left*: overview of the K-4 Parcel project site to the west; *right*: Cactus Avenue Drainage Channel, view to the west from the eastern end. (Photographs taken on June 1 and July 27, 2018)

METHODS AND PROCEDURES

RECORDS SEARCHES

The records search service for this study was provided by the Western Science Center in Hemet, California, which maintains files of regional paleontological localities as well as supporting maps and documents. The records search results were used to identify previously performed paleontological resource assessments as well as known paleontological localities within a one-mile radius of the project area.

LITERATURE REVIEW

In conjunction with the records searches, CRM TECH geologist/paleontologist Harry M. Quinn, California Professional Geologist #3477, pursued a literature review on the project area and vicinity. Sources consulted during the review include primarily topographic, geologic, and soil maps of the Moreno Valley-Riverside area, published geologic literature pertaining to the project location, and other materials in the CRM TECH library and Quinn's personal library, including unpublished reports produced during similar surveys in the vicinity.

FIELD SURVEY

On June 1 and July 27, 2018, CRM TECH paleontological surveyors Salvadore Boites, Nina Gallardo, and Ben Kerridge carried out the field survey of the project area under the direction of Harry M. Quinn. The survey was accomplished by walking a series of parallel north-south transects at 15-meter (approximately 50-foot) intervals across the K-4 Parcel project site and two east-west transects along either side of the drainage channel. In this way, the entire project area was systematically examined for any indications of paleontological remains and to verify the geological formations and the soil types. Ground visibility was good to excellent (80-100 percent) in most of the project area but was reduced to poor (0-5 percent) where soil stockpiles covered the ground surface or dense vegetation growth obscured the bottom of the channel.

RESULTS AND FINDINGS

RECORDS SEARCHES

The Western Science Center found no known paleontological localities within the boundaries of the project area or within a one-mile radius (Radford 2018; see Appendix 2). However, hundreds of localities and thousands of specimens have been reported in areas further away from the project location but from sediment lithologies similar to those that are known to occur in the project vicinity (*ibid.*).

According to the Western Science Center, the project area lies atop very old alluvial fan deposits dating from the early Pleistocene. These deposits are considered to be sensitive for paleontological resources, and any fossils unearthed during the proposed projects would likely be scientifically significant (Radford 2018). Therefore, the Western Science Center assigned the projects a high potential for impacting significant, nonrenewable fossil resources in the surface soils (*ibid.*).

LITERATURE REVIEW

The surface geology within the project area was mapped by Rogers (1965) as *Qal*, or alluvium of Recent (Holocene) age. Morton et al. (2001a; 2001b) mapped the area as $Qvof_a$, or very old alluvial fan deposits of early Pleistocene age, which were described as well dissected, well indurated, reddish-brown sand deposits containing minor amounts of gravel (*ibid.*; Figure 5). Dibblee (2003a; 2003b) mapped the area as *Qa*, or alluvium of Holocene age. According to Dibblee (*ibid.*), *Qa* is composed of alluvial sand, gravel, and clay of valley areas. It is locally covered by soil and rests directly atop *Qoa*, or alluvial fan deposits of Pleistocene age, at an undetermined depth (*ibid.*).

Knecht (1971:Map Sheets 43, 44) mapped the surface soils in the project vicnity as mainly *MmB* with some *RaB2*. *MmB* belongs to the Monserate sandy loam, 0-5 percent slope, and consists of well-drained soils developed in alluvium derived mainly from granitic materials (*ibid.*:46). These soils commonly have layers cemented with dark-brown iron and silica at roughly 28 inches (*ibid.*). *RaB2* belongs to the Ramona sandy loam, 2-5 percent slopes (*ibid.*:53). It tends to be eroded and occurr on alluvial fans and terraces (*ibid.*).

FIELD SURVEY

During the field survey, no evidence of any paleontological resources was observed on the ground surface throughout the project area. The field observations confirmed that the surface sediments in and near the project area had been extensively disturbed in the past, especially along the drainage channel and the various roadways nearby.

DISCUSSION

The geologic and soil maps of the project vicinity indicate that it is an area of outcropping soils developed from the in-place decomposition of underlying igneous rock or washed in as alluvial fan deposits from nearby bedrock outcrops. The surface geology at the project location consists of exposures of locally formed alluvium of Pleistocene and Holocene (Recent) age. Holocene alluvium

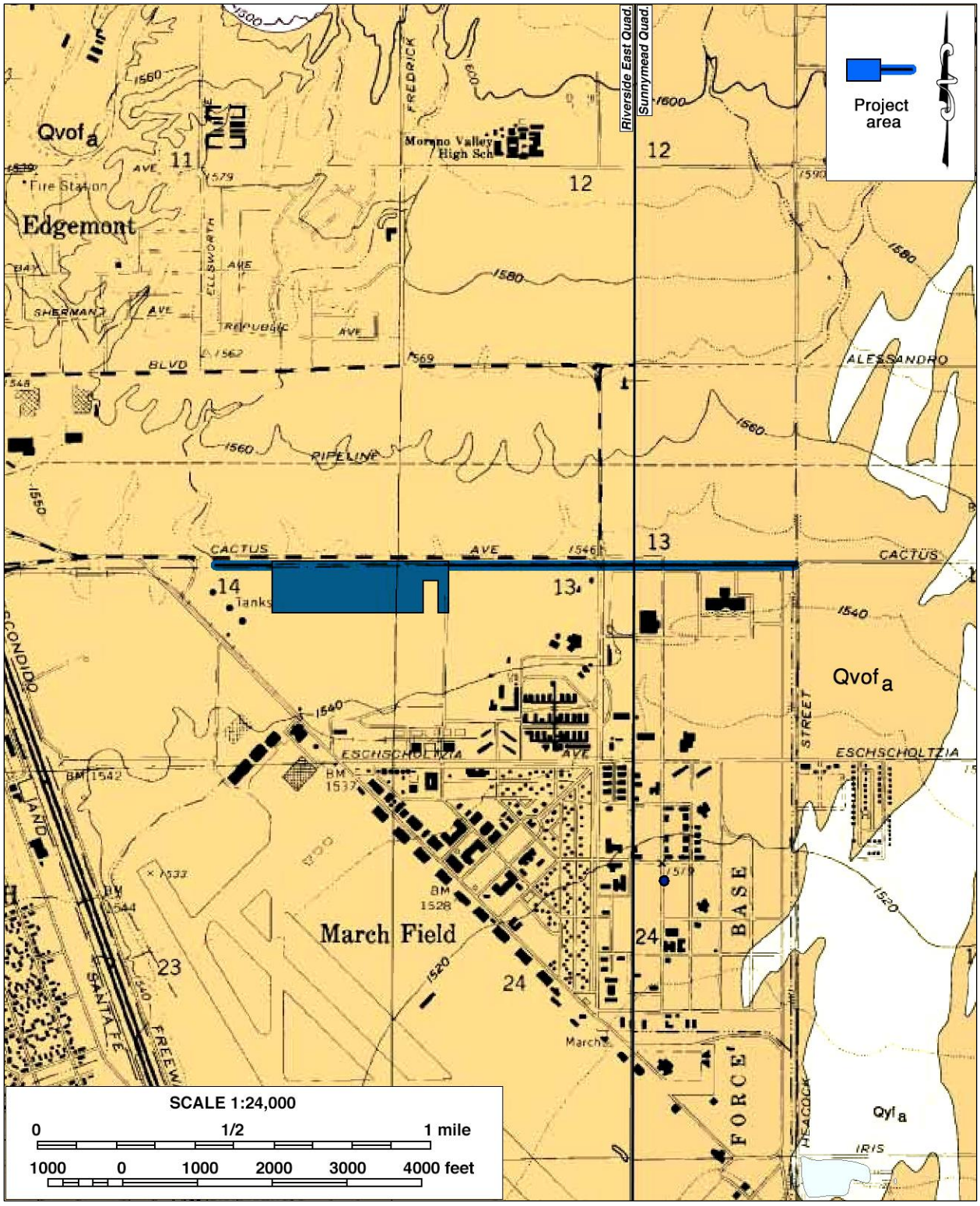


Figure 5. Geologic map of the project vicinity. (Based on Morton et al. 2001a; 2001b)

has a low potential for containing nonrenewable paleontological resources, but these surface sediments rest atop older, Pleistocene-age sediments that have a high potential for such resources. The presence of the Pleistocene alluvium subsurface in the project area may be ascertained from on-site boring logs, should they be available. If boring logs are not available, or if they are not definitive as to the depth of the older sediments, periodic inspection, or "spot-checking," will be needed in the top stratum of soils during the project in order to the determine the age of the sediments being impacted, as discussed further below.

CONCLUSION AND RECOMMENDATIONS

The results of the records searches, literature research, and field survey demonstrate that the proposed projects' potential to impact paleontological resources appears to be low in the surface soils but high in the undisturbed subsurface deposits of older Quaternary age. Based on these findings, CRM TECH recommends that a mitigation program be developed and implemented for the projects to prevent potential impact on significant, nonrenewable paleontological resources or reduce such impact to a level less than significant. The mitigation program should be developed in accordance with the provisions of CEQA as well as the proposed guidelines of the Society of Vertebrate Paleontology (2010), and should include but not be limited to the following:

- All earth-moving operations above the depth of three feet should be monitored periodically to identify the sediments being impacted, and any earth-moving operations reaching beyond the depth of three feet will require continuous monitoring for potential paleontological remains. The monitor should be prepared to quickly salvage fossils, if they are unearthed, to avoid construction delays, but must have the power to temporarily halt or divert construction equipment to allow for removal of abundant or large specimens.
- Samples of sediments should be collected and processed to recover small fossil remains.
- Recovered specimens should be identified and curated at a repository with permanent retrievable storage that would allow for further research in the future.
- A report of findings, including an itemized inventory of recovered specimens and a discussion of their significance when appropriate, should be prepared upon completion of the research procedures outlined above. The approval of the report and the inventory by the March JPA would signify completion of the mitigation program.

Under this condition, CRM TECH further recommends that the proposed projects may be cleared to proceed in compliance with CEQA and NEPA provisions on paleontological resources.

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APPENDIX 1

PERSONNEL QUALIFICATIONS

PROJECT GEOLOGIST/PALEONTOLOGIST
Harry M. Quinn, M.S., California Professional Geologist #3477

Education

1968 M.S., Geology, University of Southern California, Los Angeles, California.
1964 B.S, Geology, Long Beach State College, Long Beach.
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

Professional Experience

2000- Project Paleontologist, CRM TECH, Riverside/Colton, California.
1998- Project Archaeologist, CRM TECH, Riverside/Colton, California.
1992-1998 Independent Geological/Geoarchaeological/Environmental Consultant, Pinyon Pines, California.
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.
1988-1992 Project Geologist/Director of Environmental Services, STE, San Bernardino, California.
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

Previous Work Experience in Paleontology

1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

Memberships

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Association of Environmental Professionals; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

Publications in Geology

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

PALEONTOLOGICAL SURVEYOR
Salvadore Boites, M.A.

Education

2013 M.A., Applied Anthropology, California State University, Long Beach.
2003 B.A., Anthropology/Sociology, University of California, Riverside.
1996-1998 Archaeological Field School, Fullerton Community College, Fullerton, California.

Professional Experience

2014- Project Archaeologist/Paleontological Surveyor, CRM TECH, Colton, California.
- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.
- Paleontological surveys and monitoring at various locations in southern California; fossil recovery; soil sample collection; stratigraphic profile sketches.

2010-2011 Adjunct Instructor, Anthropology, Everest College, Anaheim, California.
2003-2008 Project Archaeologist, CRM TECH, Riverside/Colton, California.
2001-2002 Teaching Assistant, Moreno Elementary School, Moreno Valley, California.
1999-2003 Research Assistant, Anthropology Department, University of California, Riverside.

Research Interests

Cultural Resource Management, Applied Archaeology/Anthropology, Indigenous Cultural Identity, Poly-culturalism.

PALEONTOLOGICAL SURVEYOR
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2014- Project Archaeologist/Paleontological Surveyor, CRM TECH, Colton, California.
- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.
- Paleontological surveys and monitoring at various locations in southern California; fossil recovery; soil sample collection; stratigraphic profile sketches.

2004- Project Paleontologist, CRM TECH, Riverside/Colton, California.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

PALEONTOLOGICAL SURVEYOR/REPORT WRITER
Ben Kerridge, M.A.

Education

2014	Archaeological Field School, Institute for Field Research, Kephallenia, Greece.
2010	M.A., Anthropology, California State University, Fullerton.
2009	Project Management Training, Project Management Institute/CH2M HILL.
2004	B.A., Anthropology, California State University, Fullerton.

Professional Experience

2015- Project Archaeologist/Paleontological Surveyor/Report Writer, CRM TECH, Colton, California.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.
- Paleontological surveys and monitoring at various locations in southern California; fossil recovery; soil sample collection; stratigraphic profile sketches.

2015	Teaching Assistant, Institute for Field Research, Kephallenia, Greece.
2009-2014	Publications Delivery Manager, CH2M HILL, Santa Ana, California.
2010-	Naturalist, Newport Bay Conservancy, Newport Beach, California.
2006-2009	Technical Publishing Specialist, CH2M HILL, Santa Ana, California.

Memberships

Society for California Archaeology; Pacific Coast Archaeological Society

APPENDIX 2

RECORDS SEARCH RESULTS

WESTERN SCIENCE CENTER

December 13, 2018

CRM Tech
Nina Gallardo
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Dear Ms. Gallardo,

This letter presents the results of a record search conducted for the Proposed K-4 Parcel Project (CRM TECH no. 3424P) in unincorporated Riverside County, California. The project site consists of 35 acres located on the south side of Cactus Avenue between Veterans Way and Frederick Street within the March Joint Powers Authority jurisdiction, Township 3 South, Range 4 West, Sections 13 and 14 of the Riverside East and Sunnymead USGS 7.5 minute quadrangles.

The geologic units underlying this project are mapped entirely as very old alluvial fan deposits dating from the early Pleistocene period (Morton & Cox, 1988, 1996-1997). Very old alluvial fan units are considered to be of high paleontological sensitivity. The Western Science Center does not have localities within the project area or within a one mile radius, but does have numerous paleontological sites within similarly mapped Pleistocene alluvial units including the Aldi Distribution Center in Moreno Valley and the Diamond Valley Lake Project in Hemet. Similar Pleistocene alluvial units have resulted in hundreds of fossil localities and thousands of Pleistocene fossil specimens within Riverside County.

Any fossils recovered from the Proposed K-4 Parcel Project area would be scientifically significant. Excavation activity associated with development of the project area would impact the paleontologically sensitive early Pleistocene units and it is the recommendation of the Western Science Center that a paleontological resource mitigation program be put in place to monitor, salvage, and curate any recovered fossils associated with the study area.

If you have any questions, or would like further information about the Aldi Distribution Project or the Diamond Valley Lake Project, please feel free to contact me at dradford@westerncentermuseum.org

Sincerely,

Darla Radford
Collections Manager

Prepared for
K4 and Cactus Channel Improvement Project
Riverside County, California

Prepared by
Ramboll US Corporation
Irvine, California

Project Number
1690008459

Date
December 2018

GREENHOUSE GAS TECHNICAL REPORT

K4 AND CACTUS CHANNEL IMPROVEMENT PROJECT RIVERSIDE COUNTY, CALIFORNIA

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APPENDICES

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Appendix B: EMFAC2017 Model Outputs
Appendix C: County of Riverside Climate Action Plan (CAP) Screening Table

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
ACC	Advanced Clean Cars
ATCM	Air Toxic Control Measure
AQ	air quality
BAAQMD	Bay Area Air Quality Management District
BAU	business-as-usual
CAA	Clean Air Act
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAS	Climate Adaptation Strategy
CAT	Climate Action Team
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH4	methane
CHP	combined heat and power
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
CRRC	Cool Roof Rating Council
DFW	California Department of Fish and Wildlife
DOE	Department of Energy
DOT	Department of Transportation
EF	emission factor
EIR	Environmental Impact Report
EISA	Energy Independence and Security Act
EMFAC	EMission FACtors model
EO	Executive Order
EPA	Environmental Protection Agency
EV	Electric vehicle
GHGs	greenhouse gas
GP	General Plan
GWP	specific global warming potential

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ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

HDV	Heavy duty vehicle
HFCs	hydrofluorocarbons
HVAC	Heating, Ventilation and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
ITE	Institute of Transportation Engineers
JPA	Joint Powers Authority
LCFS	Low Carbon Fuel Standard
MM	Mitigation measure
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSW	Municipal solid waste
MT	Metric tonnes
$MTCO_2e$	metric tonnes of CO_2 equivalent
MW	megawatts
MWh	megawatt-hour
N_2O	Nitrogen Dioxide
NAS	National Academy of Sciences
NHTSA	National Highway Traffic Safety Administration
NOx	Oxides of Nitrogen
OPC	Ocean Protection Council
PFCs	perfluorocarbons
PV	Photovoltaic
RFS	Renewable Fuel Standard
RPS	Renewable Portfolio Standards
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Communities Strategy
SEER	Seasonal energy efficiency ratio
SF_6	sulfur hexafluoride
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCPs	short-lived climate pollutants
SP	service population

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ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

TAZ	Traffic analysis zone
TBD	To be determined
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
yr	year
WCI	Western Regional Climate Action Initiative
ZEV	Zero emission vehicles
ZNE	zero net energy

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EXECUTIVE SUMMARY

K4 and Cactus Channel Improvement Project proposes a high-cube fulfillment center warehouse for industrial use in Riverside County, California, known as the K4 and Cactus Channel Improvement Project (the Project). The Project includes an approximately 718,000 square feet building on an approximately 35.4-acre site that includes surface parking areas for automobiles and truck trailers, and a 7.0-acre drainage channel (Cactus Avenue Channel) bordering the parcel to the north (south side of Cactus Avenue). The warehouse development will be used up to 7 days per week and 24 hours per day. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site.

This Project will result in both one-time and annual direct and indirect emissions of greenhouse gases (GHGs). The term, "direct emissions of GHGs" refers to GHGs that are emitted directly as a result of the project and include land use change and construction emissions. Indirect emissions are those emissions that the Project will enable, but that are not controlled by the Project proponent. This report discusses the scientific and regulatory developments surrounding global climate change and provides an inventory surveying the emissions that would result from approving the Project.

Employees and patrons of buildings and services use electricity and heating and are transported by motor vehicles. These activities directly or indirectly emit GHGs. The most significant GHG emissions resulting from such industrial developments are emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). GHG emissions are typically measured in terms of tonnes of CO_2 equivalents (CO_2e), calculated as the product of the mass emitted of a given GHG and its specific global warming potential (GWP).

The GHG emissions inventory for this analysis includes the following sources of emissions: energy use, mobile sources, area sources, solid waste, water and wastewater, vegetation change, and construction. The ongoing operational emissions consist of the first five categories, while the one-time emissions are associated with the vegetation change and construction. This report includes the direct emissions associated with the Project as well as the indirect emissions that may result from the Project. These indirect emissions are associated with electricity generation, the embodied energy used in supplying potable water, and emissions associated with solid waste disposal. The electrical power for the Project will be supplied by Southern California Edison (SCE). Accordingly, indirect GHG emissions from electricity usage are calculated using the SCE carbon-intensity factor.

This analysis primarily utilized the California Emission Estimator Model version 2016.3.2 (CalEEMod®)[1] to assist in quantifying the GHG emissions in the inventories presented in this report for the Project. CalEEMod® is a statewide program designed to calculate both criteria and GHG emissions from development projects in California. Third-party studies were also relied upon to support analyses and assumptions made outside of CalEEMod®. CalEEMod® incorporates EMFAC2014 to calculate mobile source emissions. EMFAC2014 has been superseded by EMFAC2017.[2] In order to allow a more

[1] California Air Pollution Control Officers Association (CAPCOA). 2017. California Emissions Estimator Model. Available at: http://www.CalEEMod.com/. Accessed: August 2018.

[2] EMFAC2017 was initially released by the California Air Resources Board (CARB), which establishes California's air quality regulations, on December 22, 2017 and then updated on March 1, 2017. USEPA is currently reviewing this model to determine if it can be used in State Implementation Plans and conformity modeling. Since this

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accurate representation of mobile source operational emissions associated with the Project, mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology and defaults along with Project specific values where available.

At this time, there are no adopted numeric thresholds that govern the determination of the significance of the Project's GHG emissions. The South Coast Air Quality Management District (SCAQMD or District) has not adopted a quantification methodology or a significance threshold for GHG emissions from land use development projects.[3] However, the District did release a tiered approach in September 2008 as discussed by the SCAQMD GHG working group for discussion purposes. This Greenhouse Gas Technical Report assesses the significance of GHG impacts using three different methodologies consistent with the tiered approach discussed by the District. Each of the three methodologies is a separate and independent ground for the significance determination, which are: 1) consistency and compliance with applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32; 2) consistency with County of Riverside Climate Action Plan (CAP); and 3) consistency with the Southern California Association of Governments (SCAG) RTP/SCS as it relates to SB 375 reduction targets. Additionally, this Greenhouse Gas Technical Report includes a comparison of the Project's GHG emissions to a SCAQMD service population efficiency for informational purposes. The conclusions of these evaluations are summarized below:

1. As outlined in Section 4, the Project is consistent and compliant with a number of statewide and local regulatory programs. These programs will help the state reach the GHG reduction goals as included in the Climate Change Scoping Plan.
2. The Project is also consistent with the CAP. The results of the screening analysis show that the Project would meet the point requirements of the CAP.
3. The Project was evaluated for consistency with the SCAG RTP/SCS and SB 375 reduction targets. The results of the consistency analysis show that the Project is within the growth projections for the area.
4. The Project emissions are presented in **Table ES-1**. Both the one-time emissions and emissions that are expected to occur each year after build-out of the Project are presented. One-time emissions from construction were amortized over a 30-year period because no significance threshold has been adopted for construction GHG emissions.[4] The Project's estimated operational GHG emissions plus amortized construction emissions were evaluated for service population efficiency. A summary of GHG emissions for the service population efficiency analysis is presented in **Table ES-2**. As shown in this table, dividing the total Project 2020 scenario mitigated GHG emissions by the estimated service population yields an efficiency metric of 6.02 MT CO_2e per service population per year. This is based on a project emissions inventory to ensure an apples-to-

report has been prepared for CEQA purposes, and CEQA is a state regulation, EMFAC2017 (the most current version of the model released by CARB) was used.

[3] SCAQMD has adopted interim significance thresholds for industrial sources of 10,000 metric tons of carbon dioxide equivalents per year. The Board adopted these December 5, 2008. These thresholds are not applicable to the Project because it is not an industrial source of CO_2e emissions. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2. Accessed: August 2018.

[4] This approach to one-time construction and vegetation change GHG emissions is based on the GHG Threshold Working Group Meeting #13 Minutes from August 26, 2009. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-13/ghg-meeting-13-minutes.pdf?sfvrsn=2. Accessed: August 2018.

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apples analysis for the project emission and service population. This comparison is provided for informational purposes.

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1. INTRODUCTION

The purpose of this technical report is to present the analyses that were used to evaluate the Project's greenhouse gas (GHG) emissions. Emissions during both construction and operations of the Project were quantified. Legislation and rules regarding climate change, as well as scientific understanding of the extent to which different activities emit GHGs, continue to evolve; as such, the inventory in this report is a reflection of the guidance and knowledge currently available.

1.1 Project Description

K4 and Cactus Channel Improvement Project (the Project) proposes a high-cube fulfillment center warehouse for industrial use in Riverside County, California, known as the K4 and Cactus Channel Improvement Project (the Project). The Project is a building consisting of approximately 718,000 square feet on an approximately 35.4-acre site that includes surface parking areas for automobiles and truck trailers. The warehouse development will be used up to 7 days per week and 24 hours per day. Additionally, the Project would include implementing regional improvements to the 7-acre Cactus Avenue Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the Riverside County Flood Control District and Water Conservation District ("District") and it would either be constructed contemporaneously with the project or built separately depending on permitting and timing. The channel would function as part of the District's Master Plan and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan. Currently, the site is vacant land. The Project site is located south of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. The project site is located within the March joint Powers Authority (JPA) jurisdiction in unincorporated Riverside County, California. Interstate 215 (I-215) is located approximately 0.8 miles west of the Project site. The closest residential land uses are located approximately 0.5 miles to the north and southeast of the Project Site. The proposed Project land use summary is presented in **Table 1.**

Analysis of the Project's GHG emissions incorporates the following regulatory measures and mitigation measures:

Regulatory Measures

- Pavley regulation mandating higher fuel efficiency standards for cars and light-duty vehicles and the Advanced Clean Cars are included in vehicle emissions estimate for the Project;
- In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the United States Environmental Protection Agency (USEPA) and the National Highway Traffic Safety Administration (NHTSA) announced fuel economy and GHG standards for

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medium- and heavy-duty trucks, which applies to vehicles from model year 2014-2018.[5] USEPA and NHTSA have adopted standards for CO_2 emissions and fuel consumption, respectively, tailored to each of three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to USEPA, this program will reduce GHG emissions and fuel consumption for affected vehicles by 9 percent to 23 percent. As part of the regulatory package for the HDV GHG Regulation, California Air Resources Board (CARB) implemented the Drayage Truck Regulation and Truck and Bus Regulation.

- The Project will also benefit from USEPA/NHTSA advanced fuel economy and GHG standards (Phase 2) which were adopted in 2016 for medium- and heavy-duty trucks for model years 2018 and beyond.6
- The California Energy Commission's (CEC) 2016 Building Energy Efficiency Standards (Title 24) are the currently applicable building energy efficiency standards and became effective on January 1, 2017. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards.[7]
- California Green Building Code regulation to reduce indoor potable water use by 20% using water saving fixtures and/or flow restrictors is included in the water use and emissions estimate for the Project.
- The California Integrated Waste Management Act of 1989 requiring diversion of 50 percent of all solid waste after January 1, 2000, through source reduction, recycling, and composting facilities and also indicates that 75 percent of all solid waste will be recycled or composted by 2020 and annually thereafter.[8] In August 2015, CalRecycle released AB 341 Report to the Legislature, which identifies strategies to achieve the 75 percent goal.

Mitigation Measures

- **MM-GHG-1:** The applicant shall incorporate MM-AQ-1 (Construction Equipment Emissions Standards), MM-AQ-2 (Low-VOC Architectural Coatings), MM-AQ-3 (Construction Relations Officer), MM-AQ-4 (Improved Energy Efficiency and Water Reduction), MM-AQ-5 (Commute Trip Reduction), and MM-AQ-6 (Truck Requirements).
- MM-AQ-1 and MM-AQ-2 are not quantified as a part of the GHG analyses as these measures pertain to criteria air pollutants only. As a conservative approach, the

[5] United States Environmental Protection Agency, Office of Transportation and Air Quality. 2011. EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium-and Heavy-Duty Vehicles. August. Available at: http://www.epa.gov/otaq/climate/documents/420f11031.pdf. Accessed: August 2018.

[6] USEPA, Office of Transportation and Air Quality. 2016. Available at: https://www3.epa.gov/otaq/climate/documents/420f16044.pdf. Accessed: August 2018.

[7] CEC. 2015. 2016 Building Energy Efficiency Standards – Frequently Asked Questions. Available at: http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf. Accessed: August 2018.

[8] Available online at http://www.calrecycle.ca.gov/75percent/Plan.pdf. Accessed: August 2018.

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reductions from MM-AQ-3, MM-AQ-5, and MM-AQ-6 were not quantified due to lack of clarity on the quantity of reductions associated with these mitigation measures.

As discussed in Section 3.6.1.2, the following portions of MM-AQ-4 were quantified:

- The Project will install approximately 4.5 MW of solar photovoltaic electricity generation.
- The Project will install Energy Star certified light bulb and lighting fixtures.
- The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations.

The mitigation measure (MM-GHG-1) discussed above reflects the requirements from the from Riverside CAP screening analysis as discussed in Section 4.2.

1.2 Existing Conditions

As noted above, the Project site is currently vacant land. The plot of land is located with a United States Air Force base to the south and an industrial area to the north.

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2. DRAFT SIGNIFICANCE THRESHOLDS AND REGULATORY BACKGROUND

2.1 Regulatory Setting

The following regulations relate to the calculation of the Project's GHG emissions.

2.1.1 International Treaties and Other Developments

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. It was adopted in Kyoto, Japan, on December 11, 1997 and entered into force on February 16, 2005. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The targets amount to an average of five percent reduction against 1990 levels over the five-year period 2008-2012. The major distinction between the Protocol and the Convention is that while the Convention encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."[9]

Negotiations after Kyoto have continued in an attempt to address the period after the first "commitment period" of the Kyoto Protocol, concluded at the end of 2012. In Durban, South Africa in 2011, parties to the protocol agreed in principle to negotiate a new comprehensive and legally binding climate agreement by 2015 and to enter it into force for all parties starting from 2020. However, significant divisions remain in determining the parameters of any such new protocol, including its enforcement mechanisms and the degree to which developing economies will begin to be subject to binding emissions targets.

During the Paris Climate Conference (21st Conference of the Parties or COP) on December 12, 2015, parties to the United Nations Framework Convention on Climate Change (UNFCCC) reached "a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future." The Paris Agreement aims to limit global warming to "well below 2 degrees Celsius above pre-industrial levels".[10] On August 4, 2017 President Trump's administration delivered an official notice for the United States of America to withdraw from the Paris Agreement.[11] Under Article 28 of the Agreement, the United States of America is required to stay in the pact until at least 2019.[12]

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9 United Nations, 1998. Kyoto Protocol to the United Nations Framework Convention on Climate Change. Available at: https://unfccc.int/sites/default/files/kpeng.pdf. Accessed: August 2018.

10 United Nations, 2015. What is the Paris Agreement? Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement. Accessed: February 2019.

11 United Nations, 2017. C.N.464.2017.TREATIES-XXVII.7.d (Depositary Notification), United States of America: Communication. Available at: https://treaties.un.org/doc/Publication/CN/2017/CN.464.2017-Eng.pdf. Accessed: February 2019.

12 United Nations, 2017. UN officially notified of US intention to withdraw from Paris climate pact. Available at: https://news.un.org/en/story/2017/08/562872-un-officially-notified-us-intention-withdraw-paris-climate-pact. Accessed: February 2019.

2.1.2 Federal

2.1.2.1 Supreme Court Ruling in Massachusetts et al. v. Environmental Protection Agency

In April 2007, in Massachusetts v. EPA, the U.S. Supreme Court directed the Administrator of the U.S. Environmental Protection Agency (USEPA) to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the USEPA Administrator was directed to follow the language of Section 202(a) of the Clean Air Act (CAA). In December 2009, the Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA. By regulating the emissions of GHGs from new motor vehicles, energy conservation benefits typically result through increased engine efficiency and the reduced consumption of petroleum-based fuels (e.g., gasoline).

2.1.2.2 Federal Vehicle Standards

In response to the *Massachusetts v. EPA* decision discussed above, in 2007, President Bush directed the USEPA, the Department of Transportation (DOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and, in 2010, the USEPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intended to set standards for model years 2022–2025 in a potential future rulemaking. The standards for model years 2022-2025 were not finalized due to a statutory requirement that prevents NHTSA from setting average fuel economy standards for more than 5 years at a time.[13]

[13] EPA and NHTSA, 2012. Federal Register - 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, PDF pg. 5. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-21972.pdf. Accessed: October 2018.

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In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, the USEPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion MT and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[14]

In August 2018, The USEPA and NHTSA released a notice of proposed rulemaking called Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks (SAFE Vehicles Rule). This rule would modify the existing Corporate Average Fuel Economy (CAFE) standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards covering model years 2021 through 2026. SAFE standards are expected to uphold model year 2020 standards through 2026.[15]

2.1.2.3 Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

[14] EPA and NHTSA, 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: August 2018.

[15] NHTSA, 2018. The Safer Affordable Fuel-Efficient 'SAFE' Vehicles Rule. Available at: https://www.nhtsa.gov/corporate-average-fuel-economy/safe. Accessed: October 2018.

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2.1.3 Multi-State/Regional

2.1.3.1 The Western Regional Climate Action Initiative (WCI)

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states including California and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region's electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated this would require 2007 levels to be reduced worldwide between 50 and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. CARB's planned Cap-and-Trade Program, discussed below, is also intended to link California and the other member states and provinces. As of January 1, 2014, California's Cap-and-Trade Program is linked to Quebec's pursuant to the Agreement Between the CARB and the Gouvernement du Québec Concerning the Harmonization and Integration of Cap-and-Trade Programs Reducing Greenhouse Gas Emissions, in accordance with the direction in CARB Board Resolution 13-7 (CARB 2013b). As of January 1, 2018, California's Cap-and-Trade Program along with Québec's Program linked with Ontario's Cap-and-Trade Program (Ontario Program). However, on July 3, 2018 the Ontario government revoked its cap-and-trade regulation. With Ontario's withdrawal from the linked program, California and Québec will work together to ensure environmental integrity and stringency of the Cap-and-Trade program/market is sustained.[16]

2.1.3.2 Pacific Coast Action Plan on Climate and Energy

On October 28, 2013, the Governors of California, Oregon, and Washington and the Premier of British Columbia (together known as the Pacific Coast Collaborative or PCC) signed a clean energy pact, known as the Pacific Coast Action Plan on Climate and Energy (Pacific Coast Action Plan). In 2016, the cities of Los Angeles, Oakland, Portland, San Francisco, Seattle, and Vancouver joined the PCC through the Pacific North America Climate Leadership Agreement. Although the Action Plan does not impose legally enforceable obligations and lacks a specific schedule for implementation, the pact sets out a number of goals and aspirational measures. The Action Plan calls upon each of the parties to undertake a number of measures to address the use of carbon-based fuels in the transportation sector, including the adoption or maintenance of low-carbon fuel standards, the development of targets and action plans in order to encourage public and private investment in low-carbon commercial fleets that use alternative fuels, and the expansion of the sale of zero-emissions vehicles (ZEV). PCC's goal for a low-carbon transportation system includes achieving a hundred percent ZEV in all new passenger vehicle sales by 2050 and working with urban transit agencies to procure only zero-emission transit buses by 2025.[17]

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[16] California Air Resources Board, 2018. Cap-and-Trade Program Linkage. Available at: https://www.arb.ca.gov/cc/capandtrade/linkage/linkage.htm. Accessed: September 2018.

[17] Pacific Coast Collaboration. Vision and Roadmap for a Low-Carbon Pacific Coast Transportation System. Available at: https://pacificcoastcollaborative.org/wp-content/uploads/2018/09/PCC-Low-Carbon-Transportation-Vision-and-Roadmap.pdf. Accessed: September 2018.

2.1.4 State

2.1.4.1 Executive Order S-3-05

In 2005, former Governor Schwarzenegger signed Executive Order (EO) S-3-05, which established the following statewide GHG emission reduction goals for California: (1) by 2010, reduce GHG emissions to 2000 levels; (2) by 2020, reduce GHG emissions to 1990 levels; and (3) by 2050, reduce GHG emissions to 80 percent below 1990 levels.

2.1.4.2 Assembly Bill 32

Assembly Bill (AB) 32 (Nunez, 2006), the California Global Warming Solutions Act of 2006, entails that statewide GHG emissions be reduced to 1990 levels by 2020. In order to achieve this reduction mandate, AB 32 requires CARB to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

In 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan). In the Scoping Plan, CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of approximately 28.5 percent from the otherwise projected 2020 emissions level; i.e., those emissions that would occur in 2020, absent GHG-reducing laws and regulations (referred to as "Business-As-Usual" [BAU]).[18] Multiple Scoping Plan measures broadly cover emissions associated with new residential and commercial land use development, including, but not limited to:

- Energy Efficiency/Green Buildings: The Scoping Plan highlights the importance of energy efficiency efforts in reducing GHG emissions from residential and commercial development and indicates that zero net energy (ZNE) should be the overarching and unifying concept for energy efficiency.
- Regional Transportation-Related GHG Targets (SB 375): The Scoping Plan relies on Senate Bill (SB) 375, discussed above, as an important mechanism to reduce mobile GHG emissions by integrating land use planning and transportation planning at the regional and local level.
- Vehicle Emissions: The Scoping Plan relies on various engine, fuel and other efficiency improvement programs, and increasing electrification of the vehicle fleet.
- Cap-and-Trade Program: The Scoping Plan identifies the Cap-and-Trade program as a lynchpin, overarching strategy for California to reduce GHG emissions. As explained in the Scoping Plan, the program's implementing regulations provide assurance that California's 2020 limit will be met because the regulation sets a firm limit on 85 percent of California's GHG emissions.

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (2014 First Update).[19] The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on

[18] CARB, Climate Change Scoping Plan: A Framework for Change (December 2008), p. 12.

[19] Health & Safety Code Section 38561(h) requires CARB to update the Scoping Plan every five years.

track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.[20]

Most recently, on December 14, 2017, CARB approved the 2017 Climate Change Scoping Plan (Second Update).[21] This update identifies CARB's strategy for achieving the state's 2030 GHG target as established in SB 32 (discussed below).The strategy includes continuation of the Cap-and-Trade Program through 2030, and incorporates a Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration and a more stringent target for the Low Carbon Fuel Standard by 2030. The Second Update also incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017) and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon.

2.1.4.3 Executive Order B-30-15

In April 2015, Governor Brown signed EO B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05. Additionally, the EO directed CARB to update its Scoping Plan (see discussion above) to address the 2030 goal.

2.1.4.4 Senate Bill 32 and Assembly Bill 197

Enacted in 2016, SB 32 (Pavley, 2016) codifies the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

SB 32 was coupled with a companion bill: AB 197.[22] Designed to improve the transparency of CARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning statewide programs, policies, and investments related to climate change. AB 197 also requires CARB to make certain GHG emissions inventory data publicly available on its website; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG emission reductions; and, include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

2.1.4.5 Supreme Court Ruling in Center for Biological Diversity. v. California Fish and Wildlife

In its recent decision, *Center for Biological Diversity v. Department of Fish and Wildlife,* S217763 (*Newhall*), the Court evaluated the California Department of Fish and Wildlife's (DFW) analysis of potential impacts caused by GHG emissions contained in the Environmental Impact Report (EIR) for the proposed land development called Newhall

[20] Ibid. at p. 34.

[21] CARB. 2017. 2017 Climate Change Scoping Plan Update. December. Available at: https://www.arb.ca.gov/board/res/2017/res17-46.pdf. Accessed: February 2019.

[22] AB 197, Eduardo Garcia. State Air Resources Board: greenhouse gases: regulations. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB197. Accessed: August 2018.

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Ranch. In the EIR, the DFW analyzed GHG emissions under AB 32, using the BAU comparison as its sole criterion of significance.

In *Newhall*, the California Supreme Court concluded that a finding of consistency with meeting statewide emission reduction goals is a legally permissible criterion of significance when analyzing potential impacts of GHG emissions under CEQA. However, the Court found that the EIR's conclusion that the project's emissions would be less than significant under that criterion was not supported by substantial evidence and remanded back to the appellate court the narrow issue of whether substantial evidence supported the application of AB 32 statewide GHG reduction goal of 29% to new land use projects.

The Court then identified "potential options" for lead agencies evaluating cumulative significance of a proposed land use development's GHG emissions in future CEQA documents:

1. Business As Usual (BAU) Model: While the Court cautioned that the Scoping Plan may not be appropriate at the project-level, the BAU model might be used to determine what level of reduction from business as usual a new land use development at the proposed location must contribute in order to comply with statewide goals pursuant to AB 32.
2. Compliance With Regulatory Programs Designed To Reduce Greenhouse Gas Emissions: The Court suggests that a lead agency could rely on a showing of compliance with regulatory programs designed to reduce greenhouse gas emissions. The Court clarifies that a significance analysis based on compliance with such statewide regulations only goes to impacts within the area governed by the regulations.
3. Local Climate Action Plan Or Other "Geographically Specific Greenhouse Gas Emission Reduction Plans": The Court points out that these plans may provide a basis for the tiering or streamlining of project-level CEQA analysis, so long as the plan is "sufficiently detailed and adequately supported." Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
4. Regional Sustainable Community Strategy (SCS): The Court also articulates that a lead agency need not additionally analyze greenhouse gas emissions from cars and light trucks in CEQA documents for certain residential, mixed use and transit priority projects that are consistent with an applicable SCS adopted pursuant to SB 375.
5. Numerical GHG Significance Thresholds: Although noting that use of such thresholds are not required, the Court favorably cited to the (Bay Area Air Quality Management District) BAAQMD GHG significance thresholds, which are based on compliance with AB 32, and use a "service population" GHG ratio threshold for land use projects and a 10,000-ton annual GHG emission threshold for industrial projects. The Court remanded for further consideration the application of the 29% overall Scoping Plan metric, which is used by several Air Districts and, like the favorably-cited BAAQMD metric, is based on AB 32.

Citing to Executive Order Nos. S-3-05 and B-30-15, the Court cautioned that those EIRs taking a goal-consistency approach to CEQA significance may in the future need to consider the project's effects on meeting emissions reduction targets beyond 2020.

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2.1.4.6 Executive Order B-55-18

On September 10, 2018, Governor Brown signed EO B-55-18, to achieve carbon neutrality by moving the state of California to hundred percent clean energy by 2045. This EO also includes specific measures to reduce GHG emissions via clean transportation, energy efficient buildings, directing cap-and-trade funds to disadvantaged communities, and better management of state's forest land.[23]

2.1.4.7 Energy-Related Sources

a) Renewable Portfolio Standards (SB 1078; SB 107; SBX1-2; and SB 100)

As most recently amended by SB 350,[24] California's Renewables Portfolio Standard Program requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 40 percent of total retail sales by 2024, 45 percent of total retail sales by 2027, and 50 percent of total retail sales by 2030. On September 10, 2018 the goals of this standard were revised to a 50 percent renewable resources target by December 21, 2026, and to a 60 percent target by December 31, 2030.[25]

b) GHG Emissions Standard for Baseload Generation (SB 1368)

SB 1368 (September 29, 2006) prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated both within and outside of California, and to publicly owned as well as investor-owned electric utilities.

c) Building Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The California Energy Commission's (CEC) 2016 Building Energy Efficiency Standards (2016 Building Standards), which become effective on January 1, 2017, are the most current version of these standards.

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen) and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality.

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[23] State of California, Executive Department, 2018. Executive Order B-55-18 To Achieve Carbon Neutrality. Available at: https://www.gov.ca.gov/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf. Accessed: September 2018.

[24] SB 350, De León. Clean Energy and Pollution Reduction Act of 2015. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350. Accessed: August 2018.

[25] SB 100, De León. California Renewables Portfolio Standard Program. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201720180SB100. Accessed: September 2018.

The 2016 Title 24 standards are the currently applicable building energy efficiency standards and became effective on January 1, 2017. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards.[26]

The Title 24 standards are updated on an approximately three-year cycle. The 2019 standards will continue to improve upon the 2016 Standards for new construction of, and additions and alterations to, residential and nonresidential buildings. The 2019 Standards will go into effect on January 1, 2020.[27] The 2019 standards require solar photovoltaic systems for newly constructed single-family homes. The standards have also introduced requirements for new healthcare facilities.

2.1.4.8 Mobile Sources

a) Sustainable Communities Strategy Plans

SB 375 (Steinberg, 2008), the Sustainable Communities and Climate Protection Act, coordinates land use planning, regional transportation plans, and funding priorities to reduce GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options. SB 375 specifically requires the Metropolitan Planning Organization (MPO) relevant to the Project area (here, Southern California Association of Governments [SCAG]) to include a Sustainable Communities Strategy in its Regional Transportation Plan (RTP) that will achieve GHG emission reduction targets set by CARB by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities.

For the area under SCAG's jurisdiction, including the Project Site, CARB adopted regional targets for reduction of mobile source-related GHG emissions by 8 percent for 2020 and by 13 percent for 2035.

b) Pavley Regulations

AB 1493 (Pavley, 2002) required CARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. CARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal preemption concerns.

c) Low Carbon Fuel Standard

EO S-1-07, as issued by former Governor Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020.[28] In response, CARB approved the Low Carbon Fuel Standard (LCFS)

[26] CEC. 2015. 2016 Building Energy Efficiency Standards – Frequently Asked Questions. Available at: http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2016_Building_Energy_Efficiency_Standards_FAQ.pdf. Accessed: August 2018.

[27] CEC. 2019 Building Energy Efficiency Standards. Available at: https://www.energy.ca.gov/title24/2019standards/index.html. Accessed: August 2018.

[28] Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "lifecycle" of a transportation fuel.

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regulations in 2009, which became fully effective in April 2010. Thereafter, a lawsuit was filed challenging CARB's adoption of the regulations; and, in 2013, a court order was issued compelling CARB to remedy substantive and procedural defects of the LCFS adoption process under CEQA.[29] However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. In September 2015, CARB re-adopted the LCFS regulations.

d) Advanced Clean Cars Program

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for non-commercial passenger vehicles and light-duty truck for model years 2017-2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions.

e) Zero Emission Vehicles

Zero emission vehicles (ZEVs) include hydrogen fuel cell electric vehicles and plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles.

In 2012, Governor Brown issued EO B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet in order to help California achieve a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. In furtherance of that statewide target for the transportation sector, the EO also calls upon CARB, the CEC and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure.

EO B-16-2012 specifically directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth, and improve the quality of life in the state."[30]

2.1.4.9 Solid Waste Diversion

California Integrated Waste Management Act of 1989 and Assembly Bill 341

The California Integrated Waste Management Act of 1989, as modified by AB 341 ,[31] requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; (2) diversion of 50 percent of all solid waste on and after January 1, 2000; and (3) source reduction, recycling and composting of 75 percent of all solid waste on or after 2020, and annually thereafter. The California Department of Resources Recycling and Recovery (CalRecycle) is required to develop strategies, including source reduction, recycling, and composting activities, to achieve the 2020 goal.

[29] *POET, LLC v. CARB* (2013) 217 Cal.App.4th 1214.

[30] Executive Order B-16-2012. Available at: https://www.gov.ca.gov/news.php?id=17472. Accessed: August 2018.

[31] AB 341, Chesbro. Solid waste: diversion. Available at: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB341. Accessed: August 2018.

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CalRecycle published a discussion document, entitled *California's New Goal: 75 Percent Recycling,* which identified concepts that would assist the State in reaching the 75 percent goal by 2020. Subsequently, in August 2015, CalRecycle released the *AB 341 Report to the Legislature*, which identifies five priority strategies for achievement of the 75 percent goal: (1) moving organics out of landfills; (2) expanding recycling/ manufacturing infrastructure; (3) exploring new approaches for State and local funding of sustainable waste management programs; (4) promoting State procurement of post-consumer recycled content products; and, (5) promoting extended producer responsibility.

2.1.4.10 Other Potentially Applicable State Regulations or Policies

a) Executive Order S-13-08

On November 14, 2008, Governor Arnold Schwarzenegger signed Executive Order S-13-08, which called on State agencies to develop a strategy for identification of and preparation for expected climate change impacts in California. The resulting 2009 California Climate Adaptation Strategy (CAS) report was developed by the California Natural Resources Agency in coordination with the Climate Action Team (CAT). The report presents the best available science relevant to climate impacts in California and proposes a set of recommendations for California decision-makers to assess vulnerability and promote resiliency in order to reduce California's vulnerability to climate change. Guidance regarding adaptation strategies is general in nature and emphasizes incorporation of strategies into existing planning policies and processes. An update to the CAS report was released for public comment by the end of 2013.[32]

In addition to requiring the CAT to create a Climate Adaptation Strategy, Executive Order S-13-08 ordered the creation of a comprehensive Sea Level Rise Assessment Report. The report, published in June 2012, indicates that the sea level along most of California's coast is expected to rise about 1 meter over the next century and is likely to increase the risk of damage in the form of flooding, coastal erosion, and wetland loss due to storm surges and high waves. The sea level increase is slightly higher than projected for global sea levels.[33, 34]

Executive Order S-13-08 also called for the California Ocean Protection Council (OPC) to work with the other CAT State agencies to develop interim guidance for assessing the potential impacts of sea level rise due to climate change in California. In coordination with National Academy of Sciences (NAS) efforts, the OPC drafted interim guidance recommending that State agencies consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project vulnerability, reduce expected risks, and increase resiliency to sea level rise. The draft resolution and interim guidance document is consistent with the Ocean Protection Act (Division 26.5, Public Resource Code Section 3561 5(a)(1)),

[32] Climate Change Portal: California Climate Adaptation Strategy. Available at: http://www.climatechange.ca.gov/adaptation/strategy/index.html and http://resources.ca.gov/climate/safeguarding/. Accessed: August 2018.

[33] National Research Council of the National Academies: Committee on Sea Level Rise in California, Oregon, and Washington; Board on Earth Sciences and Resources and Ocean Studies Board; Division of Earth and Life Studies. Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future, June 2012 Available at: http://www.nap.edu/catalog.php?record_id=13389. Accessed: August 2018.

[34] Office of News and Public Information of the National Academies. California Sea Level Projected to Rise a Higher Rate than Global Average; Slower Rate for Oregon, Washington, But Major Earthquake Could Cause Sudden Rise, June 22, 2012. Available at: http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=13389. Accessed: August 2018.

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which specifically directs the OPC to coordinate activities of State agencies to improve the effectiveness of State efforts to protect ocean resources.[35, 36]

b) Assembly Bill 1613 (Waste Heat and Carbon Emissions Reduction Act)

AB 1613 directed the CEC, the California Public Utilities Commission (CPUC), and CARB to implement the Waste Heat and Carbon Emissions Reduction Act, which is designed to encourage development of new combined heat and power (CHP) systems in California with a generating capacity of not more than 20 megawatts. In June 2010, the CEC published modified final guidelines establishing technical criteria for eligibility of CHP systems for programs to be developed by the CPUC and publicly owned utilities.[37] Section 2843 of the Act provides that the CEC's guidelines require that CHP systems:

- Be designed to reduce waste energy;
- Have a minimum efficiency of 60%;
- Have NO_x emissions of no more than 0.07 pounds per megawatt-hour;
- Be sized to meet the eligible customer generation thermal load;
- Operate continuously in a manner that meets the expected thermal load and optimizes the efficient use of waste heat; and
- Be cost-effective, technologically feasible, and environmentally beneficial.

As directed by AB 1613, the CPUC also established (1) a standard tariff for the sale of electricity to electricity corporations for delivery to the electrical grid;[38] and (2) a "pay as you save" pilot program requiring electricity corporations to finance the installation of qualifying CHP systems by non-profit and government entities. A January 2011 decision by an administrative law judge determined that the pilot program will not be established due to lack of customer interest and difficulties in instituting a program that meets California Department of Corporations requirements.[39]

c) Senate Bill X7-7(Water Conservation Act of 2009)

The Water Conservation Act of 2009 sets an overall goal of reducing per-capita urban water use by 20% by December 31, 2020. The state was required to make incremental progress toward this goal by reducing per-capita water use by at least 10% by December 31, 2015. Reduction in water consumption directly reduces the energy necessary and the associated

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[35] The Coastal and Ocean Resources Working Group for the Climate Action Team (CO-CAT). Available at: http://www.opc.ca.gov/2010/07/coastal-and-ocean-climate-action-team-co-cat. Accessed: August 2018.

[36] Sea-Level Rise Task Force of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), October 2010 Available at: http://opc.ca.gov/webmaster/ftp/pdf/agenda_items/20110311/12.SLR_Resolution/SLR-Guidance-Document.pdf. Accessed: August 2018.

[37] Guidelines for Certification of Combined Heat and Power Systems Pursuant to the Waste Heat and Carbon Emissions Reduction Act, Public Utilities Code, Section 2840 et seq. Available at: http://www.energy.ca.gov/2015publications/CEC-200-2015-001/CEC-200-2015-001-CMF.pdf. Accessed: August 2018.

[38] CHP Feed-in Tariff. Available at: http://www.cpuc.ca.gov/General.aspx?id=5293. Accessed: August 2018.

[39] Decision 11-01-010, Decision Before the Public Utilities Commission of the State of California. Order Instituting Rulemaking on the Commission's Own Motion into combined heat and power pursuant to Assembly Bill (AB) 1613, January 2011. Available at: http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/129669.PDF. Accessed: August 2018.

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emissions to convene, treat, and distribute the water; it also reduces emissions from wastewater treatment.

The Department of Water Resources adopted a regulation on February 16, 2011 that sets forth criteria and methods for exclusion of industrial process water from the calculation of gross water use for purposes of urban water management planning. The regulation would apply to all urban retail water suppliers required to submit an Urban Water Management Plan, as set forth in the Water Code, Division 6, Part 2.6, Sections 10617 and 10620.

2.1.5 Regional

2.1.5.1 South Coast Air Quality Management District Policies

CEQA Guidelines and Proposed GHG Thresholds

SCAQMD is principally responsible for comprehensive air pollution control in the Basin, which includes Los Angeles, Orange, and the urbanized portions of Riverside and San Bernardino Counties, including the Project site. SCAQMD works directly with Southern California Association of Governments (SCAG), County transportation commissions, and local governments and cooperates actively with all federal and State government agencies to regulate air quality.

In April 2008, SCAQMD convened a Working Group to develop GHG significance thresholds. On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. As to all other projects, where the SCAQMD is not the lead agency, the Board has, to date, only adopted an interim threshold of 10,000 $MTCO_2e$ per year for industrial stationary source projects.[40]

For all other projects, SCAQMD staff proposed a multiple tier analysis to determine the appropriate threshold to be used. The draft proposal suggests the following tiers: Tier 1 is any applicable CEQA exemptions, Tier 2 is consistency with a GHG reduction plan, Tier 3 is a screening value or bright line, Tier 4 is a performance-based standard, and Tier 5 is GHG mitigation offsets.[41]

According to the presentation given at the September 28, 2010 Working Group meeting, SCAQMD staff reviewed the tiered significance threshold approach[42]. The proposed tiers are as follows:

Tier 1: Determine if CEQA categorical exemptions are applicable. If not move to Tier 2;

Tier 2: Consider whether or not the proposed project is consistent with a locally adopted GHG reduction plan (often called a Climate Action Plan) that has gone through public

[40] South Coast Air Quality Management District, Board Meeting Date: December 5, 2008, Agenda No. 31, Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans for use by the AQMD, website. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2http://www.aqmd.gov/hb/2008/December/081231a.htm. Accessed: August 2018.

[41] Ibid.

[42] SCAQMD 2010. CEQA Significance Thresholds Working Group Meeting #15. September 28. Available at http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf?sfvrsn=2. Accessed: August 2018.

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hearings and CEQA review, which has an approved inventory that includes monitoring, etc. If not move to Tier 3;

Tier 3: For all land use types, if projects are less than 3,000 metric tonnes/year of CO_2e, the project is presumed to be less than significant for GHGs. If the project exceeds 3,000 metric tonnes of CO_2 equivalent per year ($MTCO_2e/yr$); move to Tier 4. More specific screening thresholds were also provided, which include 1,400 $MTCO_2e/yr$ for commercial projects and 3,500 $MTCO_2e/yr$ for residential projects. These thresholds were based on a review of the Office of Planning and Research database which included 711 CEQA projects using a 90% capture approach;

Tier 4: The proposed performance standards include three options:

1. Percent Emission Reduction Target (no further recommendation)
2. Early Implementation of Applicable AB 32 Scoping Plan Measures (incorporated into option 3)
3. SCAQMD Efficiency Target

For option 3, there are targets for 2020 and 2035, using an approach similar to the BAAQMD Thresholds. The proposed 2020 target is:

- 4.8 MT/year CO_2e per service population for project level threshold (land use employment only)
- 6.6 MT/year CO_2e per service population for plan level threshold

The proposed 2035 target is:

- 3.0 MT/year CO_2e per service population for project level threshold
- 4.1 MT/year CO_2e per service population for plan level threshold
- Incorporate Sustainable Communities and Climate Protection Act of 2008 or SB 375 regional targets.

Tier 5: Off-site mitigation for life of project (30 years), if this threshold is to be used, GHG emissions must be mitigated to less than the Tier 3 screening significance threshold. The SCAQMD clarified that offsets should have a 30-year project life, should be real, quantifiable, verifiable, and surplus and will be considered in the following prioritized manner:

- Project design feature/onsite reduction measures;
- Offsite within neighborhood;
- Offsite within district;
- Offsite within state;
- Offsite out of state; and
- Substitution allowed via enforceable commitment (e.g. when an offset project ends prematurely).

If the Project cannot meet any of the Tiers, it is presumed to be significant for GHG emissions.

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The Tier 4 percent emission reduction target is based on a percent reduction target that is based on consistency with AB 32. This is because the Tier 4 percent emission reduction target is based on the same numeric reductions calculated in the Scoping Plan to reach 1990 levels by 2020.

The Working Group has not convened since the fall of 2010. As of April 2017, the proposal has not been considered or approved for use by the SCAQMD Board. In the meantime, no GHG significance thresholds are approved for use in the Basin.

2.1.5.2 Southern California Association of Governments' Regional Transportation Plan/Sustainable Communities Strategy

As previously discussed, SB 375 requires SCAG to incorporate a Sustainable Communities Strategy into its RTP that achieves the GHG emission reduction targets set by CARB. As required by SB 375, CARB adopted year 2020 and 2035 GHG reduction targets for each metropolitan region. The SB 375 targets for the Southern California region under SCAG's jurisdiction in 2020 and 2035 are reductions in per capita GHG emissions of 8 percent and 13 percent, respectively.[43]

Pursuant to Government Code Section 65080(b)(2)(K), a Sustainable Communities Strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it.

In April 2016, SCAG adopted the 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy: A Plan for Mobility, Accessibility, Sustainability and a High Quality of Life (2016 RTP/SCS). SCAG's 2016 Sustainable Communities Strategy is expected to reduce per capita transportation emissions by 8 percent in 2020, 18 percent in 2035, and 22 percent in 2040. In June 2016, CARB accepted SCAG's determination that the 2016 Sustainable Communities Strategy would meet the regions' GHG reduction targets for 2020 and 2035.[44]

2.1.6 Local: Riverside County General Plan

The current Riverside County General Plan was adopted in December 2015. The current General Plan includes a number of policies regarding the reduction of GHG impacts. The EIR identifies GHG-related policies in the County's General Plan that are relevant to the Proposed Project and analyzes the Project's consistency with these policies. This analysis does not assume any emissions reductions based on General Plan policies.

2.1.6.1 Riverside County Climate Action Plan

In conjunction with the General Plan the County prepared a Climate Action Plan (CAP). Notably, the CAP sets County-wide GHG emissions targets consistent with state reduction goals in AB 32. The CAP is not part of the General Plan per se; rather, it is a separate document that provides another implementation tool of the General Plan to guide development in the County (CAP § 1.3).

The CAP identifies actions necessary to reduce GHGs across a variety of sectors, and includes:

[43] CARB, Executive Order G-11-024 (February 2011).

[44] CARB, Executive Order G-16-066 (June 2016).

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- An analysis of GHG emissions and sources attributable to Riverside County.
- Estimates on how those emissions are expected to increase.
- Recommended policies and actions that can reduce GHG emissions to meet state, federal, and international targets.
- A timeline of implementation.
- A defined tracking and reporting mechanism that will measure progress toward the goals.

The CAP includes a series of implementation measures that may be used by new development proposals to demonstrate consistency with the CAP, and by extension, AB 32. A Riverside County GHG Screening Table[45, 46] containing a menu of GHG reduction options is included as Appendix F to the CAP. If a project can obtain 100 points from the screening table, the mitigated project will implement pertinent reduction measures to meet the CAP GHG reduction goals, and a "less than significant" finding can be made under CEQA (CAP § 7.5). Several of the categories are not assigned points and are listed as "TBD." As such, the Project's point value for these categories cannot be assessed at this time. Alternatively, the CAP provides that individual developments that wish to model and mitigate projects directly may do so; in such case, consistency with the CAP is shown by demonstrating a 25% reduction in GHG emissions compared to the adjusted BAU scenario[47] for residential, commercial, industrial, institutional, and mixed-use projects, and by including all measures necessary to achieve such reductions in the Project's design, Conditions of Approval, or project-specific CEQA mitigation measures (General Plan, Policy AQ 19.3).[48]

2.2 Significance Threshold

This Greenhouse Gas Technical Report assesses significance of GHG impacts using three different methodologies. Each of the three methodologies is a separate and independent ground for the significance determination.

First, this report assesses consistency with AB 32 through evaluating the Project's consistency and compliance with applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32.

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[45] Riverside County Climate Action Plan GHG Screening Table. Available at: http://planning.rctlma.org/Portals/0/genplan/general_plan_2014/CAP/Appendix%20F%20-%20CAP.pdf. Accessed: August 2018.

[46] Riverside County, 2015. Climate Action Plan Errata. August. Available at: http://planning.rctlma.org/Portals/0/genplan/general_plan_2015/FEIR%20DOCS/Climate%20Action%20Plan%20Errata.pdf. Accessed: August 2018.

[47] The adjusted BAU is based on the 2020 adjusted BAU found in the Final Supplement to the AB 32 Scoping Plan (CARB 2011). County of Riverside Draft EIR No. 521, Section 4.7 (Public Review Draft February 2015). Available at: http://planning.rctlma.org/Portals/0/genplan/general_plan_2015/DEIR%20521/04-07_GreenhouseGases.pdf. Accessed: August 2018.

[48] The December 2015 General Plan Policy AQ 19.3, states: "Require new development projects subject to County discretionary approval to achieve the greenhouse gas reduction targets established in the CAP either through: (a) Garnishing 100 points through the Implementation Measures found the County's CAP; or (b) Requiring quantification of project-specific GHG emissions and reduction of GHG emissions to, at minimum, the applicable GHG reduction threshold established in the CAP."

Second, this report assesses if the Project is consistent with the CAP using the CAP screening tables. Since the County of Riverside CAP was developed using AB 32, this approach is also an AB 32 compliance pathway.

Third, this report assesses the Project's consistency with SB 375. Consistency with SB 375 was evaluated based on the growth assumptions of Southern California Association of Governments' (SCAG) 2016-2040 Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS).

In addition to the methodologies listed above, this report quantitatively reports the Project's GHG emissions and compares these emissions to a service population threshold for informational purposes. This methodology utilizes an efficiency metric expressed in relation to a project's service population, which is defined to include the total number of the residents and workers associated with a project. For informational purposes, this evaluation includes a comparison to the SCAQMD proposed 4.8 MT/year CO_2e per service population for project level threshold (land use employment only) for 2020.[49]

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[49] SCAQMD has adopted interim significance thresholds for industrial sources of 10,000 metric tons of carbon dioxide equivalents per year. The Board adopted these December 5, 2008. These thresholds are not applicable to the Project because it is not an industrial source of CO_2e emissions. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2. Accessed: February 2019.

3. GREENHOUSE GAS INVENTORY FOR PROJECT

This section describes the methods that Ramboll US Corporation (Ramboll) used to develop the GHG emissions inventories associated with the Project, which include construction emissions and operational emissions. Sub-categories of GHG operational emissions include: vegetation change, area sources, energy use, water and wastewater, solid waste, and mobile sources. These emissions are compared to applicable statewide and local regulatory programs designed to reduce GHG emissions consistent with AB 32. Legislation and rules regarding climate change, as well as the scientific understanding of the extent to which different activities emit GHGs, continue to evolve; as such, the inventories in this report reflect the guidance and knowledge currently available.

3.1 Units of Measurement: Tonnes of CO_2 and CO_2e

The term "GHGs" includes gases that contribute to the natural greenhouse effect, such as CO_2, CH_4, N_2O, and water, as well as gases that are only man-made and that are emitted through the use of modern industrial products, such as hydrofluorocarbons (HFCs) and chlorofluorocarbons (CFCs). The most important greenhouse gas in human-induced global warming is CO_2. While many gases have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for 81.6% of the GWP of all GHGs emitted by the United States.[50]

The effect each of these gases has on global warming is a combination of the volume of their emissions and their GWP. GWP indicates, on a pound for pound basis, how much a gas will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent than CO_2, with GWPs of 25 and 298, respectively. GHG emissions are typically measured in terms of mass of CO_2e. CO_2e are calculated as the product of the mass of a given GHG and its specific GWP.[51]

In many sections of this report, including the final summary sections, emissions are presented in units of CO_2e either because the GWPs of CH_4 and N_2O were accounted for explicitly, or the CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from that particular emissions category.

In this report, a tonne refers to a metric tonne (1,000 kilograms). Additionally, exact totals presented in all tables and report sections may not equal the sum of components due to independent rounding of numbers.

3.2 Methodology Resources

CalEEMod®

Ramboll primarily utilized the California Emission Estimator Model version 2016.3.2 (CalEEMod®)[52] to assist in quantifying the GHG emissions in the inventories presented in this

[50] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016, U.S. Environmental Protection Agency. Available online at: https://www.epa.gov/sites/production/files/2018-01/documents/2018_complete_report.pdf. Accessed: August 2018.

[51] In the updated Draft Climate Change Scoping Plan published by CARB in 2014, the GWPs for CH_4 and N_2O were updated from 21 to 25 and from 310 to 298, respectively. This report relies upon the newly proposed GWPs in the Draft Climate Change Scoping Plan.

[52] California Air Pollution Control Officers Association (CAPCOA). 2017. California Emissions Estimator Model. Available at: http://www.CalEEMod.com/. Accessed: August 2018.

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report for the Project. CalEEMod® is a statewide program designed to calculate both criteria and GHG emissions from development projects in California.

CalEEMod® is based upon CARB-approved Off-Road and On-Road Mobile-Source Emission Factor models (OFFROAD and EMFAC, respectively), and is designed to estimate construction and operational emissions for land use development projects and allows for the input of project specific information. OFFROAD2011[53] is an emissions factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment). EMFAC2014[54] is the emissions factor model used in CalEEMod® to calculate emissions rates from on-road vehicles (e.g., passenger vehicles, haul trucks). As noted above, EMFAC2014 has been superseded by EMFAC2017.[55] In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, operational mobile source emission factors were estimated using EMFAC2017. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology and defaults along with Project specific values where available.

CalEEMod® provides a simple platform to calculate both construction emissions and operational emissions from a land use project. It calculates both the daily maximum and annual average for criteria pollutants as well as total or annual GHG emissions. The model also provides default values for water and energy use.

CalEEMod® contains default values and existing regulation methodologies to use in each specific local air district region. Appropriate statewide default values can be utilized if regional default values are not defined. Ramboll used default factors for the Riverside County area that is within the SCAQMD jurisdiction for the GHG emission inventory, unless otherwise noted in the methodology descriptions below. Details regarding the specific methodologies used by CalEEMod® can be found in the CalEEMod® User's Guide and associated appendices.[56] The CalEEMod® output files are provided for reference in **Appendix A** to this report.

3.3 Indirect GHG Emissions from Electricity Use

Project-related electricity use results in indirect emissions, due to electricity generation activities occurring at off-site power plant locations. For this Project, electrical power will be supplied to the Project site by Southern California Edison (SCE). The indirect GHG emissions created as a result of Project-related electricity use are estimated through application of the following methodology.

Using CalEEMod®, the electricity intensities are multiplied by the emission intensity factors for the GHGs and are classified as indirect emissions. Emission intensity factors are GHG emission rates from a given source relative to the intensity of a specific activity in term of

[53] CARB, 2007. Off Road Mobile Source Emission factors. Available at: http://www.arb.ca.gov/msei/msei.htm. Accessed: August 2018.

[54] CARB, 2015. EMFAC 2014 Release (updated May 2015). Available at: https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-v1_0_7-release-notice.pdf. Accessed: August 2018.

[55] CARB, 2018. EMFAC 2017 Release (updated March 2018). Available at: https://www.arb.ca.gov/msei/downloads/emfac2017-public-release-notice-v1.0.2.pdf. Accessed: August 2018.

[56] SCAQMD, 2016, California Emissions Estimator Model User's Guide. Version 2016.3.2. November 2017. Available at: http://www.caleemod.com/. Accessed: August 2018.

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the amount of GHG released per megawatt of energy produced. The default electricity intensity for SCE in CalEEMod® for CO_2, CH_4, and N_2O are 702.44, 0.029, and 0.006 pounds (lbs) per megawatt-hour (MWh), respectively. The CO_2 default factor is based on the 2012 SCE Corporate Responsibility and Sustainability Report.[57] The CH_4 and N_2O default factors are based on CARB's and USEPA's e-Grid values as included in CalEEMod®.[58]

While CalEEMod®'s intensity factors for CH_4 and N_2O were used for this Project, CalEEMod®'s CO_2 intensity factor was modified based on the SCE's 2015 and 2016 energy delivery data, to account for the RPS requirements for 2020 (33 percent RPS).[59] The SCE Corporate Responsibility Report and the Preliminary Annual 33% RPS Compliance Report, provides the mix of renewable and non-renewable energy sources in SCE's energy supply, which were both used to calculate the emission factors. The emission factors were estimated by multiplying the percentage of energy delivered by SCE from non-renewable energy resources by the CO_2 emissions per total non-renewable energy metric calculated. Details regarding the specific methodologies used by CalEEMod® can be found in the CalEEMod® User's Guide and associated appendices[60]. The CalEEMod® output files are provided for reference in **Appendix A** to this report.

3.4 One-Time Emissions

One-time emissions are those emissions that are not recurring over the life of the project. This includes emissions associated with construction and emissions associated with vegetation and land use changes. The emission estimation methodology for both construction and vegetation changes are described in this section. Since the site is currently vacant land, one-time emissions associated with planting of new trees at the Project site was evaluated

3.4.1 Construction Activities

This section describes the estimation of GHG emissions from construction activities at the Project site. Construction of the Project warehouse is anticipated to occur across five phases, beginning in 2020. This analysis assumes construction begins in mid-2019. This is conservative, as emission factors improve in future years and; therefore, actual construction emissions will be lower than shown in this report. Construction for the Cactus Channel improvements could occur contemporaneously with the warehouse or separately depending on permitting and timing. For purposes of this analyses we have conservatively assumed that construction associated with Cactus Channel would occur at the same time as the warehouse construction.

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[57] SCE. 2012 Corporate Responsibility and Sustainability. Available at: https://www.sce.com/wps/wcm/connect/68145014-2eba-40c2-8587-6482ce056977/CRR_08202013.pdf?MOD=AJPERES&ContentCache=NONE. Accessed: August 2018.

[58] USEPA. eGRID2012 Version 1.0. Year 2009 Summary Table. Available at: http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2012V1_0_year09_SummaryTables.pdf. Accessed: August 2018.

[59] The CH_4 and N_2O intensity factors from CalEEMod® are based on emissions from California's mix of power generation sources in 2009. As more renewable energy is integrated into the electricity grid, these intensity factors will also decrease.

[60] SCAQMD, 2017, California Emissions Estimator Model User's Guide. Version 2016.3.2. July. Available at: http://www.CalEEMod.com/. Accessed: August 2018.

The major construction phases for the Project warehouse included in this analysis are:

- Site Preparation: involves clearing any vegetation (grubbing and tree/stump removal) and stones prior to grading. It also involves some rough grading and utility installation.
- Grading: involves the cut and fill of land to ensure the proper base and slope for the construction foundation.
- Building Construction: involves the construction of structures and buildings.
- Architectural Coating: involves the application of coatings to both the interior and exterior of buildings or structures
- Paving: involves the laying of concrete or asphalt such as in parking lots or roads.

There will not be a demolition phase for this Project since the construction will occur on previously undeveloped land. GHG emissions from these construction phases are largely attributable to fuel use from construction equipment and worker commuting to the Project site.

The construction for Cactus Channel improvements is classified as site preparation in CalEEMod® and will include excavation and box culvert installation activities.

Ramboll used CalEEMod® to assist in quantification of the construction emissions. The analysis was based on a mix of project specific estimates including the numbers and types of equipment that will be used in the construction of the Project as well as the duration of the different construction phases. The construction equipment parameters (horsepower, load factor, and hours of operation) and worker/vendor trip amounts were based on CalEEMod® default data. Vendor trips include vehicles such as water trucks and concrete trucks. The hauling trip amounts were estimated using project specific data for volume of soil imported/exported and the CalEEMod® default assumption for haul truck capacity of 16 cubic yards per truck. Worker and vendor trip distances are based on CalEEMod® default assumptions. The haul trip distance for the warehouse construction soil import is 3 miles, based on Project specific data. The haul trip distance for Cactus Channel construction soil export is based on CalEEMod® default assumptions. The Project area was assumed to be developed over a two-year time frame commencing in 2020. This analysis assumes construction begins in mid-2019. This is conservative, as emission factors improve in future years and; therefore, actual construction emissions will be lower than shown in this report. The construction schedule, equipment lists, and construction related on-road trips are shown in **Tables 2 through 4**, respectively. The CalEEMod® output files are included in **Appendix A**.

3.4.1.1 Emissions from Construction Equipment

The emission calculations associated with construction equipment are from off-road equipment engine use based on the equipment list and phase length.

Since the majority of the off-road construction equipment used for construction projects are diesel-fueled, CalEEMod® assumes all of the equipment operates on diesel fuel. The calculations associated with construction equipment include the running exhaust emissions from off-road equipment. Since the equipment is assumed to be diesel, there are no starting or evaporative emissions associated with the equipment as these are *de minimis* for

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diesel-fueled equipment. CalEEMod® calculates the exhaust emissions based on default values for horsepower and load factor from CARB's OFFROAD2011 model.[61]

The GHG emissions associated with off-road construction equipment are shown in **Table 5.** Most of the emissions occur during the building construction phase. While the Project has committed to using 50% Tier 3 and 50% Tier 4 Final off-road equipment during all construction phases, there is no quantitative GHG reduction estimated from this reduction given the limitations of information from CalEEMod® and OFFROAD2011.

3.4.1.2 GHG Emissions from On-Road Trips

Construction generates on-road vehicle exhaust (including evaporative emissions) from personal vehicles for worker/vendor commuting and trucks for soil/material hauling. These emissions are calculated in CalEEMod® based on the number of trips and vehicle miles traveled (VMT) along with emission factors from EMFAC2014 which are embedded in CalEEMod®. The numbers of worker and vendor trips represent defaults from CalEEMod® based on the construction equipment to be used. The number of haul trips was estimated based on the volume of soil to be imported (220,000 cubic yards) and exported (60,000 cubic yards), and the CalEEMod® default assumption for haul truck capacity of 16 cubic yards per truck.

The mobile source emissions were calculated using trip rates and lengths, as well as emission factors from EMFAC2014 as outlined in the CalEEMod® user's guide.[62] Details regarding on-road trips generated during the construction phase are presented in **Table 4**.

The emissions associated with on-road activities are shown in **Table 6**. Most of the emissions were estimated to occur from the workers' and vendors' trips during the building construction phase.

3.4.1.3 Total Construction Emissions

The total emissions from construction are summarized in **Table 7.** Total GHG emissions from all project construction phases for off-road and on-road emissions are 458 and 1,656 MT CO_2e, respectively. Total GHG emissions from the construction activities are 2,114 MT CO_2e. When amortized over 30-year project lifetime, the construction GHG emissions are 70 MT CO_2e/year.[63] Detailed emission inventories from the CalEEMod® output files are included in **Appendix A.**

3.4.1.4 Regulatory Measures

The construction emissions will comply with the applicable regulations and programs. These include the CARB ATCM to limit diesel fueled commercial motor vehicle idling, CARB in-use Off-Road and On-Road regulations, and the California Cap-and-Trade Program.

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[61] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 32. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: August 2018.

[62] CAPCOA. 2017. California Emissions Estimator Model User's Guide. Appendix A. Page 37. Version 2016.3.2. November. Available at: http://www.caleemod.com. Accessed: August 2018.

[63] This approach to one-time construction GHG emissions is based on the GHG Threshold Working Group Meeting #13 Minutes from August 26, 2009. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-13/ghg-meeting-13-minutes.pdf?sfvrsn=2. Accessed: August 2018.

3.4.2 Vegetation Changes

This section presents the calculation of GHG emissions associated with any vegetation removal and re-vegetation at the Project site. As described previously, the existing site is vacant and has little to no vegetation. Planting trees will sequester CO_2 and is considered to result in a one-time carbon-stock change. Trees sequester CO_2 while they are actively growing. The amount of CO_2 sequestered depends on the type of tree. In this case, new trees will be planted at the Project site. This will result in carbon sequestration. Therefore, planting of new trees results in decrease in overall GHG emissions. GHG emissions associated with planting of new trees are amortized over a 30-year project lifetime (see **Table 8**).

3.4.2.1 Regulatory Measures

No applicable regulatory measures related to GHG emissions from vegetation changes were identified.

3.5 Annual Operational Emissions

Operational emissions are emissions that would occur after build-out of the Project. This analysis identifies operational emissions for source categories including direct emissions from area and mobile sources and indirect emissions from energy use, water/wastewater, and waste management. There is no operational activity associated with the Cactus Channel, hence operational emissions are zero.

3.5.1 Area Sources

Area sources are those emissions that are generally too small to be uniquely identified as point sources and are thus generally aggregated as a group. CalEEMod® estimates emissions for the following sources, which are included under the category of "area" sources: landscaping equipment (e.g., lawn mowers), consumer products, and architectural coatings. There are no GHG emissions from consumer product and architectural coating activities. The area source GHG emissions included in this analysis result from landscaping maintenance equipment related fuel combustion sources, such as lawn mowers. Based on CalEEMod® defaults, all operational days (i.e., 250 days per year) were assumed to be summer days, with no snow days. GHG emissions due to natural gas combustion in buildings are excluded from this section since they are included in the emissions associated with building energy use (described in Section 3.5.2). The GHG emissions for the Project were calculated using CalEEMod® defaults based upon the land uses that will be part of the Project.

The resulting GHG emissions from the use of landscape maintenance equipment are presented in **Table 9**.

3.5.1.1 Regulatory Measures

No applicable regulatory measures related to GHG emissions from landscape maintenance equipment were identified.

3.5.2 Energy Use

GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions. Climate Zone 10 was selected based on the CEC forecast climate zone map shown in the CalEEMod® User's Guide.

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Project emissions have been calculated using a SCE emission factor that accounts for the 33% RPS required by 2020, as discussed in Section 3.3. The adjusted SCE emission factor is based on their Corporate Responsibility Report and the Preliminary Annual 33% RPS Compliance Report, which provides the mix of renewable and non-renewable sources in SCE's energy supply. With this data, the SCE emission factor is adjusted to represent what the emissions from SCE would be in 2020 (see **Table 10**).

3.5.2.1 Emissions Estimation from Energy Use

As mentioned above, GHGs are emitted from buildings as a result of activities for which electricity and natural gas are typically used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building. Electricity and natural gas use in buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as in plug-in appliances.

The Project's unmitigated and mitigated CO_2e emissions from electricity and natural gas usage are presented in **Table 11**. The mitigated scenario reflects reduced emissions due to installation of Energy Star-certified lighting.

3.5.2.2 Regulatory Measures

In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some types of fixed lighting.[64] The 2016 Title 24 standards are the currently applicable building energy efficiency standards and became effective on January 1, 2017. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards. The Project's GHG emissions calculations reflect that the Project is meeting the 2016 Title 24 Part 6 Building Code for nonresidential construction.

Emission factors for electricity are dependent on statewide renewable energy generation targets. The RPS established a target of 33% energy from renewable sources for all electricity providers in California by 2020. SCE-specific electricity intensity factors were derived; the energy intensity factors for CO_2, CH_4, and N_2O mass emissions per kilowatt hour are described in **Section 3.3** and Section **3.5.2**.

3.5.3 Water Supply, Treatment and Distribution

Indirect GHG emissions result from the production of electricity used to convey, treat, and distribute water and wastewater. The amount of electricity required to convey, treat, and distribute water depends on the volume of water as well as the sources of the water. Additional emissions from wastewater treatment include CH_4 and N_2O, which are emitted directly from the wastewater.

The Project's total water demand values were based on site-specific annual demand projections (**Table 12**). The GHG emissions associated with water conveyance, treatment, and distribution, as well as wastewater treatment were calculated using CalEEMod® default assumptions.

[64] Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/. Accessed: August 2018.

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The Project unmitigated and mitigated indoor and outdoor water usage's resulting GHG emissions are presented in **Table 12**. The indoor and outdoor water usage includes measures for low use faucets and water efficient landscapes.

3.5.3.1 Regulatory Measures

The Project will comply with the California Green Building Code, which requires that indoor potable water use be reduced by 20 percent through the use of water saving fixtures and/or flow restrictors.

3.5.4 Solid Waste

Municipal solid waste (MSW) is the amount of material that is disposed of by land filling, recycling, or composting. CalEEMod® calculates the indirect GHG emissions associated with waste that is disposed of at a landfill. The program uses annual waste disposal rates from the CalRecycle data for individual land uses. The emission estimates for this Project were based on CalEEMod® default factors adjusted to a 75% waste diversion rate using CalRecycle waste disposal rates for unincorporated Riverside County. CalEEMod® uses the overall California Waste Stream composition to generate the necessary types of different waste disposed into landfills. The program quantifies the GHG emissions associated with the decomposition of the waste, which generates methane based on the total amount of degradable organic carbon. The program quantifies the CO_2 emissions associated with the combustion of methane, if applicable. Default landfill gas concentrations were used as reported in Section 2.4 of AP-42. The IPCC has a similar method to calculate GHG emissions from MSW in its 2006 Guidelines for National Greenhouse Gas Inventories.

The CalEEMod® solid waste module determines the GHG emissions associated with the disposal of solid waste into landfills, in quantities that are based upon land use type according to waste disposal studies conducted by CalRecycle. For this module, CalEEMod® default and CalRecycle waste generation rates were used since site specific information was not available. GHG emissions associated with non-landfill diverted waste streams are not considered, because it is generally assumed that these diversions do not result in any appreciable amounts of GHG emissions when operated effectively.[65] These waste diversion alternatives may result in differences in life-cycle emissions of GHGs, but it is not appropriate to combine life-cycle emissions for only one category of emissions.[66]. As mentioned previously, biogenic CO_2 emissions were not included when CARB analyzed the GHG emissions inventory under AB 32. Therefore, they are not included in the Project emissions inventory.

Project GHG emissions from solid waste are presented in **Table 13**.

3.5.4.1 Regulatory Measures

The analysis has assumed that the Project will be consistent with the state's waste diversion goal of 75% waste diversion by 2020.[67]

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[65] CARB. 2010. Local Government Operations Protocol. Chapter 9.4.

[66] This inventory represents scope 1 and 2 emission categories. A life-cycle analysis of waste diversion would be a scope 3 inventory. CARB's Local Government Operations Protocol Version 1.1 (May 2010) clearly states that scope 3 emissions should not be combined with scope 1 and 2 emissions.

[67] CalRecycle. 2013. California's 75 Percent Initiative. Available at: http://www.calrecycle.ca.gov/75percent/. Accessed: August 2018.

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3.5.5 Mobile Source Emissions

The GHG emissions associated with on-road mobile sources are generated by employees and trucks visiting the proposed Project. The emissions associated with on-road mobile sources includes running exhaust emissions, starting emissions and idling exhaust emissions. Running exhaust emissions are dependent on VMT. Starting emissions are associated with the number of starts or time between vehicle uses and the assumptions used in determining these values are described below. Idling exhaust emissions are based on the amount of time a vehicle spends idling. As noted in Section 3.1, CalEEMod® relies upon EMFAC2014 to estimate mobile source emission factors. EMFAC2014 has been superseded by EMFAC2017. To allow for a more accurate representation of mobile source operational emissions associated with the Project, mobile source emission factors were estimated using EMFAC2017. Emission factors were obtained from EMFAC2017 for Riverside County. EMFAC2017 model outputs are included in **Appendix B**. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology and defaults along with Project specific traffic activity data such as the trip rates specified in the Project's Traffic Impact Analysis (TIA)[68] and trip length information as noted below.

3.5.5.1 Trip Rates

Trip rates are one of the parameters used to calculate Project mobile source emissions. CalEEMod® relies upon trip generation rates by land use types and associated average trip length by trip type to estimate the air quality and GHG emissions. Urban Crossroads[69] provided peak daily trip rates by vehicle type for the Project that would occur during the holiday season (November 15th to January 15th). Daily trips during the non-peak period were estimated to be two-thirds of the peak daily trips based on the ratio of peak period to non-peak period employment at a similar high-cube fulfillment center warehouse. As shown in **Table 14**, annual average truck trips were estimated using the daily trip estimates for each time period (peak and non-peak) and the number of days in that time period.

3.5.5.2 Trip Lengths

Trip lengths are another factor used to calculate Project mobile source emissions. Annual VMT is estimated as a product of annual average trips and trip length for each vehicle type. The default CalEEMod® trip length of 16.6 miles for commercial-work trips (i.e., trips made by someone who is employed by the commercial land use sector) for Riverside County located within SCAQMD jurisdiction were used for passenger vehicles that represent vehicles used by employees. The trip length for trucks was assumed to be 60 miles based on likely geographical travel by trucks in the South Coast Air Basin.[70, 71] The default commercial-nonwork trip length for trucks in CalEEMod® is 6.9 miles. Therefore, the use of a 60-mile trip length is conservative assumption. Trip lengths and total VMT are presented in **Table 14**.

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[68] Urban Crossroads. 2018. K4 Parcel Traffic Impact Analysis. July 20. Table 4-1 [Project Trip Generation Rates] and Table 4-2 [Project Trip Generation Summary].

[69] Urban Crossroads. 2018. K4 Parcel Traffic Impact Analysis. July 20. Table 4-1 [Project Trip Generation Rates] and Table 4-2 [Project Trip Generation Summary].

[70] Modular Logistics Center EIR, Technical Appendix B1. Available at: http://www.moval.org/cdd/pdfs/projects/mv-logistics/draft-eir.pdf. Accessed: September 2018.

[71] Integra Perris Distribution Center Project Draft EIR. Available at: http://www.cityofperris.org/departments/development/IntegraDistCenter/DEIRIntegraPerrisDistributionCenter0814.pdf. Accessed: September 2018.

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3.5.5.3 Vehicle Fleet Mix

Vehicle fleet mix is another parameter used to estimate mobile source emissions from Project operation. Each vehicle type has a different emission factor for each pollutant, so CalEEMod® relies upon vehicle fleet mixes by land use type to estimate the GHG emissions for each land use. The fleet mix for passenger vehicles was calculated based on the CalEEMod® default fleet mix for the Unrefrigerated Warehouse – No Rail land use in Riverside County (South Coast). Passenger vehicles represent vehicles used by employees to commute to work. The fleet mix for trucks was estimated based on trip rates from the TIA, with 2-axle trucks further distributed into LHD1 and LHD2 based on the ratio of their CalEEMod® defaults. The vehicle fleet mix is presented in **Table 15**.

3.5.5.4 Mobile Source Emission Factors

Emission factors were obtained from EMFAC2017 for Riverside County. The emission factors used to estimate running exhaust emissions are presented in **Table 16.** These emission factors are on a "per mile" basis and thus the emissions were calculated by multiplying these factors by the estimated VMT for each vehicle type listed in **Table 14**. The emission factors for starting exhaust are presented in **Table 17**. These emission factors are on a "per trip" basis and thus starting emissions were calculated by multiplying these emission factors by the estimated number of trips for each vehicle type listed in **Table 14**. The emission factors used to estimate GHG emissions from truck idling are presented in **Table 18.** These emission factors are on a "per minute of idling" basis and thus the idling emissions were calculated by multiplying these emissions factors by the estimated idle duration of 15 minutes per round trip (5 minutes at entry gate, 5 minutes at dock, and 5 minutes at exit gate) for each truck type and total number of truck round trips.[72] Please note that the trip counts shown in **Table 14** are one-way trips; hence these trip counts were divided by two to estimate the number of round trips.

3.5.5.5 Estimated Emissions from Mobile Sources

The Project was estimated to generate approximately 31,661,414 VMT/yr and 1,550,472 annual one-way trips, which would result in GHG emissions as shown in **Table 19**.

3.5.5.6 Regulatory Measures

AB 1493 required that CARB establish GHG emission standards for automobiles, light-duty trucks, and other vehicles determined by CARB to be vehicles whose primary use is non-commercial personal transportation in the state. In addition, the NHTSA and EPA have established corporate fuel economy standards and GHG emission standards, respectively, for automobiles, and light-, medium-, and heavy-duty vehicles. Implementation of these standards and fleet turnover (replacement of older vehicles with newer ones) will gradually reduce emissions from the proposed project's motor vehicles. The effectiveness of fuel economy improvements and the GHG emission standards over time was evaluated by using the EMFAC2017 emission factors for motor vehicles.

The analysis includes the benefit of reductions from some adopted regulatory programs, which are accounted for as follows:

[72] Idle duration at any one location is limited to 5 minutes, based on CARB Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://www.arb.ca.gov/regact/idling/idling.htm. Accessed: February 2019.

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- AB 1493 ("the Pavley Standard") required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. EMFAC2017 includes emission reductions for non-commercial passenger vehicles and light-duty trucks of model year 2017 – 2025.
- The ACC program, introduced in 2012, combines the control of smog, soot causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. EMFAC2017 includes reductions associated with this regulation that are represented in this analysis.
- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 1) were adopted in 2011 for medium- and heavy-duty trucks for model years 2014-2018. This Heavy-Duty National Program is intended to reduce fuel use and GHG emissions from medium- and heavy-duty vehicles, semi-trucks, pickup trucks and vans, and all types and sizes of work trucks and buses in between. EMFAC2017 emission factors used for the analyses in this report include reductions associated with this regulation.
- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 2) were adopted in 2016 for medium- and heavy-duty trucks for model years 2018 and beyond. The Phase 2 program includes technology-advancing standards that substantially reduce GHG emissions and fuel consumption resulting in an ambitious, yet achievable, program that will allow manufacturers to meet the applicable standards over time, at reasonable cost, through a mix of different technologies. This standard will phase in beginning with model year 2021 and will culminate with model year 2027. Based on the Phase 2 standards, it is assumed that the Project's GHG emissions will continue to decrease over time beyond what is presented herein.

The Cap-and-Trade Program for Stationary Sources and Fuels will help the state reduce GHG emissions to meet the statewide targets. The San Joaquin Valley Air Pollution Control District (SJVAPCD) approved Policy APR-2025 (CEQA Determinations of Significance for Projects Subject to CARB's GHG Cap-and-Trade Regulation) to evaluate whether projects subject to the cap-and-trade regulation would comply with plans for reducing GHG emissions supported by an environmental review compliant with CEQA requirements, and that compliance with this plan would adequately mitigate GHG emissions for CEQA purposes under the SJVAPCD thresholds. SJVAPCD concluded that the cap-and-trade regulation is such a plan, and that compliance would result in a project having a less than significant impact for GHG emissions that are subject to the cap-and-trade regulations. Transportation fuels (and thus transportation) are included in the cap-and-trade program. The regulation requires that emissions generated by these facilities and combustion of fuels be reduced over time. Accordingly, the SJVAPCD found that "GHG emission increases caused by fuel use (other than jet fuels [which are not regulated under the cap-and-trade regulation] are determined to have a less than significance impact on global climate change under CEQA."

Emissions associated with transportation fuels and energy (electricity and natural gas) are the largest portions of GHG emissions associated with the Project, and these sectors are now subject to the cap-and-trade regulation. This project analysis conservatively includes all mobile emission without accounting for mitigation resulting from Cap-and-Trade.

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3.6 Mitigation Measures

This section presents the methodology used to evaluate the Project's GHG emissions reductions associated with mitigation measures. Since the emissions reductions associated with some mitigation measure were not readily available as a simple CalEEMod® output, the following methodology was used to estimate the emission reductions for each mitigation measure as applicable. Mitigation Measure MM-GHG-1 provides that the applicant shall incorporate MM-AQ-1 (Construction Equipment Emissions Standards), MM-AQ-2 (Low-VOC Architectural Coatings), MM-AQ-3 (Construction Relations Officer), MM-AQ-4 (Improved Energy Efficiency and Water Reduction), MM-AQ-5 (Commute Trip Reduction), and MM-AQ-6 (Truck Requirements). The emissions reduction estimation methods are presented below for each mitigation measure that is listed within MM-GHG-1.

3.6.1.1 Quantified Mitigation Measures

Emission reductions associated with the following mitigation measures were incorporated into the emissions analysis for the Project.

MM-AQ-4 (Improved Energy Efficiency and Water Reduction):

- The Project will install approximately 4.5 MW of solar photovoltaic electricity generation (**Table 20**).
- The Project will install Energy Star certified light bulb and lighting fixtures[73] (estimated within CalEEMod®, see **Table 11**).
- The Project will exceed the Riverside County Climate Action Plan requirement for water efficient landscaping by having no turf and only drought tolerant plants and introducing additional water efficient irrigation controls such as smart irrigation controllers (accounted for while estimating Project operational water demand, see **Table 12**).
- The Project will provide circuitry and capacity for installation of electric vehicle charging stations consistent with the Riverside County Climate Action Plan criteria. The Project shall develop eleven on-site electric vehicle (EV) charging stations and fifty-four off-site EV charging stations (**Table 21**).

3.6.1.2 Unquantified Mitigation Measures

Emission reductions associated MM-AQ-1 and MM-AQ-2 are not quantified as a part of the GHG analyses as these measures pertain to criteria air pollutants only. As a conservative approach, the reductions from MM-AQ-3, parts of MM-AQ-4, MM-AQ-5, and MM-AQ-6 were not quantified due to lack of clarity on the quantity of reductions associated with these mitigation measures. A list of these unquantified mitigation measures is presented below:

MM-AQ-1 (Construction Equipment Emission Standards): During Project construction, the construction contractor, with oversight by March JPA, shall ensure that all off-road diesel-powered construction equipment greater than 50 horsepower shall meet, at a minimum, the Tier 3 emission standards for non-road diesel engines promulgated by the United States Environmental Protection Agency (USEPA). In addition, construction contractor

[73] Energy Star. Energy Star Qualified LED Lighting. Available at: https://www.energystar.gov/products/lighting_fans/light_fixtures/why_choose_energy_star_qualified_led_lighting. Accessed: May 2018.

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shall utilize 50% Tier 4 Final construction equipment, based on number of pieces of construction equipment.

MM-AQ-2 (Low-VOC Architectural Coatings): The construction contractor shall be required to utilize Super-Compliant VOC interior and exterior paints, which are defined by SCAQMD as meeting the "super-compliant" VOC standard of 10 grams per liter (g/L), during construction and long-term operations.[74]

MM-AQ-3 (Construction Relations Officer): The Project will provide a construction relations officer to act as a community liaison to oversee on-site construction activity and all emissions and congestion related matters. A phone number and email contact information for the construction relations officer shall be posted on signage at construction site entrance points.

MM-AQ-4 (Improved Energy Efficiency and Water Reduction):

- The Project will install duct insulation to a minimum level of R-6 and modestly enhanced window insulation (for a 5% improvement over the 2016 Title 24 requirement) consistent with the Riverside County Climate Action Plan criteria.
- Consistent with the Riverside County Climate Action Plan criteria, the Project will include the following design elements: Construction of modest cool roof, defined as CRRC Rated 0.15 aged solar reflectance and 0.75 thermal emittance; Use of HVAC equipment with a SEER of 14 or higher; Installation of water heaters with an energy factor of .92 or higher; All rooms will have some form of daylighting (e.g., skylights or windows); At least 50% of artificial lighting unit fixtures will be high efficacy; Waterless urinals and high efficiency toilets will be used throughout the Project; and water efficient faucets will be used throughout the Project.
- The Project will provide electrical outlets at building exterior areas.
- The Project landscape non-potable water system will meet "purple" pipe standards.

MM-AQ-5 (Commute Trip Reduction):

- Five percent (5%) of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools.
- The Project will provide short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces).
- The Project will provide "end-of-trip" facilities including showers, lockers, and changing space (four clothes lockers and one shower provided for every 80 employee parking spaces, separate facilities for each gender for projects with 160 or more employee parking spaces).
- Each tenant will provide on-site food vending machines or refrigerator, microwave oven and mail facilities (i.e., drop box) at the Project site. Projects will also consider the provision of an ATM machine as feasible.

[74] SCAQMD. Super-Compliant Architectural Coatings. Available at: http://www.aqmd.gov/home/programs/business/business-detail?title=super-compliant-coatings. Accessed: August 2018.

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MM-AQ-6 (Truck Requirements):

- For any warehouse use, the loading docks shall be designed to accommodate SmartWay trucks.[75] The March JPA will require evidence of compliance prior to issuance of a certificate of occupancy for any warehouse use.

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[75] USEPA, SmartWay Basic Information. Available: http://www3.epa.gov/smartway/about/. Accessed: May 2018.

4. ANALYSIS OF CONSISTENCY WITH GHG SIGNIFICANCE THRESHOLDS

This section examines the Project's significance of GHG impacts using three different methodologies. Additionally, this Greenhouse Gas Technical Report includes a comparison of the Project's GHG emissions to a SCAQMD service population efficiency for informational purposes. Total project operational GHG emissions are summarized in **Table 22**.

4.1 Consistency with AB 32 Regulatory Programs

The Project is consistent and compliant with applicable statewide and local regulatory programs. As discussed above, the Project will be subject to a number of regulatory programs designed to reduce GHG emissions consistent with AB 32. The list below summarizes the regulations and programs related to the emission source categories.

- Energy Use:

  California Title 20 Standards
  California Title 24, Part 6 Standards (2013 and 2016)
  California Title 24, Part 11 Standards
  California Renewable Portfolio Standard (SB X1 2)
  California Cap-and-Trade Program

- Water Supply, Treatment and Distribution:

  Executive Order B-29-15
  California Title 24, Part 11 Standards
  County of Riverside Ordinance No. 859
  Senate Bill X7-7

- Solid Waste:

  California AB 341 (waste diversion)

- Mobile Sources:

  California AB 1493/Pavley Standards (through model year 2025)
  California Advanced Clean Cars Standards (through model year 2025)
  California Low Carbon Fuel Standard
  USEPA/NHTSA CAFÉ Standards (through model year 2018)
  California Cap-and-Trade Program

- Construction:

  CARB In-Use Off-Road Regulation
  CARB In-Use On-Road Heavy-Duty Diesel Vehicles Regulation
  California Cap-and-Trade Program

4.2 Consistency with County of Riverside CAP

The Project's significance with respect to GHG emissions is also evaluated based on its consistency with the County of Riverside CAP. The CAP includes screening tables, which "provide guidance in measuring the reduction of greenhouse gas emissions attributable to certain design and construction measures incorporated into development projects." The CAP further indicates that "the Screening Table assigns points for each option incorporated into a

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project as mitigation or a project design feature." and also summarizes that "Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the County's GHG Technical Report. As such, those projects that garner a total of 100 points or greater would not require quantification of project specific GHG emissions. Consistent with CEQA Guidelines, such projects would be determined to have a less than significant individual and cumulative impact for GHG emissions."

The Project's points are shown in the table in **Appendix C**. The results of the screening analysis show that the Project would earn 656 points based on planned reduction measures. As such, the Project would meet the requirement of the CAP.

The Project earned points for the following planned reduction measures:

- **Insulation:** Walls will have a minimum of R-13 insulation and the roof will have R-38 insulation for all office space associated with the Project, as required by 2016 Title 24.
- **Windows:** All windows will have modestly enhanced window insulation.
- **Cool Roofs:** Modest cool roof will be constructed.
- **Heating/Cooling System:** Project will install a minimum of R-6 duct insulation, as required by 2016 Title 24.
- **Space Heating/Cooling Equipment:** Those areas that are cooled and heated will have HVAC equipment of 14 SEER or higher.
- **Water Heaters:** The water heaters installed will be of .92 energy factor or higher.
- **Daylighting:** All rooms will have some form of daylighting be it skylights or windows.
- **Artificial Lighting:** 50% of in unit fixtures will be high efficacy.
- **Photovoltaic:** 2016 Title 24 requires that nonresidential solar ready requirements apply to hotel/motel occupancies with ten habitable stories or fewer, high-rise multi-family buildings with ten stories or fewer, and all other nonresidential buildings with three habitable stories or fewer. The Project will further install solar photovoltaic panels to generate electricity equal to 100% of the power needs of the project.
- **Water Efficient Landscaping:** No turf; only drought tolerant plants.
- **Water Efficient Irrigation Systems**: Smart irrigation controllers only.
- **Toilets:** Waterless urinals and high efficiency toilets will be used throughout.
- **Faucets:** Water efficient faucets will be used throughout.
- **Recycled Water:** Graywater (purple pipe) irrigation system will be used for outdoor water.
- **Signal Improvements:** At least one traffic signal along a nearby arterial will be synchronized.
- **Sidewalks:** Sidewalks exist on the north side of the street and will be added on the south side.
- **Electric Vehicle Recharging:** 2016 CALGreen (Title 24, Part 11) requires circuit and capacity for electric vehicle charging in non-residential areas where the total number of

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parking spaces is 10 or more. The Project will additionally install eleven on-site and fifty-four off-site EV charging stations.

- **Commercial Vehicle Idling Restriction:** All commercial vehicles are restricted to 5-minutes or less per trip on site and at loading docks.

4.3 Consistency Evaluation with SB 375 (SCAG RTP/SCS)

The Southern California Association of Governments (SCAG) RTP is a long-range transportation plan that is developed and updated by SCAG every four years. The RTP provides a vision for transportation investments throughout the region. The SCS will integrate land use and transportation strategies that will achieve GHG emissions reduction targets that are forecasted to achieve reduction in GHG emissions to achieve the state's 2035 and 2040 GHG reduction goals.[76]

The Project lies entirely within Traffic Analysis Zone (TAZ) 43268200. The 2016 RTP/SCS projects that within TAZ 43268200, there will be a total of 8,755 jobs by 2020 and 22,196 by 2045.[77] As of 2016, there are 4,531 jobs in the March JPA jurisdiction. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Adding jobs consistent with 2016 RTP/SCS projections supports SCAG's achievement of ARB emissions reductions targets.

The SCS also indicates that this is a jobs poor area so providing more jobs will actually reduce GHG emissions and reduce VMT as it will provide local jobs to achieve a more favorable jobs-housing balance.

Additionally, the March JPA Draft General Plan[78] discusses the need to create more jobs as described below:

- March JPA has a stated goal of providing 38,000 jobs, through development of its Planning Area, to the western Riverside County area thereby creating a much-needed job center. The creation of a job center is important to reduce the existing jobs/housing imbalance that exists in this region such that it can help reduce traffic congestion, pollution, fossil fuel dependence and improve the overall quality of life for the residents of western Riverside County. (p. 1-11)
- March JPA has a mission to replace regional economic benefit that was lost with the realignment of the active duty March Air Force Base into a Reserve Base in April 1996. The quantified benefits are the creation of at least 38,000 jobs, and more that $500 million annual economic contribution to the Riverside County region. (p. 5-4)

The Project is expected to generate 900 jobs. This is approximately 21% of the projected job growth in TAZ 43268300 in 2020 as compared to 2016, and approximately 5.1% of projected job growth in 2045 as compared to 2016. This allows the creation of 4,224 jobs between 2016 and 2020, and 17,665 jobs between 2016 and 2045. Since the jobs created by the Project are within the job growth projections in the 2016 RTP/SCS, will not impair the

[76] 2016. The 2016-2040 Regional Transportation Plan/Sustainable Communities Strategy. April. Available at: http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf. Accessed: December 2018.

[77] Jobs data provided by March JPA.

[78] General Plan of the March Joint Powers Authority. Available at: https://www.marchjpa.com/documents/docs_forms/general_plan_updt_011718.pdf. Accessed: December 2018.

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region's ability to achieve the GHG reductions from Project related mobile sources as required by SB 375 because the land use development pattern proposed by the Project results in jobs within the total number of jobs projected by SCAG's 2016 RTP/SCS, and is consistent with the underlying assumptions upon which SCAG's 2016 RTP/SCS was based.

4.4 Quantitative Analysis of Updated Scoping Plan (Service Population)

For informational purposes, an additional comparison to a service population target is included since no numeric threshold for determining the significance of construction or operational GHG emissions from a residential/commercial development project has been adopted by the lead agency or by the SCAQMD. The SCAQMD's draft 2020 target for project-level analysis is 4.8 $MTCO_2e$ per year per service population (land use employment only).[79] The service population estimate for the Project is 900 employees on an annual average basis. Non-peak period service population is estimated to be two-thirds of the peak period based on Project specific estimates.

The Project's mitigated efficiency metric is estimated to be 17.5 MT CO_2e per year per service population, which is above the draft threshold, however, this is based on a comparison that does not fairly compare the Project emissions inventory to the associated service population. In this case, the trucks associated with Project operation are the predominant emissions source, however, those drivers are not considered in the SCAQMD's service population since they are not included in the employment for the Project land use.[80] With the analysis described in **Table 23**, the emissions from these trucks are included in the total emissions, but the drivers are excluded from the service population.

Further, this analysis also evaluates the Project's GHG emissions utilizing a modified emissions inventory to compare against the efficiency target because the District's draft definition of "service population" leads to a negative bias for projects with emissions not related to the residents or workers of the project. The modified emissions inventory used in this analysis evaluates the emissions associated with the defined service population – the workers at the project site and not the truck workers and the truck emissions; as such, mobile source emissions associated with the operational trucks are excluded from the emissions total. In this analysis, shown in **Table 24**, the Project's efficiency metric is estimated to be 6.02 MT CO_2e per year per service population, which is above the draft threshold. This analysis is included for informational purposes only.

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[79] SCAQMD has adopted interim significance thresholds for industrial sources of 10,000 metric tons of carbon dioxide equivalents per year. The Board adopted these December 5, 2008. These thresholds are not applicable to the Project because it is not an industrial source of CO_2e emissions. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2. Accessed: February 2019.

[80] SCAQMD. 2020. Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15. September 28. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf). Accessed: September 2018.

TABLES

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Table ES-1. Summary of Unmitigated and Mitigated GHG Emissions (2020)
K4 and Cactus Channel Improvement Project
Riverside County, California

Emissions Category[1]	GHG Emissions[2]	
	Unmitigated 2020	Mitigated 2020[3]
	MT CO_2e/yr	
Area Sources	0.04	0.04
Energy Usage	497	-1,342
Energy Star Lighting	-	*-175*
Solar PV	-	*-1,664*
Water	18.0	18.0
Waste Disposed	123	123
Traffic	17,298	16,856
EV charging, on- and off-site	-	*-441*
Operational Sub-Total	***17,936***	***15,656***
Construction Amortized[4]	70	70
Vegetation[4]	0	-5
Total[5]	**18,007**	**15,721**

Notes:

[1] One-time emissions (i.e., construction) and operational emissions were calculated using CalEEMod® for the build-out year.

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] Emissions reductions associated with mitigation measures are shown as negative values due to the decrease in emissions.

[4] One-time emissions from construction and vegetation sequestration were amortized over a 30-year period.

[5] Sum of annualized one-time emissions and operational emissions.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EV - electric vehicle
GHG - greenhouse gases
kW - kilowatt
MT - metric tons
N_2O - nitrous oxide
PV - photovoltaic
SP - service population
yr - year

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Table ES-2. Summary of Unmitigated and Mitigated Service Population Efficiency - Heavy Duty Trucks Excluded (2020)
K4 and Cactus Channel Improvement Project
Riverside County, California

Emissions Category[1]	GHG Emissions[2]	
	Unmitigated 2020	Mitigated 2020[3]
	MT CO_2e/yr	
Area Sources	0.04	0.04
Energy Usage	497	-1,342
Energy Star Lighting	-	*-175*
Solar PV	-	*-1,664*
Water	18.0	18.0
Waste Disposed	123	123
Traffic	6,992	6,551
EV charging, on- and off-site	-	*-441*
Operational Sub-Total	***7,630***	***5,350***
Construction Amortized[4]	70	70
Vegetation[4]	0	-5
Total[5]	**7,701**	**5,416**
Service Population[6]	**900**	
Total Emissions per Service Population (MT CO_2e/SP/yr)	**8.56**	**6.02**

Notes:

[1] One-time emissions (i.e., construction) and operational emissions were calculated using CalEEMod® for the build-out year.

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] Emissions reductions associated with mitigation measures are shown as negative values due to the decrease in emissions.

[4] One-time emissions from construction and vegetation sequestration were amortized over a 30-year period.

[5] Sum of annualized one-time emissions and operational emissions.

[6] The service population is a Project-specific estimate.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EV - electric vehicle
GHG - greenhouse gases
kW - kilowatt
MT - metric tons
N_2O - nitrous oxide
PV - photovoltaic
SP - service population
yr - year

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Table 1. Project Land Uses
K4 and Cactus Channel Improvement Project
Riverside County, California

Project Land Use	CalEEMod® Land Use Type	CalEEMod® Land Use Subtype[1]	Land Use Unit Amount	Size Metric	Acreage
Warehouse Construction					
Warehouse	Industrial	Unrefrigerated Warehouse - No Rail	718	1000 sqft	20
Parking Lot	Parking	Parking Lot	670	1000 sqft	15.4
Cactus Channel Construction					
Cactus Channel[2]	Parking	Other Non-Asphalt Surfaces	3.45	acres	3.45

Notes:

[1] Land uses as defined in CalEEMod®. Parking – Other Non-Asphalt Surfaces was used as a placeholder land use in CalEEMod, as there is no CalEEMod land use for a drainage channel.

[2] Cactus Channel land use acreage is based on the expected area that will be disturbed during construction.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
sqft - square feet

\\wcirvfps1\projects\L\Lewis\K4 Project\Technical Work\Emissions\[K4_CalEEMod_MB.xlsx]Project Land Use

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Table 2. Construction Schedule Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name[1]	CalEEMod® Phase Type[1]	Start Date[1]	End Date[1]	Phase Duration[2] (days)
Warehouse Construction				
Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	55
Pad/Site-specific Activities	Grading	8/5/2019	8/30/2019	20
Building Construction	Building Construction	9/2/2019	5/22/2020	190
Paving	Paving	5/25/2020	6/11/2020	14
Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	13
Cactus Channel Construction				
Cactus Channel Improvements - Phase 1	Site Preparation	5/20/2019	11/19/2019	132
Cactus Channel Improvements - Phase 2	Site Preparation	11/20/2019	5/19/2020	130

Notes:
[1] Construction phases and duration are based on Project-specific estimates.
[2] The construction work week was assumed to be 5 days per week.

Abbreviations:
CalEEMod® - California Emissions Estimator Model

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Table 3. Construction Equipment Mix Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name	CalEEMod® Phase Type	Equipment Type[1]	Number of Equipment[1]	Hours per day[2]	Horsepower[2] (hp)	Load Factor[2]
Warehouse Construction						
Rough Grading and Utility Installation	Site Preparation	Rubber Tired Dozers	2	8	247	0.4
		Tractors/Loaders/Backhoes	2	8	97	0.37
Pad/Site-Specific Grading Activities	Grading	Excavators/Graders/Scrapers[3]	3	8	367	0.48
		Rubber Tired Dozers	2	8	247	0.4
		Tractors/Loaders/Backhoes	2	8	97	0.37
Building Construction	Building Construction	Cranes	1	7	231	0.29
		Forklifts	2	8	89	0.2
		Tractors/Loaders/Backhoes	2	7	97	0.37
		Welders	2	8	46	0.45
Paving	Paving	Pavers	2	8	130	0.42
		Paving Equipment	2	8	132	0.36
		Rollers	2	8	80	0.38
Architectural Coating	Architectural Coating	Air Compressors	2	6	78	0.48
Cactus Channel Construction						
Cactus Channel Improvements - Phase 1	Site Preparation	Excavators	2	8	158	0.38
		Rubber Tired Loaders	2	8	203	0.36
Cactus Channel Improvements - Phase 2	Site Preparation	Cranes	1	8	231	0.29

Notes:
[1] Equipment type and number of equipment based on Project-specific data.
[2] Operation hours, horsepower, and load factor based on CalEEMod® defaults. Available at: www.caleemod.com. Accessed: August 2018.
[3] Excavators, graders, and scrapers are assumed to be interchangeable equipment. This equipment group was conservatively modeled in CalEEMod® as scrapers.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
hp - horsepower

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Table 4. Construction Trip Assumptions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase Name	Worker Trips per Day[1]	Vendor Trips per Day[1]	Total Hauling Trips[2]
Warehouse Construction			
Rough Grading and Utility	10	0	27,500
Pad/Site-specific Activities	18	0	0
Building Construction	583	227	0
Paving	15	0	0
Architectural Coating	117	0	0
Cactus Channel Construction			
Cactus Channel Improvements - Phase 1	10	0	7,500
Cactus Channel Improvements - Phase 2	3	0	0

Notes:

[1] Trips are presented as one-way trips and are based on CalEEMod® defaults. The one-way trip lengths for worker and vendor trips are also based on CalEEMod® defaults and are 14.7 and 6.9 miles, respectively.

[2] Trips are presented as one-way trips and represent the total trips for the phase. Project specific estimates of the volume of soil imported (220,000 cubic yards) and exported (60,000 cubic yards) were used to estimate the number of haul trips required. The hauling trip distance for warehouse construction is 3 miles, based on Project specific data. The hauling trip distance for Cactus Channel construction is based on the CalEEMod® default of 20 miles.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

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Table 5. GHG Construction Emissions from Off-Road Equipment
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase	Construction Activity	Year	CO_2e Emissions[1,2] (MT)
Warehouse	Rough Grading and Utility Installation	2019	58
	Pad/Site-Specific Grading Activities	2019	62
	Building Construction	2019	70
	Building Construction	2020	81
	Paving	2020	14
	Architectural Coating	2020	3
Cactus Channel	Phase 1	2019	136
	Phase 2	2020	8
	Phase 2	2020	26
Total		**2019**	**326**
		2020	**132**

Notes:

[1] Emissions shown here are based on Project-specific construction schedule and equipment list CalEEMod® defaults were used for on-site construction equipment horsepower and load factors. Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs.

[2] CO_2e includes CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2e - carbon dioxide equivalents
CO_2 - carbon dioxide
GHG - greenhouse gas
MT - metric tons
N_2O - nitrous oxide

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Table 6. GHG Construction Emissions from On-Road Vehicles
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase	Construction Activity	Year	CO_2e Emissions[1,2]			
			Hauling	Vendor	Worker	Total
			(MT)			
Warehouse	Rough Grading and Utility Installation	2019	310	0	2.6	313
	Pad/Site-Specific Grading Activities	2019	0	0	1.7	1.7
	Building Construction	2019	0	245	241	486
	Building Construction	2020	0	288	276	564
	Paving	2020	0	0	1.0	1.0
	Architectural Coating	2020	0	0	7.0	7.0
Cactus Channel	Phase 1	2019	275	0	6.3	281
	Phase 2	2019	0	0	0.4	0
	Phase 2	2020	0	0	1.4	1.4
Total		**2019**	**585**	**245**	**252**	**1,082**
		2020	**0**	**288**	**286**	**574**

Notes:

[1] Emissions shown here are based on Project-specific construction schedule, equipment list, and amount of hauling material. CalEEMod® defaults were used for on-road vehicle trips. Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs.

[2] CO_2e includes CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
MT - metric tons
N_2O - nitrous oxide

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Table 7. Summary of Construction GHG Emissions
K4 and Cactus Channel Improvement Project
Riverside County, California

Construction Phase	CO_2e Emissions[1]		
	Equipment	Vehicles	Total
	(MT)		
Warehouse	289	1,373	1,661
Cactus Channel	170	283	453
Total	**458**	**1,656**	**2,114**
		30-yr amortized[2]	**70**

Notes:
[1] Emissions estimated using CalEEMod®. Obtained from Table 5 and Table 6.
[2] One-time emissions from construction were amortized over a 30-year period.

Abbreviations:
CalEEMod - CALifornia Emissions Estimator MODel
CO_2e - carbon dioxide equivalents
GHG - greenhouse gas
MT - metric tons

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Table 8. Vegetation Change Evaluation
K4 and Cactus Channel Improvement Project
Riverside County, California

Net New Trees[1] (# of Trees)	CO_2e Emissions Associated with Sequestration[2] (MT)	30-year Amortized CO_2e Emissions Associated with Sequestration (MT/yr)
200	-142	**-5**

Notes:

[1] Project includes 200 new trees planted at the Project site.

[2] Sequestration is based on the CalEEMod® default for sequestration rate of 0.0354 MT/tree/year for miscellaneous tree species with an active growing period of 20 years.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel

CO_2e - carbon dioxide equivalents

MT - metric tons

yr - year

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Table 9. GHG Emissions Associated with Operational Area Sources
K4 and Cactus Channel Improvement Project
Riverside County, California

Category[1]	CO_2e Emissions[2] (MT/yr)
Landscaping	0.04
Total	**0.04**

Notes:

[1] Categories that CalEEMod classifies as "Area Sources." CalEEMod does not associate any CO_2e emissions with Architectural Coating and Consumer Products.

[2] Emissions were estimated using CalEEMod®.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel

CO_2e - carbon dioxide equivalents

GHG - greenhouse gases

MT - metric tons

yr - year

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Table 10. Utility GHG Emission Factor Associated with Renewable Portfolio Standard
K4 and Cactus Channel Improvement Project
Riverside County, California

Energy Delivered [MWh]				
	2015	**2016**	**Average**	**Units**
Total Energy Delivery[2]	75,374,350	73,268,226	--	MWh
from renewables[2]	18,315,967	20,734,908		MWh
from non-renewables	57,058,383	52,533,318	--	MWh
% of Total Energy From Renewables[1]	24.3%	28.3%	--	
% of Total Energy From Non-Renewables	76%	72%	--	
CO_2 Intensity Factor per Total Energy Delivered[1]	517.00	529.00	523.00	lbs CO_2/MWh delivered
CO_2 Intensity Factor per Total Non-Renewable Energy[3]	682.96	737.80	--	lbs CO_2/MWh delivered

Estimated Intensity Factors for Total Energy Delivered[4]				
2020 RPS (33%)	**457.6**	**494.3**	**475.95**	lbs CO_2/MWh delivered

Notes:

[1]2015 and 2016 intensity factor per total energy delivered and percent of total energy from renewables information provided in the 2016 SCE Corporate Responsibility Report, page 8 and 45. Available at: https://www.edison.com/content/dam/eix/documents/investors/corporate_responsibility/2016-eix-corporate-responsibility-and-sustainability-report.pdf. Accessed: May 2018.

[2] The total energy from renewable energy as provided in the SCE 2016 Preliminary Annual 33% RPS Compliance Report Appendix A - Page 5. Available at: http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/7501D8430F71FC7688258183007868CD/$FILE/R1502020-SCE%202016%20Annual%20RPS%20Compliance%20Report-PUBLIC.pdf. Accessed: May 2018.

[3] The emissions metric presented here is calculated based on the total CO_2 emissions divided by the energy delivered from non-renewable sources.

[4] The intensity factors for default RPS assumption are estimated by multiplying the percentage of energy delivered from non-renewable energy by the CO_2 emissions per total non-renewable energy metric calculated above. The emission factor presented here is 33% RPS for 2020. The estimate provided here and the PUP reports issued by SCE assume that renewable energy sources do not result in any CO_2 emissions.

Abbreviations:

CO_2 - carbon dioxide
GHG - greenhouse gases
lbs - pounds
MT - metric tonnes
MWh - megawatt-hour
RPS - Renewable Portfolio Standards
SCE - Southern California Edison

Conversions:

lb/metric tonne 2204.62

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Table 11. Unmitigated and Mitigated GHG Emissions Associated with Electricity and Natural Gas Use During Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

CalEEMod Land Use	Project Entitlement	CO_2e Emissions from Energy Use[2]	
		Unmitigated	Mitigated[3]
		(MT/yr)	
Industrial	Unrefrigerated Warehouse - No Rail	446	309
Parking	Parking Lot	51	13
	Total	**497**	**322**
Additional Mitigation Measures			
Solar PV[4]		-	-1,664
	Total	**497**	**-1,342**

Notes:
[1] Energy usage for each land use was based on CalEEMod databases, includes electricity and natural gas demand.
[2] Emissions were estimated using CalEEMod®.
[3] Installation of Energy Star certified light bulb and lighting fixtures reduces lighting electricity demand by 75%.
[4] Emissions reductions from rooftop solar PV arrays are shown in greater detail in Table 20.

Abbreviations:
CalEEMod - CALifornia Emissions Estimator MODel
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
MT - metric tons
PV - photovoltaic
yr - year

P:\L\Lewis\K4 Project\Technical Work\Emissions\Operational\[K4_Operational_Emissions.xlsx]GHG_Energy

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Table 12. Unmitigated and Mitigated GHG Emissions Associated with Water Use During Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

Project Indoor Water Usage[1]	Project Outdoor Water Usage[2]	CO_2e Emissions from Water Use[3]	
		Unmitigated	Mitigated
gal/year	gal/year	(MT/yr)	
3,285,000	1,755,193	18.0	18.0

Notes:

[1] Project specific data indicates 10 gallon/day/employee for 900 employees on an annual average basis. Assumption accounts for low-use fixtures. Yearly estimate assumes 365 days of operation per year at the daily water usage rate.

[2] Project specific data. Includes measures for water efficient landscapes.

[3] Emissions were estimated using CalEEMod®. Refer to Appendix A for detailed CalEEMod® outputs.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CO_2e - carbon dioxide equivalents
gal - gallons
GHG - greenhouse gases
MT - metric tons
yr - year

P:\L\Lewis\K4 Project\Technical Work\Emissions\Operational\[K4_Operational_Emissions.xlsx]GHG_Water

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Table 13. GHG Emissions Associated with Waste Disposal During Project Operation
K4 and Cactus Channel Improvement Project
Riverside County, California

CalEEMod Land Use	Project Entitlement	Waste Disposed (75% diversion) (tons/yr)	CO_2e Emissions Associated with Waste (MT/yr)
Industrial	Unrefrigerated Warehouse - No Rail	245	123
Parking	Parking Lot	--	0
	Total	**245**	**123**

Notes:

[1] Solid waste disposal emissions using default data in CalEEMod® were adjusted to 75% waste diversion using CalRecycle waste disposal rates for unincorporated Riverside County.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
MT - metric tons
yr - year

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Table 14. Operational Mobile Source Trip Parameters and Vehicle Miles Traveled
K4 and Cactus Channel Improvement Project
Riverside County, California

Vehicle Type	Peak Period Daily Trips[1,2]	Non-Peak Period Daily Trips[3]	Annual Average Trips[4]	Trip Length[5,6]	Annual Average VMT[7]
Passenger Cars	5,356	3,571	1,413,984	16.6	23,472,134
2-Axle Trucks	86	57	22,704	60	1,362,240
3-Axle Trucks	107	71	28,248	60	1,694,880
4-Axle+ Trucks	324	216	85,536	60	5,132,160

Notes:

[1] Project-specific vehicle trip rates prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018.

[2] Peak period daily trip rates in this table represent the maximum daily one-way trips that would occur during the holiday season (November 15th to January 15th).

[3] Non-peak period daily trips are estimated to be 2/3rd of the peak daily trips based on the ratio of peak period to non peak period employment.

[4] Annual trips are calculated using the daily trip estimates for each time period (peak and non-peak) and the number of days in that time period.

[5] Passenger cars represent vehicles used by employee to commute to work. Average trip length for these vehicles is assumed to be equal to the CalEEMod® default trip length for commercial-work trips in Riverside County.

[6] Commercial non-work trip lengths for truck trips is assumed to be 60 miles based on an anticipated truck usage similar to recent Environmental Impact Reports for warehouse distribution centers in the region. The CalEEMod® default for commercial non-work trip length is 6.9 miles. Therefore, the use of a 60-mile trip length is conservative.

[7] Estimated as a product of trip length and annual average trips for each vehicle type.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
VMT - vehicle miles traveled

P:\L\Lewis\K4 Project\Technical Work\Emissions\Operational\[K4_Operational_Emissions.xlsx]Project_Trips_VMT_GHG

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Table 15. Operational Mobile Source Fleet Mixes
K4 and Cactus Channel Improvement Project
Riverside County, California

CalEEMod® Default[1]	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
	53.8%	3.8%	18.4%	12.2%	1.7%	0.5%	1.7%	6.8%	0.1%	0.1%	0.5%	0.1%	0.1%

Passenger Vehicles[2]	LDA	LDT1	LDT2
	70.7%	5.1%	24.2%

Trucks[3]	2-Axle		3-Axle	4-Axle
	LHDT1	LHDT2	MHDT	HHDT
	12.7%	3.9%	20.7%	62.7%

Notes:

[1] CalEEMod® default Unrefrigerated Warehouse - No Rail land use subtype in Riverside County - South Coast.

[2] Passenger vehicles represent vehicles used by employees to commute to work. Fleet mix for passenger vehicles are estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix.

[3] Fleet mix for the 2-axle, 3-axle, and 4-axle trucks was estimated by rationing the trip rates for these vehicle types prepared by Urban Crossroads in the *K4 Parcel Project Traffic Impact Analysis* dated July 20, 2018. 2-axle trucks further distributed into LHD1 and LHD2 based on the ratio of these vehicle classes in the CalEEMod® default fleet mix.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
LDA - Light Duty Automobile
LDT - Light-Duty Truck
LHD - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MDV - Medium-Duty Vehicle
MH - Motor Home
MHD - Medium-Heavy Duty truck
OBUS - Other Buses
UBUS - Urban Buses
MCY - Motorcycle
SBUS - School Bus

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Table 16. Operational Mobile Source Emission Factors: Running Exhaust
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	EMFAC VMT Output[1] (miles/day)	EMFAC Running Exhaust Emissions Output[2] (tons/day)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	23,249,118	6,942	0.133	0.072
LDT1	2,177,180	771	0.028	0.021
LDT2	7,020,151	2,678	0.062	0.035
Trucks				
LHDT1	1,069,352	755	0.056	0.007
LHDT2	285,131	199	0.021	0.001
MHDT	774,036	850	0.121	0.006
HHDT	1,858,206	2,876	0.453	0.053

EMFAC Vehicle Class	Project Specific Fleet Mix[3]	Running Exhaust Emission Factors[4] (grams/mile)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	70.7%	271	0.005	0.0028
LDT1	5.1%	321	0.012	0.0089
LDT2	24.2%	346	0.008	0.0045
Weighted Emission Factor[5]		**292**	**0.006**	**0.0035**
Trucks				
LHDT1	12.7%	640	0.05	0.006
LHDT2	3.9%	634	0.07	0.004
MHDT	20.7%	997	0.14	0.007
HHDT	62.7%	1,404	0.22	0.026
Weighted Emission Factor[5]		**1,193**	**0.18**	**0.019**

Notes:

[1] Data obtained from Table B-1 in Appendix B of this report.

[2] Running exhaust emissions obtained from Table B-3 in Appendix B of this report.

[3] Data obtained from Table 15.

[4] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[5] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate VMT-based emission factors for passenger vehicles and trucks.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
EMFAC - EMission FACtors model
HHDT - Heavy-Heavy Duty truck
LHDT - Light-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
N_2O - nitrous oxide

Conversion Factor:

907,184.74 grams per ton

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Table 17. Operational Mobile Source Emission Factors: Starting Exhaust
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	EMFAC Vehicle Trips Output[1] (trips/day)	EMFAC Starting Exhaust Emissions Output[2] (tons/day)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	2,629,908	163	0.079	0.16
LDT1	258,535	20	0.010	0.028
LDT2	816,421	67	0.033	0.071
Trucks				
LHDT1	434,726	5.0	0.0115	0.0079
LHDT2	108,780	0.80	0.0016	0.0010
MHDT	144,226	1.1	0.0008	0.0012
HHDT	156,757	0.01	0.0000023	0.000000037

Vehicle Class	Project Specific Fleet Mix[3]	Starting Exhaust Emission Factors[4] (grams/trip)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	70.7%	56	0.027	0.056
LDT1	5.1%	69	0.034	0.098
LDT2	24.2%	74	0.036	0.079
Weighted Emission Factor[5]		**61**	**0.030**	**0.064**
Trucks				
LHDT1	12.7%	11	0.024	0.017
LHDT2	3.9%	6.7	0.014	0.0087
MHDT	20.7%	7.1	0.0050	0.0073
HHDT	62.7%	0.050	0.000013	0.00000021
Weighted Emission Factor[5]		**3.1**	**0.0046**	**0.0040**

Notes:

[1] Data obtained from Table B-2 in Appendix B of this report.

[2] Starting exhaust emissions obtained from Table B-3 in Appendix B of this report.

[3] Data obtained from Table 15.

[4] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trip output.

[5] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate trip-based emission factors for passenger vehicles and trucks.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
LDT - Light-Duty Truck
LHDT - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
N_2O - nitrous oxide

Conversion Factor:

907,184.74 grams per ton

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Table 18. Operational Mobile Source Emission Factors: Truck Idling
K4 and Cactus Channel Improvement Project
Riverside County, California

EMFAC Vehicle Class	Project Specific Fleet Mix[1]	Idling Emission Factors for Trucks[2] (grams/idle-minute)		
		CO_2	N_2O	CH_4
LHDT1	12.7%	71	0	0.019
LHDT2	3.9%	103	0	0.011
MHDT	20.7%	117	0	0.0026
HHDT	62.7%	103	0	0.0020
Weighted Emission Factor[3]		**102**	**0**	**0.0046**

Notes:

[1] Data obtained from Table 15.

[2] Data obtained from Table B-4 in Appendix B of this report. N_2O emissions are zero, as reported by EMFAC.

[3] Emission factors for EMFAC vehicle classes are weighted based on project-specific fleet mix to estimate idling emission factors for trucks.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
EMFAC - EMission FACtors model
LHDT - Light-Heavy Duty truck
HHDT - Heavy-Heavy Duty truck
MHDT - Medium-Heavy Duty truck
N_2O - nitrous oxide

Conversion Factor:

60 minutes per hour

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Table 19. Operational Mobile Source Emissions Summary
K4 and Cactus Channel Improvement Project
Riverside County, California

Mobile Source Activity	Annual Average VMT[1] (miles/year)	Annual Trips[1] (one-way trips/year)	Idle Duration (minutes/ round trip)	GHG Emissions (MT/yr)			
				CO_2	N_2O	CH_4	CO_2e[2]
Passenger Car Trips (On- and Off-Site)[3]	23,472,134	1,413,984	--	6,932	0.19	0.173	6,992
Truck Trips (On- and Off-Site)[3]	8,189,280	136,488	--	9,767	1.45	0.153	10,202
Truck Idling (On-Site)[4]	--	136,488	15	104	0	0.005	104
Total Unmitigated Emissions[5]				**16,803**	**1.63**	**0.331**	**17,298**
Mitigation Measure - Electric Vehicle Charging Stations[6]							-441
Total Mitigated Emissions[7]							**16,856**

Notes

[1] Data obtained from Table 14.

[2] CO_2e estimated based on Global Warming Potentials for 100-year time horizon for CO_2, N_2O, and CH_4 as presented in the Intergovernmental Panel on Climate Change Fourth Assessment Report.

[3] Includes emissions from running exhaust and starting exhaust. Emissions were estimated using emission factors from Tables 16 and 17 along with annual average VMT and annual average trips.

[4] Includes emissions from on-site truck idling that is estimated using the number of round trips (i.e. half of the one-way trips), idling time per round trip and truck idling emission factors from Tables 18.

[5] Estimated as a sum of emissions from passenger car trips, truck trips, and truck idling.

[6] Emissions reductions from electric vehicle charging stations are shown in greater detail in Table 21.

Abbreviations:
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
lbs - pounds
MT - metric tonnes
N_2O - nitrous oxide
VMT - vehicle miles traveled
yr - year

Conversion Factors:
2204.62 lb/MT
453.592 g/lb

Global Warming Potentials

CO_2	1
CH_4	25
N_2O	298

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Table 20. GHG Emissions Reduction from Rooftop Solar Photovoltaic Panels
K4 and Cactus Channel Improvement Project
Riverside County, California

Parameters		Units
Total Project Rooftop Area	718,000	sqft
System Size[1]	4.5	MW
System Generation[2]	7,668	MWh/year
Electricity Intensity Factor[3]	478	lb CO_2e/MWh
Annual GHG Emission Reduction	**1,664**	**MT CO_2e/yr**

Notes

[1] System size based on Project-specific data.

[2] System generation was determined using default commercial rooftop solar array assumptions in the National Renewable Energy Laboratory's PVWatts tool. Available at: http://pvwatts.nrel.gov/pvwatts.php.

[3] CO_2e weighted intensity factor for SCE accounts for CO_2, N_2O, and CH_4 emissions rates under the 33% RPS for 2020.

Abbreviations

CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
kW - kilowatt
kWh - kilowatt-hour
lb - pound
MT - metric tonnes
MWh - megawatt-hour
RPS - Renewable Portfolio Standards
SCE - Southern California Edison
sqft - square feet
yr - year
PV - photovoltaic

Conversion Factors:

lb/MT	2204.62
MT/gram	1.00E-06
MWh to KWh	0.001
(lbs CO2e/MWh delivered)	478.47
ft/m	3.28

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Table 21. GHG Emissions Reduction from Electric Vehicle Charging Stations
K4 and Cactus Channel Improvement Project
Riverside County, California

Parameters		Unit
Estimating GHG Emissions Reduction from Replacement of Gasoline Vehicle with Electric Vehicle		
SCE Electricity Emission Factor[1]	0.22	MT CO_2e/MWh
Fuel Economy of Electric Vehicle[2]	0.25	kWh/mi
Gasoline/Diesel CO_2e Emission while Running[3]	295	g/mi
Annual Energy Delivery per Parking Spot[4]	7,056	kWh/charging station/yr
Annual VMT Reduction per Parking Spot[5]	28,224	mi/charging station/yr
Number of Parking Spots Provided Chargers[6]	65	charging stations
Annual VMT Reduction from All Stations (Based on Charge)	1,834,560	mi/yr
Estimated Benefit from Installing On-Site Electric Vehicle Charging Stations		
GHG Emissions of Gasoline/Diesel Vehicle[7]	541	MT CO_2e/yr
GHG Emissions of Electric Vehicle[8]	100	
Annual GHG Emissions Reduction	**441**	MT CO_2e/yr

Notes:

[1] CO_2e weighted intensity factor for SCE accounts for CO_2 and CH_4 emissions rates under the 33% RPS for 2020.

[2] US Department of Energy, 2013. Benefits and Considerations of Electricity as a Vehicle Fuel. Available at: http://www.afdc.energy.gov/fuels/electricity_benefits.html. Accessed: August 2018.

[3] Running exhaust emission rates for CO_2, CH_4, and N_2O were estimated using EMFAC2017 for light-duty gasoline and diesel-powered vehicles in Riverside County, aggregated for all models and speeds, averaged over all seasons in calendar year 2020. Emission rate was converted to CO_2e using the Fourth Assessment Report Global Warming Potentials. Available at: https://www.arb.ca.gov/msei/msei.htm. Accessed: August 2018.

[4] Annual Energy Delivery and VMT reduction based on an average monthly energy delivery of 588 kWh per charging station for conventional Level 2 chargers, as estimated by the California Energy Commission. Available at: https://www.energy.ca.gov/2018publications/CEC-500-2018-020/CEC-500-2018-020.pdf. Accessed: December 2018.

[5] Annual VMT reduction calculated as the annual energy delivery divided by the fuel economy of an electric vehicle.

[6] Number of charging stations based on project commitment.

[7] GHG emissions calculated using annual VMT reduction at all stations and CO_2e emission rate.

[8] GHG emissions calculated using annual VMT reduction at all stations, fuel economy of electric vehicles, along with SCE electricity CO_2e emission factor.

Abbreviations:

ACC - Advanced Clean Cars
CARB - California Air Resources Board
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EMFAC - California Air Resources Board Emissions Factor Model
EV - electric vehicle
g - grams
GHG - greenhouse gases
kWh - kilowatt-hour
lb - pound
mi - miles
MT - metric tonnes
MWh - megawatt-hour
RPS - Renewable Portfolio Standards
SCE - Southern California Edison
VMT - vehicle miles travelled
yr - year

Conversion Factors:

lb/MT	2204.62
MT/gram	1.00E-06
MWh to KWh	0.001
(lbs CO_2e/MWh delivered)	478.47

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Table 22. Summary of Unmitigated and Mitigated Operational GHG Emissions (2020)
K4 and Cactus Channel Improvement Project
Riverside County, California

Category[1]	CO_2e Emissions (MT/yr)	
	Unmitigated	Mitigated
Area	0.04	0.04
Energy Use	497	-1,342
Energy Star Lighting	–	*-175*
Solar PV	–	*-1,664*
Water Use	18.0	18.0
Waste Disposed	123	123
Traffic	17,298	16,856
EV charging, on-site	–	*-441*
Total	**17,936**	**15,656**

Notes:

[1] All operational categories are presented in greater detail in the previous tables. Emissions reductions associated with mitigation measures are shown as negative emission contributions.

[2] CO_2e emissions were estimated using CalEEMod® for all operational categories for the build-out year.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CO_2e - carbon dioxide equivalents
EV - electric vehicle
GHG - greenhouse gases
MT - metric tons
PV - photovoltaic
yr - year

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Table 23. Summary of Unmitigated and Mitigated Service Population Efficiency (2020)
K4 and Cactus Channel Improvement Project
Riverside County, California

Emissions Category[1]	GHG Emissions[2]	
	Unmitigated 2020	Mitigated 2020[3]
	MT CO_2e/yr	
Area Sources	0.04	0.04
Energy Usage	497	-1,342
Energy Star Lighting	-	*-175*
Solar PV	-	*-1,664*
Water	18.0	18.0
Waste Disposed	123	123
Traffic	17,298	16,856
EV charging, on-site and off-site	-	*-441*
Operational Sub-Total	**17,936**	**15,656**
Construction[4]	70	70
Vegetation[4]	0	-5
Total[5]	**18,007**	**15,721**
Service Population[6]	**900**	
Total Emissions per Service Population (MT CO_2e/SP/yr)	**20.0**	**17.5**

Notes:

[1] One-time emissions (i.e., construction and vegetation) and operational emissions were calculated using CalEEMod® for the build-out year.

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] Emissions reductions associated with mitigation measures are shown as negative values due to the decrease in emissions.

[4] One-time emissions from construction and vegetation sequestration were amortized over a 30-year period.

[5] Sum of annualized one-time emissions and operational emissions.

[6] The service population is a Project-specific estimate.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EV - electric vehicle
GHG - greenhouse gases
kW - kilowatt
MT - metric tons
N_2O - nitrous oxide
PV - photovoltaic
SP - service population
yr - year

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Table 24. Summary of Unmitigated and Mitigated Service Population Efficiency - Operational Truck Traffic Excluded (2020)
K4 and Cactus Channel Improvement Project
Riverside County, California

Emissions Category[1]	GHG Emissions[2]	
	Unmitigated 2020	Mitigated 2020[3]
	MT CO_2e/yr	
Area Sources	0.04	0.04
Energy Usage	497	-1,342
Energy Star Lighting	-	*-175*
Solar PV	-	*-1,664*
Water	18.0	18.0
Waste Disposed	123	123
Traffic	6,992	6,551
EV charging, on-site and off-site	-	*-441*
Operational Sub-Total	***7,630***	***5,350***
Construction[4]	70	70
Vegetation[4]	0	-5
Total[5]	**7,701**	**5,416**
Service Population[6]	**900**	
Total Emissions per Service Population (MT CO_2e/SP/yr)	**8.56**	**6.02**

Notes:

[1] One-time emissions (i.e., construction and vegetation) and operational emissions were calculated using CalEEMod® for the build-out year.

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] Emissions reductions associated with mitigation measures are shown as negative values due to the decrease in emissions.

[4] One-time emissions from construction and vegetation sequestration were amortized over a 30-year period.

[5] Sum of annualized one-time emissions and operational emissions.

[6] The service population is a Project-specific estimate.

Abbreviations:

CalEEMod - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EV - electric vehicle
GHG - greenhouse gases
kW - kilowatt
MT - metric tons
N_2O - nitrous oxide
PV - photovoltaic
SP - service population
yr - year

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APPENDIX A
CALEEMOD® OUTPUT FILES

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List of CalEEMod Runs

Appendix A.1: K4 Project (On-Site) Construction
Appendix A.2: Cactus Channel (Off-Site) Construction
Appendix A.3: K4 Project Operation

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APPENDIX A.1
K4 PROJECT (ON-SITE) CONSTRUCTION

K4 - Construction - All Equipment - Unmitigated

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project Data

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Off-road Equipment -

Off-road Equipment - Project data

Trips and VMT - Project data

Grading - Project Data

Architectural Coating -

Construction Off-road Equipment Mitigation -

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	55.00
tblConstructionPhase	NumDays	75.00	20.00
tblConstructionPhase	NumDays	740.00	190.00
tblConstructionPhase	NumDays	55.00	14.00
tblConstructionPhase	NumDays	55.00	13.00
tblGrading	MaterialImported	0.00	220,000.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblTripsAndVMT	HaulingTripLength	20.00	3.00

2.0 Emissions Summary

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2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4195	5.2120	2.6744	0.0106	0.8793	0.1239	1.0033	0.3570	0.1151	0.4721	0.0000	986.8704	986.8704	0.1353	0.0000	990.2524
2020	3.7184	2.1639	2.0308	7.3100e-003	0.4134	0.0566	0.4700	0.1115	0.0532	0.1646	0.0000	669.5090	669.5090	0.0576	0.0000	670.9480
Maximum	**3.7184**	**5.2120**	**2.6744**	**0.0106**	**0.8793**	**0.1239**	**1.0033**	**0.3570**	**0.1151**	**0.4721**	**0.0000**	**986.8704**	**986.8704**	**0.1353**	**0.0000**	**990.2524**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.4195	5.2120	2.6744	0.0106	0.6058	0.1239	0.7297	0.2174	0.1151	0.3325	0.0000	986.8701	986.8701	0.1353	0.0000	990.2521
2020	3.7184	2.1639	2.0308	7.3100e-003	0.4134	0.0566	0.4700	0.1115	0.0532	0.1646	0.0000	669.5089	669.5089	0.0576	0.0000	670.9479
Maximum	**3.7184**	**5.2120**	**2.6744**	**0.0106**	**0.6058**	**0.1239**	**0.7297**	**0.2174**	**0.1151**	**0.3325**	**0.0000**	**986.8701**	**986.8701**	**0.1353**	**0.0000**	**990.2521**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**21.16**	**0.00**	**18.57**	**29.80**	**0.00**	**21.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	7-1-2019	9-30-2019	2.3745	2.3745
2	10-1-2019	12-31-2019	1.6146	1.6146
3	1-1-2020	3-31-2020	1.4461	1.4461
4	4-1-2020	6-30-2020	4.5504	4.5504
		Highest	4.5504	4.5504

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Energy	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	494.2032	494.2032	0.0269	6.6800e-003	496.8641
Mobile	0.4490	3.9614	6.2283	0.0261	1.9740	0.0249	1.9989	0.5290	0.0235	0.5524	0.0000	2,413.1626	2,413.1626	0.1158	0.0000	2,416.0582
Waste						0.0000	0.0000		0.0000	0.0000	137.0027	0.0000	137.0027	8.0966	0.0000	339.4183
Water						0.0000	0.0000		0.0000	0.0000	52.6760	466.7428	519.4188	5.4388	0.1336	695.2110
Total	**3.4385**	**4.0330**	**6.3062**	**0.0265**	**1.9740**	**0.0304**	**2.0044**	**0.5290**	**0.0289**	**0.5579**	**189.6787**	**3,374.1430**	**3,563.8217**	**13.6782**	**0.1403**	**3,947.5883**

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2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Energy	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	494.2032	494.2032	0.0269	6.6800e-003	496.8641
Mobile	0.4490	3.9614	6.2283	0.0261	1.9740	0.0249	1.9989	0.5290	0.0235	0.5524	0.0000	2,413.1626	2,413.1626	0.1158	0.0000	2,416.0582
Waste						0.0000	0.0000		0.0000	0.0000	137.0027	0.0000	137.0027	8.0966	0.0000	339.4183
Water						0.0000	0.0000		0.0000	0.0000	52.6760	466.7428	519.4188	5.4388	0.1336	695.2110
Total	**3.4385**	**4.0330**	**6.3062**	**0.0265**	**1.9740**	**0.0304**	**2.0044**	**0.5290**	**0.0289**	**0.5579**	**189.6787**	**3,374.1430**	**3,563.8217**	**13.6782**	**0.1403**	**3,947.5883**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Rough Grading and Utility Installation	Site Preparation	5/20/2019	8/2/2019	5	55	
2	Pad/Site-Specific Grading Activities	Grading	8/5/2019	8/30/2019	5	20	
3	Building Construction	Building Construction	9/2/2019	5/22/2020	5	190	
4	Paving	Paving	5/25/2020	6/11/2020	5	14	
5	Architectural Coating	Architectural Coating	6/12/2020	6/30/2020	5	13	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 1,077,000; Non-Residential Outdoor: 359,000; Striped Parking Area: 40,185 (Architectural Coating – sqft)

OffRoad Equipment

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K4 - Construction - All Equipment - Unmitigated - Riverside-South Coast County, Annual

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rough Grading and Utility Installation	Rubber Tired Dozers	2	8.00	247	0.40
Rough Grading and Utility Installation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Pad/Site-Specific Grading Activities	Excavators	0	8.00	158	0.38
Pad/Site-Specific Grading Activities	Graders	0	8.00	187	0.41
Pad/Site-Specific Grading Activities	Rubber Tired Dozers	2	8.00	247	0.40
Pad/Site-Specific Grading Activities	Scrapers	3	8.00	367	0.48
Pad/Site-Specific Grading Activities	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Welders	2	8.00	46	0.45
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	2	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Rough Grading and Utility Installation	4	10.00	0.00	27,500.00	14.70	6.90	3.00	LD_Mix	HDT_Mix	HHDT
Pad/Site-Specific Grading Activities	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	583.00	227.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	2	117.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

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3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.3451	0.0000	0.3451	0.1842	0.0000	0.1842	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0752	0.7927	0.3623	6.4000e-004		0.0410	0.0410		0.0377	0.0377	0.0000	57.5276	57.5276	0.0182	0.0000	57.9827
Total	**0.0752**	**0.7927**	**0.3623**	**6.4000e-004**	**0.3451**	**0.0410**	**0.3861**	**0.1842**	**0.0377**	**0.2219**	**0.0000**	**57.5276**	**57.5276**	**0.0182**	**0.0000**	**57.9827**

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3.2 Rough Grading and Utility Installation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0389	1.8386	0.2085	3.2100e-003	0.0358	2.6700e-003	0.0385	9.8500e-003	2.5500e-003	0.0124	0.0000	308.6703	308.6703	0.0505	0.0000	309.9335
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3700e-003	9.9000e-004	0.0104	3.0000e-005	3.0200e-003	2.0000e-005	3.0400e-003	8.0000e-004	2.0000e-005	8.2000e-004	0.0000	2.6114	2.6114	7.0000e-005	0.0000	2.6132
Total	**0.0403**	**1.8396**	**0.2189**	**3.2400e-003**	**0.0388**	**2.6900e-003**	**0.0415**	**0.0107**	**2.5700e-003**	**0.0132**	**0.0000**	**311.2818**	**311.2818**	**0.0506**	**0.0000**	**312.5467**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1553	0.0000	0.1553	0.0829	0.0000	0.0829	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0752	0.7927	0.3623	6.4000e-004		0.0410	0.0410		0.0377	0.0377	0.0000	57.5276	57.5276	0.0182	0.0000	57.9826
Total	**0.0752**	**0.7927**	**0.3623**	**6.4000e-004**	**0.1553**	**0.0410**	**0.1963**	**0.0829**	**0.0377**	**0.1206**	**0.0000**	**57.5276**	**57.5276**	**0.0182**	**0.0000**	**57.9826**

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3.2 Rough Grading and Utility Installation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0389	1.8386	0.2085	3.2100e-003	0.0358	2.6700e-003	0.0385	9.8500e-003	2.5500e-003	0.0124	0.0000	308.6703	308.6703	0.0505	0.0000	309.9335
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3700e-003	9.9000e-004	0.0104	3.0000e-005	3.0200e-003	2.0000e-005	3.0400e-003	8.0000e-004	2.0000e-005	8.2000e-004	0.0000	2.6114	2.6114	7.0000e-005	0.0000	2.6132
Total	**0.0403**	**1.8396**	**0.2189**	**3.2400e-003**	**0.0388**	**2.6900e-003**	**0.0415**	**0.0107**	**2.5700e-003**	**0.0132**	**0.0000**	**311.2818**	**311.2818**	**0.0506**	**0.0000**	**312.5467**

3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1523	0.0000	0.1523	0.0696	0.0000	0.0696	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0593	0.6757	0.3736	6.9000e-004		0.0301	0.0301		0.0277	0.0277	0.0000	61.7374	61.7374	0.0195	0.0000	62.2257
Total	**0.0593**	**0.6757**	**0.3736**	**6.9000e-004**	**0.1523**	**0.0301**	**0.1823**	**0.0696**	**0.0277**	**0.0973**	**0.0000**	**61.7374**	**61.7374**	**0.0195**	**0.0000**	**62.2257**

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3.3 Pad/Site-Specific Grading Activities - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	6.5000e-004	6.8300e-003	2.0000e-005	1.9800e-003	1.0000e-005	1.9900e-003	5.3000e-004	1.0000e-005	5.4000e-004	0.0000	1.7093	1.7093	5.0000e-005	0.0000	1.7105
Total	**8.9000e-004**	**6.5000e-004**	**6.8300e-003**	**2.0000e-005**	**1.9800e-003**	**1.0000e-005**	**1.9900e-003**	**5.3000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7093**	**1.7093**	**5.0000e-005**	**0.0000**	**1.7105**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0685	0.0000	0.0685	0.0313	0.0000	0.0313	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0593	0.6757	0.3736	6.9000e-004		0.0301	0.0301		0.0277	0.0277	0.0000	61.7373	61.7373	0.0195	0.0000	62.2257
Total	**0.0593**	**0.6757**	**0.3736**	**6.9000e-004**	**0.0685**	**0.0301**	**0.0986**	**0.0313**	**0.0277**	**0.0590**	**0.0000**	**61.7373**	**61.7373**	**0.0195**	**0.0000**	**62.2257**

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3.3 Pad/Site-Specific Grading Activities - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.9000e-004	6.5000e-004	6.8300e-003	2.0000e-005	1.9800e-003	1.0000e-005	1.9900e-003	5.3000e-004	1.0000e-005	5.4000e-004	0.0000	1.7093	1.7093	5.0000e-005	0.0000	1.7105
Total	**8.9000e-004**	**6.5000e-004**	**6.8300e-003**	**2.0000e-005**	**1.9800e-003**	**1.0000e-005**	**1.9900e-003**	**5.3000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7093**	**1.7093**	**5.0000e-005**	**0.0000**	**1.7105**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0843	0.6722	0.5237	8.1000e-004		0.0399	0.0399		0.0374	0.0374	0.0000	69.2806	69.2806	0.0195	0.0000	69.7675
Total	**0.0843**	**0.6722**	**0.5237**	**8.1000e-004**		**0.0399**	**0.0399**		**0.0374**	**0.0374**	**0.0000**	**69.2806**	**69.2806**	**0.0195**	**0.0000**	**69.7675**

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3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0335	1.1396	0.2268	2.5600e-003	0.0624	8.5800e-003	0.0710	0.0180	8.2100e-003	0.0262	0.0000	244.5083	244.5083	0.0208	0.0000	245.0292
Worker	0.1260	0.0917	0.9623	2.6700e-003	0.2787	1.7500e-003	0.2805	0.0740	1.6100e-003	0.0756	0.0000	240.8254	240.8254	6.5900e-003	0.0000	240.9901
Total	**0.1594**	**1.2313**	**1.1891**	**5.2300e-003**	**0.3411**	**0.0103**	**0.3514**	**0.0920**	**9.8200e-003**	**0.1018**	**0.0000**	**485.3337**	**485.3337**	**0.0274**	**0.0000**	**486.0193**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0843	0.6722	0.5237	8.1000e-004		0.0399	0.0399		0.0374	0.0374	0.0000	69.2805	69.2805	0.0195	0.0000	69.7674
Total	**0.0843**	**0.6722**	**0.5237**	**8.1000e-004**		**0.0399**	**0.0399**		**0.0374**	**0.0374**	**0.0000**	**69.2805**	**69.2805**	**0.0195**	**0.0000**	**69.7674**

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3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0335	1.1396	0.2268	2.5600e-003	0.0624	8.5800e-003	0.0710	0.0180	8.2100e-003	0.0262	0.0000	244.5083	244.5083	0.0208	0.0000	245.0292
Worker	0.1260	0.0917	0.9623	2.6700e-003	0.2787	1.7500e-003	0.2805	0.0740	1.6100e-003	0.0756	0.0000	240.8254	240.8254	6.5900e-003	0.0000	240.9901
Total	**0.1594**	**1.2313**	**1.1891**	**5.2300e-003**	**0.3411**	**0.0103**	**0.3514**	**0.0920**	**9.8200e-003**	**0.1018**	**0.0000**	**485.3337**	**485.3337**	**0.0274**	**0.0000**	**486.0193**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0894	0.7282	0.6044	9.6000e-004		0.0409	0.0409		0.0384	0.0384	0.0000	80.6529	80.6529	0.0227	0.0000	81.2199
Total	**0.0894**	**0.7282**	**0.6044**	**9.6000e-004**		**0.0409**	**0.0409**		**0.0384**	**0.0384**	**0.0000**	**80.6529**	**80.6529**	**0.0227**	**0.0000**	**81.2199**

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3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0332	1.2159	0.2379	3.0100e-003	0.0738	6.8800e-003	0.0807	0.0213	6.5800e-003	0.0279	0.0000	287.4550	287.4550	0.0230	0.0000	288.0294
Worker	0.1380	0.0967	1.0324	3.0500e-003	0.3300	2.0300e-003	0.3320	0.0876	1.8700e-003	0.0895	0.0000	276.1030	276.1030	6.9100e-003	0.0000	276.2759
Total	**0.1712**	**1.3126**	**1.2703**	**6.0600e-003**	**0.4039**	**8.9100e-003**	**0.4128**	**0.1089**	**8.4500e-003**	**0.1174**	**0.0000**	**563.5580**	**563.5580**	**0.0299**	**0.0000**	**564.3053**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0894	0.7282	0.6044	9.6000e-004		0.0409	0.0409		0.0384	0.0384	0.0000	80.6528	80.6528	0.0227	0.0000	81.2198
Total	**0.0894**	**0.7282**	**0.6044**	**9.6000e-004**		**0.0409**	**0.0409**		**0.0384**	**0.0384**	**0.0000**	**80.6528**	**80.6528**	**0.0227**	**0.0000**	**81.2198**

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3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0332	1.2159	0.2379	3.0100e-003	0.0738	6.8800e-003	0.0807	0.0213	6.5800e-003	0.0279	0.0000	287.4550	287.4550	0.0230	0.0000	288.0294
Worker	0.1380	0.0967	1.0324	3.0500e-003	0.3300	2.0300e-003	0.3320	0.0876	1.8700e-003	0.0895	0.0000	276.1030	276.1030	6.9100e-003	0.0000	276.2759
Total	**0.1712**	**1.3126**	**1.2703**	**6.0600e-003**	**0.4039**	**8.9100e-003**	**0.4128**	**0.1089**	**8.4500e-003**	**0.1174**	**0.0000**	**563.5580**	**563.5580**	**0.0299**	**0.0000**	**564.3053**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.5000e-003	0.0985	0.1026	1.6000e-004		5.2700e-003	5.2700e-003		4.8500e-003	4.8500e-003	0.0000	14.0198	14.0198	4.5300e-003	0.0000	14.1331
Paving	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0297**	**0.0985**	**0.1026**	**1.6000e-004**		**5.2700e-003**	**5.2700e-003**		**4.8500e-003**	**4.8500e-003**	**0.0000**	**14.0198**	**14.0198**	**4.5300e-003**	**0.0000**	**14.1331**

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3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.4000e-004	3.6100e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	0.9656	0.9656	2.0000e-005	0.0000	0.9662
Total	**4.8000e-004**	**3.4000e-004**	**3.6100e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**0.9656**	**0.9656**	**2.0000e-005**	**0.0000**	**0.9662**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.5000e-003	0.0985	0.1026	1.6000e-004		5.2700e-003	5.2700e-003		4.8500e-003	4.8500e-003	0.0000	14.0197	14.0197	4.5300e-003	0.0000	14.1331
Paving	0.0202					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0297**	**0.0985**	**0.1026**	**1.6000e-004**		**5.2700e-003**	**5.2700e-003**		**4.8500e-003**	**4.8500e-003**	**0.0000**	**14.0197**	**14.0197**	**4.5300e-003**	**0.0000**	**14.1331**

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3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	3.4000e-004	3.6100e-003	1.0000e-005	1.1500e-003	1.0000e-005	1.1600e-003	3.1000e-004	1.0000e-005	3.1000e-004	0.0000	0.9656	0.9656	2.0000e-005	0.0000	0.9662
Total	**4.8000e-004**	**3.4000e-004**	**3.6100e-003**	**1.0000e-005**	**1.1500e-003**	**1.0000e-005**	**1.1600e-003**	**3.1000e-004**	**1.0000e-005**	**3.1000e-004**	**0.0000**	**0.9656**	**0.9656**	**2.0000e-005**	**0.0000**	**0.9662**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.4211					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.4242**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

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3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-003	2.4500e-003	0.0262	8.0000e-005	8.3600e-003	5.0000e-005	8.4100e-003	2.2200e-003	5.0000e-005	2.2700e-003	0.0000	6.9935	6.9935	1.8000e-004	0.0000	6.9979
Total	**3.5000e-003**	**2.4500e-003**	**0.0262**	**8.0000e-005**	**8.3600e-003**	**5.0000e-005**	**8.4100e-003**	**2.2200e-003**	**5.0000e-005**	**2.2700e-003**	**0.0000**	**6.9935**	**6.9935**	**1.8000e-004**	**0.0000**	**6.9979**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.4211					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1500e-003	0.0219	0.0238	4.0000e-005		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	3.3192	3.3192	2.6000e-004	0.0000	3.3257
Total	**3.4242**	**0.0219**	**0.0238**	**4.0000e-005**		**1.4400e-003**	**1.4400e-003**		**1.4400e-003**	**1.4400e-003**	**0.0000**	**3.3192**	**3.3192**	**2.6000e-004**	**0.0000**	**3.3257**

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3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-003	2.4500e-003	0.0262	8.0000e-005	8.3600e-003	5.0000e-005	8.4100e-003	2.2200e-003	5.0000e-005	2.2700e-003	0.0000	6.9935	6.9935	1.8000e-004	0.0000	6.9979
Total	**3.5000e-003**	**2.4500e-003**	**0.0262**	**8.0000e-005**	**8.3600e-003**	**5.0000e-005**	**8.4100e-003**	**2.2200e-003**	**5.0000e-005**	**2.2700e-003**	**0.0000**	**6.9935**	**6.9935**	**1.8000e-004**	**0.0000**	**6.9979**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4490	3.9614	6.2283	0.0261	1.9740	0.0249	1.9989	0.5290	0.0235	0.5524	0.0000	2,413.1626	2,413.1626	0.1158	0.0000	2,416.0582
Unmitigated	0.4490	3.9614	6.2283	0.0261	1.9740	0.0249	1.9989	0.5290	0.0235	0.5524	0.0000	2,413.1626	2,413.1626	0.1158	0.0000	2,416.0582

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	1,206.24	1,206.24	1206.24	5,169,603	5,169,603
Total	1,206.24	1,206.24	1,206.24	5,169,603	5,169,603

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	416.4233	416.4233	0.0254	5.2500e-003	418.6220
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	416.4233	416.4233	0.0254	5.2500e-003	418.6220
NaturalGas Mitigated	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
NaturalGas Unmitigated	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45754e+006	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
Total		**7.8600e-003**	**0.0715**	**0.0600**	**4.3000e-004**		**5.4300e-003**	**5.4300e-003**		**5.4300e-003**	**5.4300e-003**	**0.0000**	**77.7799**	**77.7799**	**1.4900e-003**	**1.4300e-003**	**78.2421**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45754e+006	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
Total		**7.8600e-003**	**0.0715**	**0.0600**	**4.3000e-004**		**5.4300e-003**	**5.4300e-003**		**5.4300e-003**	**5.4300e-003**	**0.0000**	**77.7799**	**77.7799**	**1.4900e-003**	**1.4300e-003**	**78.2421**

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	234412	50.6066	3.0800e-003	6.4000e-004	50.8738
Unrefrigerated Warehouse-No Rail	1.69448e+006	365.8167	0.0223	4.6100e-003	367.7482
Total		**416.4233**	**0.0254**	**5.2500e-003**	**418.6220**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	234412	50.6066	3.0800e-003	6.4000e-004	50.8738
Unrefrigerated Warehouse-No Rail	1.69448e+006	365.8167	0.0223	4.6100e-003	367.7482
Total		**416.4233**	**0.0254**	**5.2500e-003**	**418.6220**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Unmitigated	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3421					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.6378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6800e-003	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Total	**2.9816**	**1.6000e-004**	**0.0178**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0344**	**0.0344**	**9.0000e-005**	**0.0000**	**0.0368**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3421					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.6378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6800e-003	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Total	**2.9816**	**1.6000e-004**	**0.0178**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0344**	**0.0344**	**9.0000e-005**	**0.0000**	**0.0368**

7.0 Water Detail

7.1 Mitigation Measures Water

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	519.4188	5.4388	0.1336	695.2110
Unmitigated	519.4188	5.4388	0.1336	695.2110

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	166.037 / 0	519.4188	5.4388	0.1336	695.2110
Total		**519.4188**	**5.4388**	**0.1336**	**695.2110**

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7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	166.037 / 0	519.4188	5.4388	0.1336	695.2110
Total		**519.4188**	**5.4388**	**0.1336**	**695.2110**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	137.0027	8.0966	0.0000	339.4183
Unmitigated	137.0027	8.0966	0.0000	339.4183

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8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	674.92	137.0027	8.0966	0.0000	339.4183
Total		**137.0027**	**8.0966**	**0.0000**	**339.4183**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	674.92	137.0027	8.0966	0.0000	339.4183
Total		**137.0027**	**8.0966**	**0.0000**	**339.4183**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.2
CACTUS CHANNEL (OFF-SITE) CONSTRUCTION

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K4 - Cactus Channel - Unmitigated

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	3.45	Acre	3.45	150,282.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2023
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - 2020 RPS (33%)

Land Use -

Construction Phase - Project data

Off-road Equipment - Project data

Off-road Equipment - Project data

Trips and VMT -

Grading -

Energy Use -

Construction Off-road Equipment Mitigation -

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K4 - Cactus Channel - Unmitigated - Riverside-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	132.00
tblConstructionPhase	NumDays	5.00	130.00
tblGrading	MaterialExported	0.00	60,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95

2.0 Emissions Summary

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2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1196	2.0659	0.8374	4.5200e-003	0.0762	0.0458	0.1220	0.0204	0.0423	0.0626	0.0000	424.4795	424.4795	0.0634	0.0000	426.0646
2020	0.0234	0.2701	0.1109	3.0000e-004	1.6500e-003	0.0111	0.0128	4.4000e-004	0.0102	0.0107	0.0000	26.7257	26.7257	8.2300e-003	0.0000	26.9315
Maximum	**0.1196**	**2.0659**	**0.8374**	**4.5200e-003**	**0.0762**	**0.0458**	**0.1220**	**0.0204**	**0.0423**	**0.0626**	**0.0000**	**424.4795**	**424.4795**	**0.0634**	**0.0000**	**426.0646**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.1196	2.0658	0.8374	4.5200e-003	0.0741	0.0458	0.1199	0.0201	0.0423	0.0623	0.0000	424.4793	424.4793	0.0634	0.0000	426.0645
2020	0.0234	0.2701	0.1109	3.0000e-004	1.6500e-003	0.0111	0.0128	4.4000e-004	0.0102	0.0107	0.0000	26.7256	26.7256	8.2300e-003	0.0000	26.9314
Maximum	**0.1196**	**2.0658**	**0.8374**	**4.5200e-003**	**0.0741**	**0.0458**	**0.1199**	**0.0201**	**0.0423**	**0.0623**	**0.0000**	**424.4793**	**424.4793**	**0.0634**	**0.0000**	**426.0645**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**2.67**	**0.00**	**1.55**	**1.49**	**0.00**	**0.44**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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K4 - Cactus Channel - Unmitigated - Riverside-South Coast County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0118	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0118**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**9.0000e-005**

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2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0118	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0118**	**0.0000**	**4.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**9.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Phase 1	Site Preparation	5/20/2019	11/19/2019	5	132	
2	Phase 2	Site Preparation	11/20/2019	5/19/2020	5	130	

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Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 3.45

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1	Excavators	2	8.00	158	0.38
Phase 1	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1	Rubber Tired Loaders	2	8.00	203	0.36
Phase 1	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Phase 2	Cranes	1	8.00	231	0.29
Phase 2	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Phase 1	4	10.00	0.00	7,500.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2	1	3.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

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3.2 Phase 1 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.8000e-003	0.0000	3.8000e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0871	0.9911	0.6523	1.5100e-003		0.0384	0.0384		0.0354	0.0354	0.0000	135.3074	135.3074	0.0428	0.0000	136.3777
Total	**0.0871**	**0.9911**	**0.6523**	**1.5100e-003**	**3.8000e-003**	**0.0384**	**0.0422**	**5.8000e-004**	**0.0354**	**0.0359**	**0.0000**	**135.3074**	**135.3074**	**0.0428**	**0.0000**	**136.3777**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0215	0.9821	0.1239	2.8600e-003	0.0647	3.4900e-003	0.0681	0.0178	3.3400e-003	0.0211	0.0000	274.7044	274.7044	0.0180	0.0000	275.1533
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2800e-003	2.3900e-003	0.0250	7.0000e-005	7.2500e-003	5.0000e-005	7.3000e-003	1.9300e-003	4.0000e-005	1.9700e-003	0.0000	6.2674	6.2674	1.7000e-004	0.0000	6.2717
Total	**0.0248**	**0.9845**	**0.1489**	**2.9300e-003**	**0.0719**	**3.5400e-003**	**0.0754**	**0.0197**	**3.3800e-003**	**0.0231**	**0.0000**	**280.9719**	**280.9719**	**0.0181**	**0.0000**	**281.4250**

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3.2 Phase 1 - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.7100e-003	0.0000	1.7100e-003	2.6000e-004	0.0000	2.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0871	0.9911	0.6523	1.5100e-003		0.0384	0.0384		0.0354	0.0354	0.0000	135.3073	135.3073	0.0428	0.0000	136.3775
Total	**0.0871**	**0.9911**	**0.6523**	**1.5100e-003**	**1.7100e-003**	**0.0384**	**0.0401**	**2.6000e-004**	**0.0354**	**0.0356**	**0.0000**	**135.3073**	**135.3073**	**0.0428**	**0.0000**	**136.3775**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0215	0.9821	0.1239	2.8600e-003	0.0647	3.4900e-003	0.0681	0.0178	3.3400e-003	0.0211	0.0000	274.7044	274.7044	0.0180	0.0000	275.1533
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.2800e-003	2.3900e-003	0.0250	7.0000e-005	7.2500e-003	5.0000e-005	7.3000e-003	1.9300e-003	4.0000e-005	1.9700e-003	0.0000	6.2674	6.2674	1.7000e-004	0.0000	6.2717
Total	**0.0248**	**0.9845**	**0.1489**	**2.9300e-003**	**0.0719**	**3.5400e-003**	**0.0754**	**0.0197**	**3.3800e-003**	**0.0231**	**0.0000**	**280.9719**	**280.9719**	**0.0181**	**0.0000**	**281.4250**

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3.3 Phase 2 - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5600e-003	0.0901	0.0344	9.0000e-005		3.8200e-003	3.8200e-003		3.5100e-003	3.5100e-003	0.0000	7.7729	7.7729	2.4600e-003	0.0000	7.8344
Total	**7.5600e-003**	**0.0901**	**0.0344**	**9.0000e-005**	**0.0000**	**3.8200e-003**	**3.8200e-003**	**0.0000**	**3.5100e-003**	**3.5100e-003**	**0.0000**	**7.7729**	**7.7729**	**2.4600e-003**	**0.0000**	**7.8344**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.6000e-004	1.7100e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4273	0.4273	1.0000e-005	0.0000	0.4276
Total	**2.2000e-004**	**1.6000e-004**	**1.7100e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4273**	**0.4273**	**1.0000e-005**	**0.0000**	**0.4276**

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3.3 Phase 2 - 2019

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5600e-003	0.0901	0.0344	9.0000e-005		3.8200e-003	3.8200e-003		3.5100e-003	3.5100e-003	0.0000	7.7729	7.7729	2.4600e-003	0.0000	7.8344
Total	**7.5600e-003**	**0.0901**	**0.0344**	**9.0000e-005**	**0.0000**	**3.8200e-003**	**3.8200e-003**	**0.0000**	**3.5100e-003**	**3.5100e-003**	**0.0000**	**7.7729**	**7.7729**	**2.4600e-003**	**0.0000**	**7.8344**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.2000e-004	1.6000e-004	1.7100e-003	0.0000	4.9000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4273	0.4273	1.0000e-005	0.0000	0.4276
Total	**2.2000e-004**	**1.6000e-004**	**1.7100e-003**	**0.0000**	**4.9000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4273**	**0.4273**	**1.0000e-005**	**0.0000**	**0.4276**

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3.3 Phase 2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0227	0.2696	0.1058	2.9000e-004		0.0111	0.0111		0.0102	0.0102	0.0000	25.3463	25.3463	8.2000e-003	0.0000	25.5512
Total	**0.0227**	**0.2696**	**0.1058**	**2.9000e-004**	**0.0000**	**0.0111**	**0.0111**	**0.0000**	**0.0102**	**0.0102**	**0.0000**	**25.3463**	**25.3463**	**8.2000e-003**	**0.0000**	**25.5512**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	4.8000e-004	5.1600e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3794	1.3794	3.0000e-005	0.0000	1.3803
Total	**6.9000e-004**	**4.8000e-004**	**5.1600e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3794**	**1.3794**	**3.0000e-005**	**0.0000**	**1.3803**

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3.3 Phase 2 - 2020

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0227	0.2696	0.1058	2.9000e-004		0.0111	0.0111		0.0102	0.0102	0.0000	25.3462	25.3462	8.2000e-003	0.0000	25.5512
Total	**0.0227**	**0.2696**	**0.1058**	**2.9000e-004**	**0.0000**	**0.0111**	**0.0111**	**0.0000**	**0.0102**	**0.0102**	**0.0000**	**25.3462**	**25.3462**	**8.2000e-003**	**0.0000**	**25.5512**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.9000e-004	4.8000e-004	5.1600e-003	2.0000e-005	1.6500e-003	1.0000e-005	1.6600e-003	4.4000e-004	1.0000e-005	4.5000e-004	0.0000	1.3794	1.3794	3.0000e-005	0.0000	1.3803
Total	**6.9000e-004**	**4.8000e-004**	**5.1600e-003**	**2.0000e-005**	**1.6500e-003**	**1.0000e-005**	**1.6600e-003**	**4.4000e-004**	**1.0000e-005**	**4.5000e-004**	**0.0000**	**1.3794**	**1.3794**	**3.0000e-005**	**0.0000**	**1.3803**

4.0 Operational Detail - Mobile

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4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.548600	0.036250	0.186898	0.112544	0.014284	0.004806	0.017604	0.070134	0.001409	0.001147	0.004508	0.000918	0.000898

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0118	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005
Unmitigated	0.0118	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	9.7100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005
Total	**0.0118**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**9.0000e-005**

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6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.0900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	9.7100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	4.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.0000e-005	9.0000e-005	0.0000	0.0000	9.0000e-005
Total	**0.0118**	**0.0000**	**4.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.0000e-005**	**9.0000e-005**	**0.0000**	**0.0000**	**9.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

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7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

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8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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APPENDIX A.3
K4 PROJECT OPERATION

K4 - Operation

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Unrefrigerated Warehouse-No Rail	718.00	1000sqft	20.00	718,000.00	0
Parking Lot	669.75	1000sqft	15.38	669,749.10	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2020
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	475.95	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

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Project Characteristics - 2020 RPS (33%)

Land Use - Project data

Energy Use -

Water And Wastewater - Project data

Solid Waste - 75% waste diversion

Land Use Change -

Sequestration -

Area Mitigation - Super-low VOC content

Energy Mitigation - All lighting fixtures will be Energy Star certified

Construction Phase - Construction emissions evaluated separately

Off-road Equipment - Construction emissions evaluated separately.

Trips and VMT - Construction emissions evaluated separately.

Vehicle Trips - Mobile emissions evaluated separately.

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K4 - Operation - Riverside-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintNonresidentialExteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	100	10
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblAreaMitigation	UseLowVOCPaintParkingValue	100	10
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	50	10
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	50	10
tblConstructionPhase	NumDays	50.00	0.00
tblLandUse	LandUseSquareFeet	669,750.00	669,749.10
tblLandUse	LotAcreage	16.48	20.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	702.44	475.95
tblSequestration	NumberOfNewTrees	0.00	200.00
tblSolidWaste	SolidWasteGenerationRate	674.92	245.46
tblTripsAndVMT	WorkerTripNumber	15.00	0.00
tblVehicleTrips	ST_TR	1.68	0.00
tblVehicleTrips	SU_TR	1.68	0.00
tblVehicleTrips	WD_TR	1.68	0.00
tblWater	IndoorWaterUseRate	166,037,500.00	3,285,000.00
tblWater	OutdoorWaterUseRate	0.00	1,755,193.00

2.0 Emissions Summary

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2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

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Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Energy	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	494.2032	494.2032	0.0269	6.6800e-003	496.8641
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	49.8262	0.0000	49.8262	2.9446	0.0000	123.4422
Water						0.0000	0.0000		0.0000	0.0000	1.0422	13.4442	14.4864	0.1079	2.7000e-003	17.9866
Total	**2.9894**	**0.0716**	**0.0778**	**4.3000e-004**	**0.0000**	**5.4900e-003**	**5.4900e-003**	**0.0000**	**5.4900e-003**	**5.4900e-003**	**50.8683**	**507.6818**	**558.5502**	**3.0795**	**9.3800e-003**	**638.3297**

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2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.6737	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Energy	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	320.2295	320.2295	0.0163	4.4800e-003	321.9719
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	49.8262	0.0000	49.8262	2.9446	0.0000	123.4422
Water						0.0000	0.0000		0.0000	0.0000	1.0422	13.4442	14.4864	0.1079	2.7000e-003	17.9866
Total	**2.6815**	**0.0716**	**0.0778**	**4.3000e-004**	**0.0000**	**5.4900e-003**	**5.4900e-003**	**0.0000**	**5.4900e-003**	**5.4900e-003**	**50.8683**	**333.7082**	**384.5765**	**3.0689**	**7.1800e-003**	**463.4374**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**10.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**34.27**	**31.15**	**0.34**	**23.45**	**27.40**

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2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	141.6000
Vegetation Land Change	0.0000
Total	**141.6000**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	6/27/2018	6/26/2018	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.38

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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3.2 Demolition - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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3.2 Demolition - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unrefrigerated Warehouse-No	16.60	8.40	6.90	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120
Unrefrigerated Warehouse-No Rail	0.538064	0.038449	0.184390	0.122109	0.017402	0.005339	0.017250	0.067711	0.001365	0.001213	0.004629	0.000959	0.001120

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5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install High Efficiency Lighting

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	242.4496	242.4496	0.0148	3.0600e-003	243.7298
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	416.4233	416.4233	0.0254	5.2500e-003	418.6220
NaturalGas Mitigated	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
NaturalGas Unmitigated	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421

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5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45754e+006	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
Total		**7.8600e-003**	**0.0715**	**0.0600**	**4.3000e-004**		**5.4300e-003**	**5.4300e-003**		**5.4300e-003**	**5.4300e-003**	**0.0000**	**77.7799**	**77.7799**	**1.4900e-003**	**1.4300e-003**	**78.2421**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	1.45754e+006	7.8600e-003	0.0715	0.0600	4.3000e-004		5.4300e-003	5.4300e-003		5.4300e-003	5.4300e-003	0.0000	77.7799	77.7799	1.4900e-003	1.4300e-003	78.2421
Total		**7.8600e-003**	**0.0715**	**0.0600**	**4.3000e-004**		**5.4300e-003**	**5.4300e-003**		**5.4300e-003**	**5.4300e-003**	**0.0000**	**77.7799**	**77.7799**	**1.4900e-003**	**1.4300e-003**	**78.2421**

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	234412	50.6066	3.0800e-003	6.4000e-004	50.8738
Unrefrigerated Warehouse-No Rail	1.69448e+006	365.8167	0.0223	4.6100e-003	367.7482
Total		**416.4233**	**0.0254**	**5.2500e-003**	**418.6220**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	58603	12.6517	7.7000e-004	1.6000e-004	12.7185
Unrefrigerated Warehouse-No Rail	1.06444e+006	229.7980	0.0140	2.9000e-003	231.0113
Total		**242.4496**	**0.0148**	**3.0600e-003**	**243.7298**

6.0 Area Detail

6.1 Mitigation Measures Area

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K4 - Operation - Riverside-South Coast County, Annual

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.6737	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Unmitigated	2.9816	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368

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6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.3421					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.6378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6800e-003	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Total	**2.9816**	**1.6000e-004**	**0.0178**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0344**	**0.0344**	**9.0000e-005**	**0.0000**	**0.0368**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0342					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.6378					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6800e-003	1.6000e-004	0.0178	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0344	0.0344	9.0000e-005	0.0000	0.0368
Total	**2.6737**	**1.6000e-004**	**0.0178**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0344**	**0.0344**	**9.0000e-005**	**0.0000**	**0.0368**

7.0 Water Detail

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7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	14.4864	0.1079	2.7000e-003	17.9866
Unmitigated	14.4864	0.1079	2.7000e-003	17.9866

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.285 / 1.75519	14.4864	0.1079	2.7000e-003	17.9866
Total		**14.4864**	**0.1079**	**2.7000e-003**	**17.9866**

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7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	3.285 / 1.75519	14.4864	0.1079	2.7000e-003	17.9866
Total		**14.4864**	**0.1079**	**2.7000e-003**	**17.9866**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	49.8262	2.9446	0.0000	123.4422
Unmitigated	49.8262	2.9446	0.0000	123.4422

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8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	245.46	49.8262	2.9446	0.0000	123.4422
Total		**49.8262**	**2.9446**	**0.0000**	**123.4422**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unrefrigerated Warehouse-No Rail	245.46	49.8262	2.9446	0.0000	123.4422
Total		**49.8262**	**2.9446**	**0.0000**	**123.4422**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

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10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	141.6000	0.0000	0.0000	141.6000

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11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Others	35.4 / 3	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	200	141.6000	0.0000	0.0000	141.6000
Total		**141.6000**	**0.0000**	**0.0000**	**141.6000**

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APPENDIX B
EMFAC2017 MODEL OUTPUTS

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Table B-1. EMFAC2017 Output for Vehicle Miles Traveled in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Sub Area	EMFAC Vehicle Class	Fuel	Vehicles Miles Traveled (miles/day)
2020	Riverside (SC)	LDA	Gas	22,811,940
2020	Riverside (SC)	LDA	Dsl	211,708
2020	Riverside (SC)	LDA	Elec	225,470
2020	Riverside (SC)	LDT1	Gas	2,171,444
2020	Riverside (SC)	LDT2	Gas	6,953,901
2020	Riverside (SC)	LHDT1	Gas	522,854
2020	Riverside (SC)	LHDT2	Gas	74,925
2020	Riverside (SC)	MHDT	Gas	51,276
2020	Riverside (SC)	HHDT	Gas	496
2020	Riverside (SC)	LDT1	Dsl	704
2020	Riverside (SC)	LDT2	Dsl	38,381
2020	Riverside (SC)	LHDT1	Dsl	546,498
2020	Riverside (SC)	LHDT2	Dsl	210,206
2020	Riverside (SC)	MHDT	Dsl	722,760
2020	Riverside (SC)	HHDT	Dsl	1,849,784
2020	Riverside (SC)	LDT1	Elec	5,032
2020	Riverside (SC)	LDT2	Elec	27,870
2020	Riverside (SC)	HHDT	NG	7,927

Abbreviations:
Dsl - diesel
Elec - electric
HHDT - heavy-heavy duty truck
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
NG - natural gas
SC - South Coast

P:\L\Lewis\K4 Project\Technical Work\Emissions\Operational\[K4_Operational_Emissions.xlsx]EMFAC_2020_RiversideSC_VMT

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Table B-2. EMFAC2017 Output for Vehicle Trips in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, CA

Calendar Year	Sub Area	EMFAC Vehicle Class	Fuel	Trips (trips/day)
2020	Riverside (SC)	LDA	Gas	2,577,014
2020	Riverside (SC)	LDA	Dsl	23,004
2020	Riverside (SC)	LDA	Elec	29,889
2020	Riverside (SC)	LDT1	Gas	257,766
2020	Riverside (SC)	LDT2	Gas	808,079
2020	Riverside (SC)	LHDT1	Gas	236,934
2020	Riverside (SC)	LHDT2	Gas	33,477
2020	Riverside (SC)	MHDT	Gas	25,405
2020	Riverside (SC)	HHDT	Gas	157
2020	Riverside (SC)	LDT1	Dsl	108
2020	Riverside (SC)	LDT2	Dsl	3,973
2020	Riverside (SC)	LHDT1	Dsl	197,791
2020	Riverside (SC)	LHDT2	Dsl	75,303
2020	Riverside (SC)	MHDT	Dsl	118,822
2020	Riverside (SC)	HHDT	Dsl	155,838
2020	Riverside (SC)	LDT1	Elec	662
2020	Riverside (SC)	LDT2	Elec	4,369
2020	Riverside (SC)	HHDT	NG	762

Abbreviations:
Dsl - diesel
Elec - electric
HHDT - heavy-heavy duty truck
LDA - passenger car
LDT1 - light duty trucks (0-3750 pounds)
LDT2 - light duty trucks (3751-5750 pounds)
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
NG - natural gas
SC - South Coast

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	CH4	0.071419443
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	CO2	6893.981078
2020	Annual	Riverside (SC)	LDA	Gas	RUNEX	N2O	0.125232946
2020	Annual	Riverside (SC)	LDA	Gas	STREX	CH4	0.163336214
2020	Annual	Riverside (SC)	LDA	Gas	STREX	CO2	163.3554784
2020	Annual	Riverside (SC)	LDA	Gas	STREX	N2O	0.078747716
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	CH4	0.000169533
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	CO2	47.71704173
2020	Annual	Riverside (SC)	LDA	Dsl	RUNEX	N2O	0.007500454
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	CH4	0.021409978
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	CO2	770.3177324
2020	Annual	Riverside (SC)	LDT1	Gas	RUNEX	N2O	0.027664937
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	CH4	0.027991372
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	CO2	19.59522554
2020	Annual	Riverside (SC)	LDT1	Gas	STREX	N2O	0.009566094
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	CH4	0.034939139
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	CO2	2666.397429
2020	Annual	Riverside (SC)	LDT2	Gas	RUNEX	N2O	0.060362747
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	CH4	0.070945387
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	CO2	66.82824583
2020	Annual	Riverside (SC)	LDT2	Gas	STREX	N2O	0.032700735
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	CH4	0.002243942
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	CO2	2.160767964
2020	Annual	Riverside (SC)	LHDT1	Gas	IDLEX	N2O	5.60E-05
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	CH4	0.004145501
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	CO2	458.5452686
2020	Annual	Riverside (SC)	LHDT1	Gas	RUNEX	N2O	0.008965574
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	CH4	0.0079224
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	CO2	5.034736174
2020	Annual	Riverside (SC)	LHDT1	Gas	STREX	N2O	0.011533401
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	CH4	0.000322048
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	CO2	0.351483702
2020	Annual	Riverside (SC)	LHDT2	Gas	IDLEX	N2O	7.97E-06
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	CH4	0.000401095
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	CO2	75.11756712
2020	Annual	Riverside (SC)	LHDT2	Gas	RUNEX	N2O	0.001199952
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	CH4	0.001037697
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	CO2	0.803678368
2020	Annual	Riverside (SC)	LHDT2	Gas	STREX	N2O	0.001621683
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	CH4	0.000352856
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	CO2	0.773417189
2020	Annual	Riverside (SC)	MHDT	Gas	IDLEX	N2O	9.86E-06
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	CH4	0.000847965
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	CO2	93.2535829
2020	Annual	Riverside (SC)	MHDT	Gas	RUNEX	N2O	0.001568515
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	CH4	0.001162114
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	CO2	1.126665873
2020	Annual	Riverside (SC)	MHDT	Gas	STREX	N2O	0.000789438
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	CH4	6.76E-05
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	CO2	1.167712124
2020	Annual	Riverside (SC)	HHDT	Gas	RUNEX	N2O	9.54E-05
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	CH4	3.68E-08
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	CO2	0.00864427

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Table B-3. EMFAC2017 Output for Average Daily Emissions in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Fuel	Process	Pollutant	Emission (tons/day)
2020	Annual	Riverside (SC)	HHDT	Gas	STREX	N2O	2.31E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	CH4	8.03E-06
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	CO2	0.313580136
2020	Annual	Riverside (SC)	LDT1	Dsl	RUNEX	N2O	4.93E-05
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	CH4	3.29E-05
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	CO2	11.63345037
2020	Annual	Riverside (SC)	LDT2	Dsl	RUNEX	N2O	0.001828616
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	CH4	8.84E-05
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	CO2	2.409749679
2020	Annual	Riverside (SC)	LHDT1	Dsl	IDLEX	N2O	0.000378779
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	CH4	0.002758271
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	CO2	296.4162539
2020	Annual	Riverside (SC)	LHDT1	Dsl	RUNEX	N2O	0.046592507
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	CH4	3.36E-05
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	CO2	1.474903864
2020	Annual	Riverside (SC)	LHDT2	Dsl	IDLEX	N2O	0.000231834
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	CH4	0.000886741
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	CO2	124.1757981
2020	Annual	Riverside (SC)	LHDT2	Dsl	RUNEX	N2O	0.019518706
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	CH4	8.31E-05
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	CO2	11.13812552
2020	Annual	Riverside (SC)	MHDT	Dsl	IDLEX	N2O	0.001750758
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	CH4	0.005217363
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	CO2	757.1315661
2020	Annual	Riverside (SC)	MHDT	Dsl	RUNEX	N2O	0.119010539
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	CH4	0.003591848
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	CO2	187.8107155
2020	Annual	Riverside (SC)	HHDT	Dsl	IDLEX	N2O	0.029521229
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	CH4	0.009948438
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	CO2	2846.019764
2020	Annual	Riverside (SC)	HHDT	Dsl	RUNEX	N2O	0.447354674
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	CH4	0.000282453
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	CO2	0.848835098
2020	Annual	Riverside (SC)	HHDT	NG	IDLEX	N2O	0.000173041
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	CH4	0.043048534
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	CO2	29.08849803
2020	Annual	Riverside (SC)	HHDT	NG	RUNEX	N2O	0.005929881

Abbreviations:
CH4 - methane
CO2 - carbon dioxide
Dsl - diesel
HC - hydrocarbon
HHDT - heavy-heavy duty truck
IDLEX - idle exhaust
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
N2O - nitrous oxide
NG - natural gas
RUNEX - running exhaust
SC - South Coast
STREX - starting exhaust

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Table B-4. EMFAC2017 Output for Heavy Duty Truck Idle Emission Rates in Riverside County
K4 and Cactus Channel Improvement Project
Riverside County, California

Calendar Year	Season Month	Sub Area	EMFAC Vehicle Class	Process	Pollutant	Emission Rate (g/idle-hour)
2020	Annual	Riverside (SC)	HHDT	IDLEX	CO2	6151.086501
2020	Annual	Riverside (SC)	HHDT	IDLEX	CH4	0.121365297
2020	Annual	Riverside (SC)	LHDT1	IDLEX	CO2	4276.53584
2020	Annual	Riverside (SC)	LHDT1	IDLEX	CH4	1.120257841
2020	Annual	Riverside (SC)	LHDT2	IDLEX	CO2	6200.306082
2020	Annual	Riverside (SC)	LHDT2	IDLEX	CH4	0.636365458
2020	Annual	Riverside (SC)	MHDT	IDLEX	CO2	7018.196821
2020	Annual	Riverside (SC)	MHDT	IDLEX	CH4	0.153369672

Abbreviations:
CH4 - methane
CO2 - carbon dioxide
g - grams
HHDT - heavy-heavy duty truck
IDLEX - idle exhaust
LHDT1 - light-heavy duty truck (8501-10000 pounds)
LHDT2 - light-heavy duty truck (10001-14000 pounds)
MHDT - medium-heavy duty truck
SC - South Coast

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APPENDIX C
COUNTY OF RIVERSIDE CLIMATE ACTION PLAN (CAP) SCREENING TABLE

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

	Description	Assigned Point Values	Project Points	Evaluation Basis
Implementation Measure IM E5: Energy Efficiency for Commercial/Public Development				
E5.A Building Envelope				
E5.A.1 Insulation	Baseline standard (walls R-13; roof/attic: R-30)	0 points	0	Project will meet mandatory 2016 T24 requirements.
	Modestly Enhanced Insulation (walls R-13; roof/attic: R-38)	15 points		
	Enhanced Insulation (rigid wall insulation R-13; roof/attic: R-38)	18 points		
	Greatly Enhanced Insulation (spray foam wall insulated walls R-15 or higher, roof/attic R-38 or higher)	20 points		
E5.A.2 Windows	Baseline Standard (required)	0 points	0	Project will meet mandatory 2016 T24 requirements.
	Modestly Enhanced Window Insulation (5% > Title 24)	7 points		
	Enhanced Window Insulation (15%> Title 24)	8 points		
	Greatly Enhanced Window Insulation (20%> Title 24)	12 points		
E5.A.3 Cool Roofs	Modest Cool Roof (CRRC Rated 0.15 aged solar reflectance, 0.75 thermal emittance)	12 points	12	**Per MM-AQ-4** - Modest Cool Roof will be constructed.
	Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance)	14 points		
	Greatly Enhanced Cool Roof (CRRC Rated 0.35 aged solar reflectance, 0.75 thermal emittance)	16 points		
E5.A.4 Air Infiltration	Minimizing leaks in the building envelope is as important as the insulation properties of the building. Insulation does not work effectively if there is excess air leakage.	0	0	No Project Commitment.
	Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent)	12 points		
	Blower Door HERS Verified Envelope Leakage or equivalent	10 points		
	Title 24 standard (required)	0 points		
	Modest Building Envelope Leakage (5% > Title 24)	4 points		
	Reduced Building Envelope Leakage (15% > Title 24)	8 point		
	Minimum Building Envelope Leakage (20% > Title 24)	12 points		
E5.A.5 Thermal Storage of Building	Thermal storage is a design characteristic that helps keep a constant temperature in the building. Common thermal storage devices include strategically placed water filled columns, water storage tanks, and thick masonry walls.		0	No Project Commitment.
	Modest Thermal Mass (10% of floor or 10% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	4 points		
	Enhanced Thermal Mass (20% of floor or 20% of walls: 12" or more thick exposed concrete or masonry. No permanently installed floor covering such as carpet, linoleum, wood or other insulating materials)	6 points		
E5.B Indoor Space Efficiencies				
E5.B.1 Heating/Cooling System	Minimum Duct Insulation (R-4.2 required)	0 points	0	Project will meet mandatory 2016 T24 requirement.
	Modest Duct insulation (R-6)	8 point		
	Enhanced Duct Insulation (R-8)	10 points		
	Distribution loss reduction with inspection (HERS Verified Duct Leakage or equivalent)	14 points		

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

Description		Assigned Point Values	Project Points	Evaluation Basis
E5.B.2 Space Heating/Cooling Equipment	Baseline VAC Efficiency (SEER 13/60% AFUE or 7.7 HSPF) Improved Efficiency HVAC (SEER 14/65% AFUE or 8 HSPF) High Efficiency HVAC (SEER 15/72% AFUE or 8.5 HSPF) Very High Efficiency HVAC (SEER 16/80% AFUE or 9 HSPF)	0 points 7 point 8 points 12 points	7	**Per MM-AQ-4** - Project will include HVAC equipment of 14 SEER or higher.
E5.B.3 Commercial Heat Recovery Systems	Heat recovery strategies employed with commercial laundry, cooking equipment, and other commercial heat sources for reuse in HVAC air intake or other appropriate heat recovery technology. Point values for these types of systems will be determined based upon design and engineering data documenting the energy savings.	TBD	0	No Project Commitment.
E5.B.4 Water Heaters	2008 Minimum Efficiency (0.57 Energy Factor) Improved Efficiency Water Heater (0.675 Energy Factor) High Efficiency Water Heater (0.72 Energy Factor) Very High Efficiency Water Heater (0.92 Energy Factor) Solar Pre-heat System (0.2 Net Solar Fraction) Enhanced Solar Pre-heat System (0.35 Net Solar Fraction)	0 points 14 points 16 points 19 points 4 points 8 points	19	**Per MM-AQ-4** - The water heaters installed will be of .92 energy factor or higher.
E5.B.5 Daylighting	Daylighting is the ability of each room within the building to provide outside light during the day reducing the need for artificial lighting during daylight hours. All peripheral rooms within building have at least one window or skylight All rooms within building have daylight (through use of windows, solar tubes, skylights, etc.) All rooms daylighted to at least 1,000 lumens	 1 point 5 points 7 points	5	**Per MM-AQ-4** - All rooms will have some form of daylighting be it skylights or windows.
E5.B.6 Artificial Lighting	Baseline standard (required) Efficient Lights (25% of in-unit fixtures considered high efficacy. High efficacy is defined as 40 lumens/watt for 15 watt or less fixtures; 50 lumens/watt for 15-40 watt fixtures, 60 lumens/watt for fixtures >40watt) High Efficiency Lights (50% of in-unit fixtures are high efficacy) Very High Efficiency Lights (100% of in-unit fixtures are high efficacy)	0 points 9 points 12 points 14 points	12	**Per MM-AQ-4** - 50% of in unit fixtures will be high efficacy.
E5.B.7 Appliances	Energy Star Commercial Refrigerator (new) Energy Star Commercial Dish Washer (new) Energy Star Commercial Cloths Washing	4 points 4 points 4 points	0	No Energy Star commitment for non-residential appliances.

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

Description		Assigned Point Values	Project Points	Evaluation Basis
E5.C Miscellaneous Commercial Building Efficiencies				
E5.C.1 Building Placement	North/South alignment of building or other building placement such that the orientation of the buildings optimizes conditions for natural heating, cooling, and lighting.	6 points	0	No Project Commitment
Shading	At least 90% of south-facing glazing will be shaded by vegetation or overhangs at noon on Jun 21st.	6 points	0	No Project Commitment
E5.C.2 Other	This allows innovation by the applicant to provide design features that increases the energy efficiency of the project not provided in the table. Note that engineering data will be required documenting the energy efficiency of innovative designs and point values given based upon the proven efficiency beyond Title 24 Energy Efficiency Standards.	TBD	0	No Project Commitment
E5.C.3 Existing Commercial building Retrofits	The applicant may wish to provide energy efficiency retrofit projects to existing residential dwelling units to further the point value of their project. Retrofitting existing commercial buildings within the unincorporated County is a key reduction measure that is needed to reach the reduction goal. The potential for an applicant to take advantage of this program will be decided on a case by case basis and must have the approval of the Riverside County Planning Department. The decision to allow applicants to participate in this program will be evaluated based upon, but not limited to the following: Will the energy efficiency retrofit project benefit low income or disadvantaged communities? Does the energy efficiency retrofit project provide co-benefits important to the County? Point value will be determined based upon engineering and design criteria of the energy efficiency retrofit project.	TBD	0	No Project Commitment
Implementation Measure IM E6: New Commercial / Industrial Renewable Energy				
E6.A.1 Photovoltaic	Solar Photovoltaic panels installed on commercial buildings or in collective arrangements within a commercial development such that the total power provided augments: Solar Ready Roofs (sturdy roof and electric hookups) 10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 100 percent of the power needs of the project	2 points 8 points 14 points 20 points 26 points 32 points 38 points 44 points 50 points 56 points 62 points	62	**Per MM-AQ-4** - The Project will install approximately 4.5 MW of solar PV electricity generation, which exceeds 100% of the electricity needs of the project.

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

	Description	Assigned Point Values	Project Points	Evaluation Basis
E6.A.2 Wind turbines	Some areas of the County lend themselves to wind turbine applications. Analysis of the areas capability to support wind turbines should be evaluated prior to choosing this feature. Wind turbines as part of the commercial development such that the total power provided augments: 10 percent of the power needs of the project 20 percent of the power needs of the project 30 percent of the power needs of the project 40 percent of the power needs of the project 50 percent of the power needs of the project 60 percent of the power needs of the project 70 percent of the power needs of the project 80 percent of the power needs of the project 90 percent of the power needs of the project 100 percent of the power needs of the project	 8 points 14 points 20 points 26 points 32 points 38 points 44 points 50 points 56 points 62 points	0	No Project Commitment
E6.A.3 Off-site renewable energy project	The applicant may submit a proposal to supply an off-site renewable energy project such as renewable energy retrofits of existing residential or existing commercial/industrial. These off-site renewable energy retrofit project proposals will be determined on a case by case basis accompanied by a detailed plan documenting the quantity of renewable energy the proposal will generate. Point values will be based upon the energy generated by the proposal.	TBD	0	No Project Commitment
E6.A.4 Other Renewable Energy Generation	The applicant may have innovative designs or unique site circumstances (such as geothermal) that allow the project to generate electricity from renewable energy not provided in the table. The ability to supply other renewable energy and the point values allowed will be decided based upon engineering data documenting the ability to generate electricity.	TBD	0	No Project Commitment
Implementation Measure IM W1: Water Use Reduction Initiative				
W1.C Irrigation and Landscaping				
W1.C.1 Water Efficient Landscaping	Limit conventional turf to < 20% of each lot (required) Eliminate conventional turf from landscaping Eliminate turf and only provide drought tolerant plants Only California Native landscape that requires no or only supplemental irrigation	0 points 3 points 4 points 8 points	4	**Per MM-AQ-4** - No turf only drought tolerant plants
W1.C.2 Water Efficient irrigation systems	Low precipitation spray heads < .75"/hr or drip irrigation Weather based irrigation control systems or moisture sensors (demonstrate 20% reduced water use)	1 point 5 points	5	**Per MM AQ-4** - Smart irrigation controllers only
W1.C.3 Storm water Reuse Systems	Innovative on-site stormwater collection, filtration and reuse systems are being developed that provide supplemental irrigation water and provide vector control. These systems can greatly reduce the irrigation needs of a project. Point values for these types of systems will be determined based upon design and engineering data documenting the water savings.	TBD	0	No Project Commitment

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

Description		Assigned Point Values	Project Points	Evaluation Basis
W1.D Potable Water				
W1.D.1 Showers	Water Efficient Showerheads (2.0 gpm)	3 points	0	Project will meet CalGreen Building Code requirements.
W1.D.2 Toilets	Water Efficient Toilets/Urinals (1.5gpm) Waterless Urinals (note that commercial buildings having both waterless urinals and high efficiency toilets will have a combined point value of 6 points)	3 points 4 points	0	Project will meet CalGreen Building Code requirements.
W1.D.3 Faucets	Water Efficient faucets (1.28 gpm)	3 points	0	Project will meet CalGreen Building Code requirements.
W1.D.4 Commercial Dishwashers	Water Efficient dishwashers (20% water savings)	4 points	0	No Project Commitment
W1.D.5 Commercial Laundry Washers	Water Efficient laundry (15% water savings) High Efficiency laundry Equipment that captures and reuses rinse water (30% water savings)	3 points 6 points	0	No Project Commitment
W1.D.6 Commercial Water Operations Program	Establish an operational program to reduce water loss from pools, water features, etc., by covering pools, adjusting fountain operational hours, and using water treatment to reduce draw down and replacement of water. Point values for these types of plans will be determined based upon design and engineering data documenting the water savings.	TBD	0	No Project Commitment
Implementation Measure IM W2: Increase Reclaimed Water Use				
W2.A.1 Recycled Water	Graywater (purple pipe) irrigation system on site	5 points	0	Project will meet CalGreen Building Code/Local Ordinance requirements.
Implementation Measure IM T1: Employment Based Trip and VMT Reduction Policy				
T1.A.1 Alternative Scheduling	Encouraging telecommuting and alternative work schedules reduces the number of commute trips and therefore VMT traveled by employees. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks. Provide flexibility in scheduling such that at least 30% of employees participate in 9/80 work week, 4-day/40-hour work week, or telecommuting 1.5 days/week.	5 points	0	No Project Commitment
T1.A.2 Car/Vanpools	Car/vanpool program Car/vanpool program with preferred parking Car/vanpool with guaranteed ride home program Subsidized employee incentive car/vanpool program Combination of all the above	1 point 2 points 3 points 5 points 6 points	0	No Project Commitment

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

Description		Assigned Point Values	Project Points	Evaluation Basis
T1.A.3 Employee Bicycle/ Pedestrian Programs	Complete sidewalk to residential within ½ mile Complete bike path to residential within 3 miles Bike lockers and secure racks Showers and changing facilities Subsidized employee walk/bike program Note: combine all applicable points for total value	1 point 1 point 1 point 2 points 3 points	3	**Per MM-AQ-5** - The Project will provide plentiful short- and long- term bicycle parking facilities to meet peak season maximum demand (one bike rack space per 20 vehicle/employee parking spaces) and "end-of-trip" facilities including showers, lockers, and changing spaces.
T1.A.4 Shuttle/Transit Programs	Local transit within ¼ mile Light rail transit within ½ mile Shuttle service to light rail transit station Guaranteed ride home program Subsidized Transit passes Note: combine all applicable points for total value	1 point 3 points 5 points 1 points 2 points	0	No Project Commitment
T1.A.5 CTR	Employer based Commute Trip Reduction (CTR). CTRs apply to commercial, offices, or industrial projects that include a reduction of vehicle trip or VMT goal using a variety of employee commutes trip reduction methods. The point value will be determined based upon a TIA that demonstrates the trip/VMT reductions. Suggested point ranges: Incentive based CTR Programs (1-8 points) Mandatory CTR programs (5-20 points)	TBD	0	No Project Commitment
T1.A.6 Other Trip Reduction Measures	Point values for other trip or VMT reduction measures not listed above may be calculated based on a TIA and/or other traffic data supporting the trip and/or VMT reductions.	TBD	0	No Project Commitment
Implementation Measure IM T3: Mixed Use Development				
T3.B.1 Mixed Use	Mixes of land uses that complement one another in a way that reduces the need for vehicle trips can greatly reduce GHG emissions. The point value of mixed use projects will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled	TBD	0	No Project Commitment
T3.B.2 Local Retail Near Residential (Commercial only Projects)	Having residential developments within walking and biking distance of local retail helps to reduce vehicle trips and/or vehicle miles traveled. The point value of residential projects in close proximity to local retail will be determined based upon traffic studies that demonstrate trip reductions and/or reductions in vehicle miles traveled.	TBD	0	Not Applicable
Implementation Measure IM T4: Preferential Parking				
T4.A.1 Parking	Provide reserved preferential parking spaces for car-share, carpool, and ultra-low or zero emission vehicles. Provide larger parking spaces that can accommodate vans used for ride- sharing programs and reserve them for vanpools and include adequate passenger waiting/loading areas.	1 point 1 point	1	**Per MM-AQ-5 -** Five percent (5%) of vehicle/employee parking spaces shall be reserved for preferential spaces for car pools and van pools.

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

	Description	Assigned Point Values	Project Points	Evaluation Basis
Implementation Measure IM T5: Signal Synchronization and Intelligent Traffic Systems				
T5.B.1 Signal improvements	Techniques for improving traffic flow include: traffic signal coordination to reduce delay, incident management to increase response time to breakdowns and collisions, Intelligent Transportation Systems (ITS) to provide real-time information regarding road conditions and directions, and speed management to reduce high free-flow speeds. Synchronize signals along arterials used by project. Connect signals along arterials to existing ITS.	1 point/ signal 3 points/ signal	3	At least one traffic signal along a nearby arterial will be synchronized.
Implementation Measure IM T6: Bicycle and Pedestrian Infrastructure				
T6.B.1 Sidewalks	Provide sidewalks on one side of the street (required) Provide sidewalks on both sides of the street Provide pedestrian linkage between commercial and residential land uses within 1 mile	0 points 1 point 3 points	1	Sidewalks exist on the north side of the street and will be added on the south side.
T6.B.2 Bicycle paths	Provide bicycle paths within project boundaries Provide bicycle path linkages between commercial and other land uses Provide bicycle path linkages between commercial and transit	TBD 2 points 5 points	0	No Project Commitment.
Implementation Measure IM T7: Electric Vehicle Use				
T7.B.1 Electric Vehicle Recharging	Provide circuit and capacity in garages/parking areas for installation of electric vehicle charging stations. Install electric vehicle charging stations in garages/parking areas.	2 points/area 8 points/station	520	**Per MM-AQ-4** - The Project will additionally install 11 on-site and 54 off-site EV charging stations. Additionally, 2013 CALGreen (Title 24, Part 11) requires circuit and capacity for electric vehicle charging in non-residential areas where the total number of parking spaces is >50.
Implementation Measure IM T8: Anti-Idling Enforcement				
T8.A.1 Commercial Vehicle Idling Restriction	All commercial vehicles are restricted to 5-minutes or less per trip on site and at loading docks.	2 points Required of all Commercial	2	Assuming Compliance.
Implementation Measure IM T9: Increase Public Transit				
T9.B.1 Public Transit	The point value of a projects ability to increase public transit use will be determined based upon a Transportation Impact Analysis (TIA) demonstrating decreased use of private vehicles and increased use of public transportation. Increased transit accessibility (1-15 points)	TBD	0	No Project Commitment.
Implementation Measure IM L2: Prohibit Gas-Powered Landscaping Equipment				
L2.B.1 Landscaping Equipment	Electric lawn equipment including lawn mowers, leaf blowers and vacuums, shredders, trimmers, and chain saws are available. When electric landscape equipment is used in place of conventional gas-powered equipment, direct GHG emissions from natural gas combustion are replaced with indirect GHG emissions associated with the electricity used to power the equipment. Project provides electrical outlets on the exterior of all buildings so that electric landscaping equipment is compatible with all built facilities.	2 points	0	No Project Commitment.

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Table C-1. Screening Table for GHG Implementation Measures for Commercial Development and Public Facilities
K4 and Cactus Channel Improvement Project
Riverside County, California

	Description	Assigned Point Values	Project Points	Evaluation Basis
Implementation Measure IM SW1: 80 Percent Solid Waste Diversion Program				
SW1.B.1 Recycling	County initiated recycling program diverting 80% of waste requires coordination with commercial development to realize this goal. The following recycling features will help the County fulfill this goal: Provide separated recycling bins within each commercial building/floor and provide large external recycling collection bins at central location for collection truck pick-up Provide commercial/industrial recycling programs that fulfills an on-site goal of 80% diversion of solid waste	2 points 5 points	0	No Project Commitment
Implementation Measure IM SW2: Construction and Demolition Debris Diversion Program				
SW2.B.1 Recycling of Construction/ Demolition Debris	Recycle 2% of debris (required) Recycle 5% of debris Recycle 8 % of debris Recycle 10% of debris Recycle 12% of debris Recycle 15% of debris Recycle 20% of debris	0 points 1 point 2 points 3 points 4 points 5 points 6 points	0	No Project Commitment
Implementation Measure IM O1: Other GHG Reduction Feature Implementation				
O1.A1 Other GHG Emissions Reduction Features	This allows innovation by the applicant to provide commercial design features that the GHG emissions from construction and/or operation of the project not provided in the table. Note that engineering data will be required documenting the GHG reduction amount and point values given based upon emission reductions calculations using approved models, methods and protocols.	TBD	0	No Project Commitment
Total Points Earned by Commercial / Industrial Project:			**656**	

Abbreviations:
GHG - greenhouse gas
IM - implementation measures
HVAC - Heating, Ventilation and Air Conditioning
MM - mitigation measures
SEER - Seasonal energy efficiency ratio
VMT - vehicle miles traveled

DRAFT

Table C-2. Screening Table Points for Project Scenario
K4 and Cactus Channel Improvement Project
Riverside County, California

Questionnaire Points	Number of Points
Commercial	656
TOTAL	**656**
Threshold Requirement	100
Meets Requirement?	**Yes**

DRAFT

PHASE I AND LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT, PROPOSED INDUSTRIAL WAREHOUSE SITE K-4, UNINCORPORATED RIVERSIDE COUNTY, NEAR CITY OF MORENO VALLEY, CALIFORNIA

Prepared For:

MERIDIAN PARK, LLC
1156 North Mountain Avenue
Upland, California 91786

Project No. 11979.001

May 16, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

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Project No. 11979.001

Meridian Park, LLC
1156 Mountain Avenue
Upland, California 91786

Attention: Mr. Timothy Reeves

Subject: Phase I and Limited Phase II Environmental Site Assessment, Proposed Industrial Warehouse Site K-4, Unincorporated Riverside County, Near City of Moreno Valley, California

Leighton Consulting, Inc. (Leighton) is pleased to present this Phase I and Limited Phase II Environmental Site Assessment Report (ESA) for the 36.74-acre property located south of Cactus Avenue between Veterans Way and extending east of Frederick Street, near the City of Moreno Valley, Unincorporated area of Riverside County, California (subject site). Leighton declares that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in §312.10 of 40 Code of Federal Regulations (CFR) 312, and the ASTM International E1527-13.

Leighton has the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject site. Leighton has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

If you have questions regarding this report, please contact us. We appreciate the opportunity to be of service to Meridian Park LLC.

Respectfully submitted,

LEIGHTON CONSULTING, INC.



Zachary Freeman, P.G.
Project Geologist

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1.0 INTRODUCTION

1.1 Authorization

Leighton Consulting, Inc. (Leighton) performed a Phase I Environmental Site Assessment (ESA) for the 36.74-acre property located south of Cactus Avenue between Veterans Way and extending east of Frederick Street, near the City of Moreno Valley, Unincorporated area of Riverside County, California (subject site – Figure 1) in accordance with Meridian Park, LLC (Client) authorization.

1.2 Purpose

The purpose of the Phase I ESA was to identify, to the extent feasible and pursuant to the processes prescribed in ASTM International (ASTM) E1527-13, recognized environmental conditions (RECs), historical RECs (HRECs), or controlled RECs (CRECs) in connection with the subject site.

- RECs are defined, according to ASTM E1527-13 as "*the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not RECs.*"

- HRECs are defined, according to ASTM E1527-13 as "*a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.*"

- CRECs are defined, according to ASTM E1527-13 as "*a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls.*" (ASTM E1527-13, 2013).

The purpose of the Limited Phase II ESA was to assess the soil stockpiles of unknown origin observed in the southeastern area of the property for arsenic and organochlorine pesticides (OCPs).

1.3 Scope of Work

The scope of work was performed in accordance with Leighton's proposal and included the following tasks:

- A reconnaissance-level visit of the subject site for evidence of the release(s) of hazardous materials and petroleum products and to assess the potential for onsite releases of hazardous materials and petroleum products;
- Records review (including review of previous environmental reports, selected governmental databases, and historical review);
- Interviews;
- A limited Phase II ESA soil investigation; and
- Preparation of a report presenting our findings.

1.4 Significant Assumptions

Leighton assumes that the purpose of this Phase I and Limited Phase II ESA is to provide appropriate inquiry into the previous ownership and use of the subject site so that the Client may qualify for the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) landowner liability protections as defined in CERCLA, 42 USC §9601(35)(B). Leighton also assumes that the information provided by the Client and its agents, regulatory database provider, and regulatory agencies is true and reliable.

1.5 Limitations and Exceptions

Leighton performed the Phase I and Limited Phase II ESA in conformance with the scope and limitations of ASTM Practice E1527-13 of the subject site. Other than the non-scope items observed in Section 1.6 that was not applicable, there were no exceptions to, or deletions from, this practice.

Property specific activities performed by Leighton and information collected regarding these activities are summarized in the following sections. The findings of this Phase I and Limited Phase II ESA are presented in Section 8.0. Opinions,

and Conclusions drawn by Leighton, based on the information collected as part of the Phase I and Limited Phase II ESA, are presented in Sections 9.0 and 10.0, respectively. References are included as Appendix A. Site Photographs are presented in Appendix B. Client Supplied documentation is included as Appendix C. Research of Environmental Liens is documented in Appendix D. The Environmental Radius Report is included as Appendix E. Regulatory records requests and responses are included as Appendix F. Historical documentation is provided in Appendix G. The laboratory documentation is included in Appendix H. The Geoprofessional Business Association (GBA) Geoenvironmental Report informational guide is provided in Appendix I.

This Phase I and Limited Phase II ESA was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions.

The observations and conclusions presented in this report are professional opinions based on the scope of activities, work schedule, and information obtained through the Phase I and Limited Phase II ESA described herein. Opinions presented herein apply to property conditions existing at the time of our study and cannot necessarily be taken to apply to property conditions or changes that we are not aware of or have not had the opportunity to evaluate. It must be recognized that conclusions drawn from these data are limited to the amount, type, distribution, and integrity of the information collected at the time of the investigation, and the methods utilized to collect and evaluate the data. Although Leighton has taken steps to obtain true copies of available information, we make no representation or warranty with respect to the accuracy or completeness of the information provided by others.

This practice does not address whether requirements in addition to all appropriate inquiry have been met in order to qualify for the landowner liability protections including the continuing obligation not to impede the integrity and effectiveness of activity and use limitations, or the duty to take reasonable steps to prevent releases, or the duty to comply with legally required release reporting obligations. Users should also be aware that there are likely to be other legal obligations with regard to hazardous substances or petroleum products discovered on the subject site that are not addressed in this practice and that may pose risks of civil and/or criminal sanctions for non-compliance.

1.6 Special Terms and Conditions

The scope of work for this Phase I and Limited Phase II ESA did not include non-scope considerations, such as, but not limited to, those listed in Section 13 of ASTM E1527-13. The scope of work for this Phase I and Limited Phase II ESA did not include non-scope items such as testing of electrical equipment for the presence of polychlorinated biphenyls (PCBs) or collection of other environmental samples, such as, water, building materials, paint or other media; assessment of natural hazards such as naturally occurring asbestos, radon gas, methane gas, or mold; assessment of the potential presence of radionuclides, biological agents, or lead in drinking water; assessment of indoor air quality (such as vapor intrusion assessment); or assessment of nonchemical hazards such as the potential for damage from earthquakes or floods, or the presence of endangered species or wildlife habitats. This Phase I and Limited Phase II ESA also did not include an extensive assessment of the environmental compliance status of the subject site or of businesses operating at the subject site, or a health-based risk assessment.

1.7 User Reliance

This report is for the exclusive use of the Meridian Park, LLC. Use of this report by any other party shall be at such party's sole risk.

1.8 Important Information about Geoenvironmental Reports

The Client is referred to Appendix I regarding important information provided by the Geoprofessional Business Association (GBA) on geoenvironmental studies and reports.

2.0 SITE DESCRIPTION

2.1 Location and Legal Description

The subject site is located south of Cactus Avenue between Veterans Way and east of Frederick Avenue, near the City of Moreno Valley, in the unincorporated area of Riverside County, California (Figure 1). According to the Riverside County Assessor's office the Assessor Parcel Numbers (APNs) associated with the subject site are 297-160-005-8, 297-200-004-0, 297-150-006-8, 297-150-007-9 and 297-150-038-7. A legal description of the subject site is included in the Environmental Lien Search Report provided by EDR (Appendix D).

2.2 Property and Vicinity General Characteristics

The subject site vicinity and the surrounding area consists of vacant land, commercial and industrial properties and March Air Reserve Base.

2.3 Current Use of the Subject Property

The subject site is currently vacant land with the exception of an area with soil piles on the eastern portion of the site.

2.4 Descriptions of Structures, Roads and Other Improvements

The subject site consists of 36.74 acres of vacant land with an area of soil piles located on the east portion of the site (Photos 1 through 12, Appendix B, Figures 2 and 3). No buildings or structures are located onsite; the southeastern perimeter of the subject site wraps around an electrical substation that is not included as part of the subject site. The substation has two paved entrances on the east that are accessible by Chanute Avenue, these entrances and Chanute Avenue are part of the subject site.

The following utilities are expected to provide future service to the subject site:

Natural Gas:	The Gas Company
Source of Potable Water:	Eastern Municipal Water District
Electric:	Southern California Edison (SCE)
Sewage Disposal:	City of Moreno Valley
Solid Waste Disposal:	Waste Management

2.5 Current Uses of Adjoining Properties

The subject site is bordered to the north by Cactus Avenue. Adjacent to the north, across Cactus Avenue, is an industrial and commercial center. To the east, the subject site is bounded by vacant land and an electrical substation. To the south, the subject site is bordered by March Air Reserve Base and to the west the subject property is bordered by a vacant lot and March Reserve Air Base.

3.0 USER PROVIDED INFORMATION

The user of this Phase I and Limited Phase II ESA is identified as Meridian Park, LLC. As a part of the ASTM E1527-13 process, Mr. Timothy Reeves, Vice President of Meridian Park, LLC, completed a questionnaire regarding the property on the behalf of the Meridian Park, LLC. A copy of this questionnaire is provided in Appendix C.

3.1 Environmental Liens or Activity and Use Limitations

Mr. Reeves indicated that he was not aware of environmental liens recorded for the subject site. Also, it was unknown if there were activity and land use limitations filed for the subject site.

Leighton also researched environmental liens and activity and land use limitations through EDR. According to the Environmental Lien Search, dated April 6, 2018, environmental liens or activity use limitations were not identified for the subject site. A copy of the lien search is included in Appendix D and references are provided in Appendix A.

3.2 Specialized Knowledge

Mr. Reeves indicated that he did not have specialized knowledge or experience related to the subject site.

3.3 Commonly Known or Reasonably Ascertainable Information

Mr. Reeves is not aware of commonly known or reasonably ascertainable information related to the subject site.

3.4 Valuation Reduction for Environmental Issues

Mr. Reeves stated that the purchase price being paid for the subject site is based on fair market value.

3.5 Owner, Property Manager, and Occupant Information

Mr. Reeves stated that the property is owned by Meridian Park, LLC and that the property is vacant land.

3.6 Reason for Performing Phase I and Limited Phase I ESA

According to the user questionnaire, the reason for requesting this Phase I ESA is for the entitlements of the property.

3.7 Other

Leighton was not provided with other reports completed for the subject site.

4.0 RECORDS REVIEW

4.1 Physical Setting Source(s)

Leighton reviewed pertinent maps and readily available literature for information on the physiography and hydrogeology of the subject site. A summary of this information is presented in the following subsections.

4.1.1 Topography

The subject site is located in Sections 13 and 14 of Township 3 South, Range 4 West of the San Bernardino Baseline and Meridian. Topographic map coverage of the site vicinity is provided by the United States Geological Survey (USGS) Riverside East 7.5-Minute Quadrangle (2012). The subject site elevations range from approximately 1,547 feet above mean sea level (msl) along the south to approximately 1,552 feet above msl along the north border of the subject site.

4.1.2 Surface Water

Surface water was not observed on the subject site. The subject site is located approximately 9 miles west of Perris Reservoir, approximately 15 miles southeast of Santa Ana River and approximately 15 miles east of Lake Mathews.

4.1.3 Geology and Soils

The subject site is located within the Perris Block of the Peninsular Ranges Geomorphic Province, a tectonic region bounded by Cucamonga-Sierra Madre fault and the San Gabriel/San Bernardino Mountains to the north, the San Jacinto fault to the east and the Elsinore and Chino faults to the west. The block is characterized by relatively shallow alluvial basins and low seismic activity in comparison with the surrounding regions. The subject site consists of Quaternary age alluvial soils (Dibblee and Minch, 2003). Surface soils in the vicinity of the subject site consist of younger aged alluvium consisting of sand, gravel and clay of valley areas covered with soil.

4.1.4 Hydrogeology

The subject site is situated in the San Jacinto Basin. The San Jacinto Basin is bounded by the San Jacinto Mountains on the east, the San Timoteo Badlands on the northeast, the Box Mountain on the north, the Santa Rosa Hills and Bell Mountain on the south and unnamed hills on the west (DWR, 2006). The major hydrostratagraphic unit in the basin is Quaternary alluvium primarily consisting. Based on well data the specific yield for the aquifer in the younger alluvium is approximately 5 to 15 percent. Groundwater quality is generally good within the subbasin. Water chemistry is dominated by sodium bicarbonate, calcium bicarbonate, or sodium chloride. Total dissolved solids average 463 milligrams per liter (mg/L) and range between 160 and 1,390 mg/L within the basin.

According to the California Department of Water Resources (DWR), the historic high for groundwater depth near the subject site is approximately 82 feet below ground surface (Well 338995N1171958W001). Leighton conducted a geotechnical investigation for the subject site in 2018; groundwater was encountered at approximately 19 feet below ground surface (bgs) in LB-2 and 23 feet bgs in LB-4 (Leighton, 2018).

4.1.5 Oil and Gas Fields

On April 5, 2018, Leighton reviewed the California Department of Conservation (CDC), Division of Oil, Gas, and Geothermal Resources, Online Mapping System (CDC, 2017). Evidence of oil wells or oil field-related facilities was not indicated on the subject site.

4.2 Standard Environmental Record Sources

A search of selected government databases was conducted by Leighton using the Environmental Data Resources (EDR) Radius Report environmental database report system. Details and descriptions of the database search are provided in the EDR report. The report meets the government records search requirements of ASTM E1527-13 Standard Practice for Environmental Property Assessments: Phase I Environmental Property Assessment Process. The database listings were reviewed within the specified radii established by the ASTM E1527-13. A copy of this report is included in Appendix E.

4.2.1 Subject Property

The subject site was identified in the EDR™ database report.

4.2.2 Offsite

The database search results for offsite properties, including those found within the “orphaned” unmapped listings, with potential to adversely impact the subject site are listed in the table below:

Table 1 - Databases Searched

Database	Search Distance (radius)	Properties Identified
Federal NPL List	**1.0-mile**	**Yes (1)**
Federal Delisted NPL List	1.0-mile	No
Federal CERCLIS List	**0.5-mile**	**Yes (1)**
Federal CERCLIS NFRAP List	0.5-mile	No
Federal RCRA CORRACTS Facility List	1.0-mile	No
Federal RCRA non-CORRACTS TSDF List	0.5-mile	No
RCRA Generators List	**0.25-mile**	**Yes (3)**
US ENG Controls List	**0.5-mile**	**Yes (1)**
US INST Controls List	**0.5-mile**	**Yes (1)**
US Brownfields	0.5-mile	No
Historic CAL-Sites	1.0-mile	No
SWRCY	**0.5-mile**	**Yes (1)**
Response	1.0-mile	No
Envirostor	**1.0-mile**	**Yes (3)**
SCH	0.25-mile	No
SWL Facilities	0.5-mile	No
LUST Facilities	**0.5-mile**	**Yes (3)**
CAL FID UST	**0.25-mile**	**Yes(1)**
SLIC	0.5-mile	No
UST	**0.25-mile**	**Yes (2)**
Historical UST	0.25-mile	No
AST	0.25-mile	No
SWEEPS UST	**0.25-mile**	**Yes(1)**
DEED	0.5-mile	No
VCP	0.5-mile	No
Drycleaners	0.25-mile	No
Indian RESERV	1.0-mile	No
Indian LUST	0.5-mile	No
Indian UST	0.25-mile	No
Manufactured Gas Plants	1.0-mile	No
EDR Historical Auto Stations	0.25-mile	No
EDR Historical Cleaners	0.25-mile	No

See EDR® Radius Report (Appendix E) for list of acronyms and data sources

Information in the environmental database report was reviewed for facilities of potential environmental concern to the subject site. The State Water Resources Control Board (SWRCB) Geotracker website and the Department of Toxic Substance Control (DTSC) Envirostor website were used to supplement the information in the database report.

The subject site is located within the former boundaries of the March Air Reserve Base (March ARB), in the northern area. According to the EDR report, March ARB was reported on the DOD, NPL, CERCLIS, RCRA-LQG, US Eng Controls, US Inst Control, ROD, NY Manifest, and PRP databases. According to the EDR radius map report the former March Air Force Base was originally used to train pilots during World War I, and by 1938, it became the central location for west-coast bombing and gunnery training. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. By November 1989, March Air Force Base was added to the NPL due to the contamination of the groundwater. According to the EDR radius map report the facilities status is "currently on the Final NPL." Operational Units (OU) were identified on the facility based on the groundwater plumes. There were numerous contaminants of concern (COCs) detected in the groundwater at the OUs including trichloroethylene (TCE), perchloroethylene (PCE), vinyl chloride, and fuel. The area that required groundwater remediation includes the southern and eastern boundary and extends 1,500 feet south of the base property, and does not include the current subject site boundary.

The listings in the database report were reviewed and not interpreted to represent an adverse effect to the subject site at the time this report was prepared based on one or more of the following:

- Nature of the database listing and not appearing on a database that reports unauthorized releases of hazardous substances;
- Reported regulatory agency status (example Case Closed);
- Reported nature of the case (soil contamination only);
- Distance of the facility to the subject site; and/or
- Location of the facility with respect to anticipated groundwater flow direction.

4.2.3 Vapor Encroachment

Leighton Consulting reviewed the Vapor Encroachment Screen (VES) produced using EDR®'s Vapor Encroachment Worksheet application that gathers regulatory database information from the accompanying Radius Report and allows the user to integrate groundwater information, regional geology, and other information to evaluate the concern for potential vapor encroachment from onsite activities and from adjacent properties. The VES application was designed by EDR® to assist parties seeking to meet the search requirements of the ASTM Standard Practice for Assessment of Vapor Encroachment into Structures on Property Involved in Real Estate Transactions (E2600-10), also referred to as the Tier 1 VES, as defined by ASTM E2600-10.

Using the VES application, there were no on-site listings for the subject site and one off-site listing within the standard search radius. There does not appear to be a potential for vapor encroachment and therefore does not appear to be a potential REC as it relates to the adjacent properties.

4.2.4 Regulatory Agency Contacts

Leighton requested regulatory records for the APN and address associated with the subject site. The following agencies were contacted:

Department of Toxic Substances Control (DTSC)

On April 5, 2018, a file review request was forwarded to the Department of Toxic Substances Control (DTSC), Cypress Office and the DTSC, Chatsworth Office via email. On April 6, 2018, Leighton received an email from the DTSC – Cypress Office stating that no records were found for the subject site. On April 12, 2018, Leighton received a letter from the DTSC – Chatsworth Office stating that no records were found for the subject site.

California Water Resources Control Board (CWRCB)

On April 5, 2018, a file review request was forwarded to the Santa Ana Regional Water Quality Control Board (SARWQCB) via email. On April 13, 2018 the file review request was updated and resubmitted to

CWRCB via email. On April 16, 2018, Leighton received an email from the CWRCB stating that records could not be found for the for the subject property based on APN's. Physical addresses or facility names are needed to search the subject site.

South Coast Air Quality Control District

Leighton searched the South Coast Air Quality Control District's Facility Information Detail (FIND) online database. No permits were identified for the subject site within the FIND database.

Riverside County Department of Environmental Health (RCDEH)

On April 5, 2018, a file review request was forwarded to the Riverside County Department of Environmental Health (RCDEH) via email. On April 11, 2018, Leighton received an email from the RCDEH stating that records could not be found for the for the subject property based on APN's. Physical addresses are needed to search the subject site.

National Pipeline Mapping System (NPMS)

Leighton reviewed records posted on the National Pipeline Mapping System's NPMS Public Map Viewer on April 13, 2018. No hazardous liquid pipelines, liquid petroleum lines, or natural gas lines were observed on the subject site or in surrounding areas (NPMS, 2018).

Copies of records requests and responses are provided in Appendix F.

Radon

Radon is not regulated within the State of California. Nonetheless, the California Department of Health Services (CDPH) and the United States Environmental Protection Agency (US EPA) both recommend a threshold of 4 picocuries per liter (pCi/L) above which certain precautions be taken to mitigate radon buildup in structures.

The State of California Department of Health Services (CDEH) conducts ongoing radon monitoring in the state. The results of the survey indicate that of the 13 indoor air samples collected from zip code 92553, none

contained radon concentrations greater than the U. S. EPA radon action level of 4 pCi/l of air. Therefore, the potential for elevated radon levels at the subject site appears to be low (CDEH, 2016).

4.2.5 Other Reports

Leighton was not provided with previous reports completed for the subject site.

4.3 Historical Use Information on the Property

Leighton reviewed selected historical information on the subject site. These references were reviewed for evidence of activities, which would suggest the presence of hazardous substances at the subject site and to evaluate the potential for the subject site to be impacted by offsite sources of contamination. The following paragraphs are a chronological summary of the review.

4.3.1 Aerial Photographs

Historical aerial photographs were reviewed for information regarding past subject site uses. Aerial photographs dated 1938, 1949, 1953, 1959, 1967, 1978, 1985, 1985, 1989, 1994, 2006, 2010 and 2014 were reviewed. References are provided in Appendix A and copies of the aerial photographs are included in Appendix G.

In the **1938** aerial photographs, the subject site and the surrounding adjacent properties was observed to be vacant native shrubland.

In the **1949** aerial photographs, the subject site and the surrounding properties were observed to be the northern portion of March Air Force Base. The subject site was observed to be primarily vacant land with small structures in the eastern area of the property. Unimproved roads cross the center and southwestern area of the subject site. Cactus Avenue was observed to be an unimproved dirt road in its present day location along the northern boundary of the subject site. The northern adjacent property was observed to be vacant land. Structures and tents belonging to March Air Force Base were observed to the east, south and west of the current boundaries of the subject site.

In the **1953** and **1959,** aerial photographs, the subject site was observed to be vacant land with vehicles and small structures observed in the eastern areas of the subject site. The northern adjacent property was observed to be vacant land. The western adjacent property was observed to contain three large above ground storage tanks. Cactus Avenue appears to be a paved road.

In the **1967,** aerial photograph, the subject site and the eastern and southern adjacent properties were observed to be vacant land, cleared of the previously observed structures and vehicles. The northern adjacent property was observed to be vacant land. The western adjacent property was observed to contain three large above ground storage tanks.

In the **1978,** aerial photograph, land use changes were not observed with the subject site or the surrounding properties.

In the **1985** and **1989,** aerial photographs, the subject site was observed to be vacant land with an unimproved road in the eastern area of the property. Overhead powerlines were observed transecting the eastern area of the subject site and within the northern border of the subject site. Land use changes are not observed with the western and eastern adjacent properties. Additional structures were observed within the southern adjacent property and further south of the subject site. In the 1989 aerial photograph, Frederick Street was observed to be a paved road in its present day configuration within the northern adjacent property. Commercial Structures were observed north of the subject site.

In the **1994,** aerial photograph, land use changes are not observed on the subject site and the surrounding properties with the exception of an electrical substation located in the property the subject site surrounds in the eastern area of the subject site. Additional commercial structures were observed in the northern adjacent property.

In the **2006 and 2010,** aerial photographs, land use changes are not observed on the subject site or the surrounding properties with the exception of additional structures within the southern and northern adjacent properties.

In the **2014,** aerial photograph, significant land use changes are not observed on the subject site or adjacent properties with the exception of a large commercial building observed in the northern adjacent property.

4.3.2 Historical Topographic Maps

Historical topographic maps were reviewed to obtain information regarding past site uses. Topographic map coverage of the site vicinity is provided by "Riverside" Quadrangle (1901, 1942 and 1947), "Perris" Quadrangle (1942), "Riverside East" Quadrangle (1953, 1967, 1980 and 2012) and "Sunnymead" Quadrangle (1953, 1967, 1980 and 2012). References are provided in Appendix A and a copy of the report is included in Appendix G.

Riverside 1901: Structures, tanks, or wells were not depicted on the subject site or adjacent properties.

Riverside 1942 and Perris 1942: Structures, tanks, or wells were not depicted on the subject site or adjacent properties.

Riverside 1947: Structures, tanks, or wells were not depicted on the subject site or adjacent properties.

Riverside East 1953 and Sunnymead 1953: Structures, tanks, or wells were not depicted on the subject site. Properties adjacent to the east of the subject site are depicted with buildings and roads.

Riverside East 1967 and Sunnymead 1967: Structures, tanks, or wells were not depicted on the subject site. The property adjacent to the west is depicted as having tanks. No buildings or structures are depicted on properties adjacent to the north, east and south of the structure. Cactus Avenue is depicted to the north of the subject site in its present day configuration.

Riverside East 1980 and Sunnymead 1980: Significant changes are not observed on the subject site or adjacent properties.

Riverside East 2012 and Sunnymead 2012: Significant changes are not observed on the subject site or adjacent properties.

4.3.3 Fire Insurance Maps

Fire insurance maps, or Sanborn® maps, are detailed city plans showing building footprints, construction details, use of structure, street address, etc. The maps were designed to assist fire insurance agents in determining the degree of hazard associated with a particular property. Sanborn® Maps were produced from approximately 1867 to the present for commercial, industrial, and residential sections of approximately 12,000 cities and towns in the United States.

According to the EDR Certified Sanborn® Map Report, there is no Sanborn map coverage for the subject site. A copy of this report has been provided in Appendix G.

4.3.4 Historical City Directories

Fire insurance maps, or Sanborn® maps, are detailed city plans showing building footprints, construction details, use of structure, street address, etc. The maps were designed to assist fire insurance agents in determining the degree of hazard associated with a particular property. Sanborn® Maps were produced from approximately 1867 to the present for commercial, industrial, and residential sections of approximately 12,000 cities and towns in the United States.

According to the report by EDR®, Sanborn Fire Insurance Maps were not identified for the subject site (Appendix G).

4.3.5 Building Permits

The subject site does have an address associated with the property, however, a review of the historical topographic maps did not depict structures within the subject site boundaries while aerial photographs depicted structures in the subject site. According to the EDR Building Permit Report, dated April 5, 2018, EDR does not have access to building permits in the city of the target property. A copy of the building permit report can be found in Appendix G.

4.3.6 Other Historical Sources

Additional resources were not researched as a part of this assessment.

4.3.7 Summary of Historical Land Use

Based on historical records, land usage is summarized as follows:

Time Period	Land Usage	Reference
Prior to 1901	Unknown	None Available
Approximately 1901 to approximately 1949	Native shrubland	Aerial Photographs Topographic Maps
Approximately 1949 to 1967	Vacant with some structures to the east of the site	Aerial Photographs Topographic Maps
Approximately 1967 to 2014	Vacant	Aerial Photographs Topographic Maps

5.0 SITE RECONNAISSANCE

5.1 Methodology and Limiting Conditions

On April 11, 2018, representatives of Leighton Zachary Freeman and Richard Orr conducted a reconnaissance–level assessment of the subject site. The subject site reconnaissance consisted of observing and documenting existing conditions of the subject site and nature of the neighboring development. Photographs of the subject site are presented in Appendix B and their view directions are noted on Figure 2. Items noted during the property reconnaissance are also depicted on Figure 2.

5.2 General Property Setting

The subject site vicinity is vacant undeveloped land.

The subject site consists of 5 parcels, approximately 36.74 acres of land. No structures were observed on the subject site. The properties adjacent to the north across Cactus Avenue are commercial or industrial in nature. To the west and south the subject site is surrounded by portions of the March Air Reserve Base. To the east the subject site is bordered by vacant land that was formerly part of the March Air Reserve Base. The remainder of the subject site is unpaved vacant property (Photos 1 through 12, Appendix B, Figure 2).

5.3 Exterior and Interior Observations

5.3.1 Hazardous Substances, Drums, and Other Chemical Containers

No hazardous substances, drums, or other chemical containers were observed on the subject site.

5.3.2 Storage Tanks

No aboveground or underground storage tanks were observed on the subject site.

5.3.3 Polychlorinated Biphenyls (PCBs)

PCBs were once used as industrial chemicals whose high stability contributed to both their commercial usefulness and their long-term deleterious environmental and health effects. PCBs can be present in

coolants or lubricating oils used in older electrical transformers, hydraulic systems, and other similar equipment. In 1979, the USEPA generally prohibited the domestic manufacture of PCBs in electrical capacitors, electrical transformers, vacuum pumps, hydraulic pumps, and gas turbines.

One pad mounted transformer was observed on the eastern portion of the subject site, adjacent to the large, off-site electrical substation located near the eastern boundary of the subject site (Photo 1, Appendix B, Figure 2). The transformer appeared in good condition and no evidence of staining or leakage was observed.

5.3.4 Waste Disposal

The subject site is vacant and does not generate waste.

5.3.5 Dumping

Evidence of dumping was observed on the southeastern portion of the subject site. An area of approximately 3.2 acres is covered with small soil piles from end dump trucks. The soils appeared to be clean and locally derived (Photos 2, 4, and 5, Appendix B).

5.3.6 Pits, Ponds, Lagoons, Septic Systems, Wastewater, Drains, Cisterns, and Sumps

Evidence of pits, lagoons, cisterns, and sumps was not observed on the subject site. A long narrow marshy pond was observed along the northern boundary of the subject site (Photo 7, Appendix B).

5.3.7 Pesticide Use

Evidence of pesticide use was not observed on the subject site.

5.3.8 Staining, Discolored Soils, Corrosion

Stained soil was not observed on the subject site.

5.3.9 Stressed Vegetation

Evidence of stressed vegetation was not observed on the subject site.

5.3.10 Unusual Odors

Unusual odors were not detected on the subject site.

5.3.11 Onsite Wells

Evidence of onsite wells was not observed on the subject site.

5.3.12 Other Observations

No other items or conditions were noted on the subject site.

6.0 INTERVIEWS

Leighton conducted interviews with persons having knowledge of current or past subject site usage. Interviews were conducted either orally or in the form of a written questionnaire. Written responses are included as Appendix C.

6.1 Interview with Owner

Leighton received a Phase I ESA Owner/Site Contact Interview Form completed by Mr. Timothy Reeves, Project Manager for Meridian Park, LLC, owner of the subject site. Mr. Reeves was not aware of environmental issues or concerns regarding the subject site.

6.2 Interview with Site/Property Manager

Mr. Reeves stated that the subject site was vacant land and that Meridian has owned it since 2016.

6.3 Interviews with Occupants

Mr. Reeves stated that the subject site was vacant land.

6.4 Interviews with Local Government Officials

Leighton did not interview employees with local government agencies to request information regarding historic and current uses of the subject site with the exception of those noted in Section 4.

6.5 Interviews with Others

Leighton did not conduct additional interviews for this Phase I and Limited Phase II ESA with the exception of the User interview discussed in Section 3.

7.0 LIMITED PHASE II ESA

On April 27, 2018, Leighton completed a limited Phase II ESA of the subject site based on the observation of several soil stockpiles of unknown origin in the southeastern area of the subject site. The scope of work for the limited Phase II ESA is described below.

7.1 Pre-field Activities

Health and Safety Plan

Leighton prepared a site-specific Health and Safety Plan (HSP) for the field work to be performed. The HSP documented the safety aspects of the work and complied with Occupational Safety and Health Administration (OSHA) regulation 29 CFR 1910.120. The HSP was onsite with Leighton personnel at all times. The HSP outlined all site procedures, potential hazards, and contained a hospital location map. Leighton personnel acknowledged acceptance of the plan by signing the HSP.

7.2 Field Activities

On April 27, 2018, Leighton staff observed that the soil stockpile area had recently been modified into one large soil stockpile. In accordance with the Department of Toxic Substances (DTSC) Information Advisory Clean Imported Fill Material (DTSC, 2001) guidance, twenty soil samples (SP1 through SP20) were collected from this single large soil stockpile. The upper 0.5 feet were removed using a hand trowel and a sample was collected 0.5 feet below the surface of the stockpile. Soil samples were retained in laboratory-supplied, 4-ounce glass jars, clearly marked with sample identification, placed in an ice-cooled chest for temporary storage, and transported to Enviro-Chem, Inc., a California Certified laboratory, located in Pomona, California, for chemical analysis.

7.3 Laboratory Analysis

Soil samples collected at depths of 0.5 feet bgs from borings SP1 through SP20 were analyzed for arsenic by EPA Method 6010B and OCPs by EPA Method 8081A.

7.4 Results

The soil analytical results were compared to one or more of the following regulatory screening criteria:

- DTSC Southern California Background concentration of 12 mg/kg for arsenic only; and
- November 2017 EPA Region 9 Regional Screening Levels (RSLs) for residential land use for OCPs and arsenic; and.
- January 2018 DTSC Human Health Risk Assessment Note 3.

The complete laboratory report and chain-of-custody form are included in Appendix H. A summary of laboratory results is presented in Table 1.

Arsenic was detected in each of the soil samples analyzed at concentrations ranging from 1.25 milligram per kilogram (mg/kg) to 2.74 mg/kg. The detected concentrations of arsenic were below the DTSC Southern California Background concentration of 12 mg/kg.

The OCP 4,4'-DDE was detected in seven of the twenty soil samples analyzed at concentrations ranging from 0.001 milligrams per kilogram (mg/kg) to 0.009 mg/kg. The OCP 4,4'-DDT was detected in four of the twenty soil samples analyzed at concentrations ranging from 0.001 mg/kg to 0.004 mg/kg. The concentrations of 4,4'-DDE and 4,4'-DDT were below their residential RSLs of 2.0 mg/kg and 1.9 mg/kg, respectively.

Laboratory analytical reports and chain of custody documents are included in Appendix H. Analytical results are summarized in Table 1.

8.0 FINDINGS

Leighton performed Phase I and Limited Phase II ESA Report for the 36.74-acre property located south of Cactus Avenue between Veterans Way and extending east of Frederick Street, near the City of Moreno Valley, Unincorporated area of Riverside County, California (subject site – Figure 1) in accordance with Meridian Park, LLC (Client) authorization.

8.1 Onsite

Historically, the subject site has been native shrubland and the subject site currently consists of 36.74 acres of vacant land (Photos 1 through 12, Appendix B, Figure 2).

One pad mounted transformer was observed on the eastern portion of the subject site, adjacent to the large, off-site electrical substation located near the eastern boundary of the subject site (Photo 1, Appendix B, Figure 2). The transformer appeared in good condition, no evidence of leakage was observed.

A search of selected government databases was conducted by Leighton using the EDR Radius Report environmental database report system. Details of the database search along with descriptions of each database researched are provided in the EDR database report. The report meets the government records search requirements of ASTM E1527-13 Standard Practice for Environmental Property Assessments: Phase I ESA Environmental Property Assessment Process. The database listings were reviewed within the specified radii established by the ASTM E1527-13. The subject site is located within the former boundaries of the March Air Reserve Base (March ARB), in the northern area. According to the EDR radius map report, March ARB was reported on the DOD, NPL, CERCLIS, RCRA-LQG, US Eng Controls, US Inst Control, ROD, NY Manifest, and PRP databases. The former March Air Force Base was originally used to train pilots during World War I, and by 1938, it became the central location for west-coast bombing and gunnery training. Due to the facility's purpose in national defense, there was a wide variety of operations that involved the use, storage, and disposal of hazardous materials and waste such as fuel, solvents and waste oil. As a result, 30 different areas of soil and groundwater contamination have been identified on the base. By November 1989, March Air Force Base was added to the NPL due to the contamination of the groundwater. According to the EDR radius map report the facilities status is "currently on the Final NPL." Operational Units (OU) were identified on the facility based on the

groundwater plumes. There were numerous contaminants of concern (COCs) detected in the groundwater at the OUs including trichloroethylene (TCE), perchloroethylene (PCE), vinyl chloride, and fuel. The OU areas that required groundwater remediation includes the southern and eastern boundary of March Air Force Base and extends 1,500 feet south of the base property, and does not include the current subject site boundary (Geotracker, 2018).

Based on the results of our concurrent limited Phase II ESA, OCPs and arsenic were not detected in the undocumented soil at concentrations exceeding the US EPA residential RSL or the DTSC HHRA Note 3 screening levels for OCPs, or the DTSC recognized Southern California background arsenic concentration of 12 mg/kg.

8.2 Offsite

Historically, the surrounding adjacent properties were native shrubland prior to the construction of March Air Force Base between 1938 and 1949. The northern adjacent property remained vacant land until commercial development began in the late 1990's. The subject site is bordered to the north by Cactus Avenue and an industrial and commercial center, to the east by vacant land and an electrical substation, to the south by March Air Reserve Base and to the west by a vacant lot and March Reserve Air Base.

Surrounding properties of environmental concern were not identified in the EDR report.

8.3 Data Gaps

Data gaps were identified by Leighton:

- Historical records between 1901 and 1938 were not available.
- EDR does not have access to building permits in the city where the subject site is located.

It is Leighton's opinion that these data gaps are not significant to identifying recognized environmental conditions on the subject site.

9.0 OPINION

9.1 Onsite

It is Leighton's opinion that no RECs, CRECs or HRECs were identified for the subject site.

9.2 Offsite

No offsite RECs, HRECs, or CRECs were identified that would negatively impact the subject site.

10.0 CONCLUSIONS

We have performed a Phase I ESA in conformance with the scope and limitations of ASTM E1527-13 for the 36.74-acre property located south of Cactus Avenue between Veterans Way and extending east of Frederick Street, near the City of Moreno Valley, Unincorporated area of Riverside County, California, the subject site. Exceptions to, or deletions from, this practice are described in Section 1.5 of this report.

It is Leighton's opinion that no RECs, CRECs or HRECs were identified for the subject site.

In general, observations should be made during future property development for areas of possible contamination such as, but not limited to, the presence of underground facilities, buried debris, waste drums, and tanks, stained soil or odorous soils. Should such materials be encountered, further investigation and analysis may be necessary at that time.

11.0 DEVIATIONS

Leighton did not deviate from or alter the scope of work, as defined in Section 1.3 of this report. Significant data gaps were not identified that affect the ability of Leighton to identify recognized environmental conditions at the subject site.

12.0 ADDITIONAL SERVICES

Leighton did not perform work outside the scope of work as defined in Section 1.3 of this report.

13.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

13.1 Corporate

Leighton is a California corporation, providing geotechnical and environmental consulting services throughout California. We are solely a consulting firm without interests in real property other than our offices in Southern California. We provide professional environmental consulting services including application of science and engineering to environmental compliance, hazardous materials/waste assessment and cleanup, and management of hazardous, solid and industrial waste. Phase I Environmental Property Assessments are a part of this practice area and have been conducted by us.

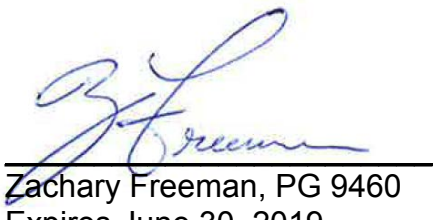
13.2 Individual

The qualifications of the Project Manager and the other Leighton environmental professionals involved in this Phase I ESA meet the Leighton corporate requirements for performing Phase I ESAs as specified by ASTM E1527-13.

13.3 Environmental Professional Statement

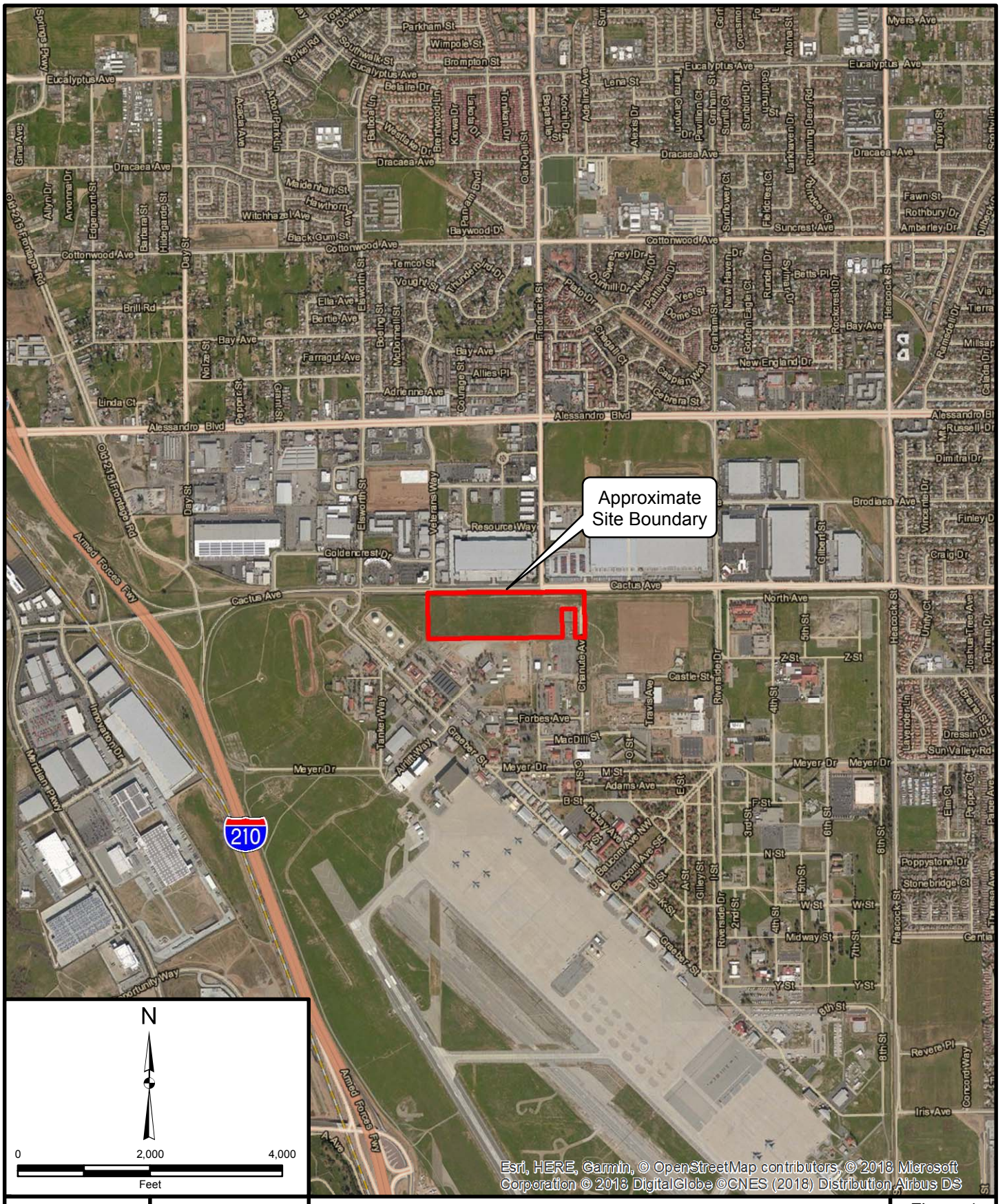
I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined by §312.10 of 40 CFR Part 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject site. I have developed and performed all the appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.



Zachary Freeman, PG 9460
Expires June 30, 2019
Associate Geologist





Project: 11979.001	Eng/Geol: ZAF
Scale:1 " = 2,000 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

Proposed Industrial Warehouse Site K-4
Unincorporated Riverside County,
Moreno Valley, California

Figure 1

Leighton

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Project: 11979.001	Eng/Geol: ZAF
Scale:1 " = 200 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

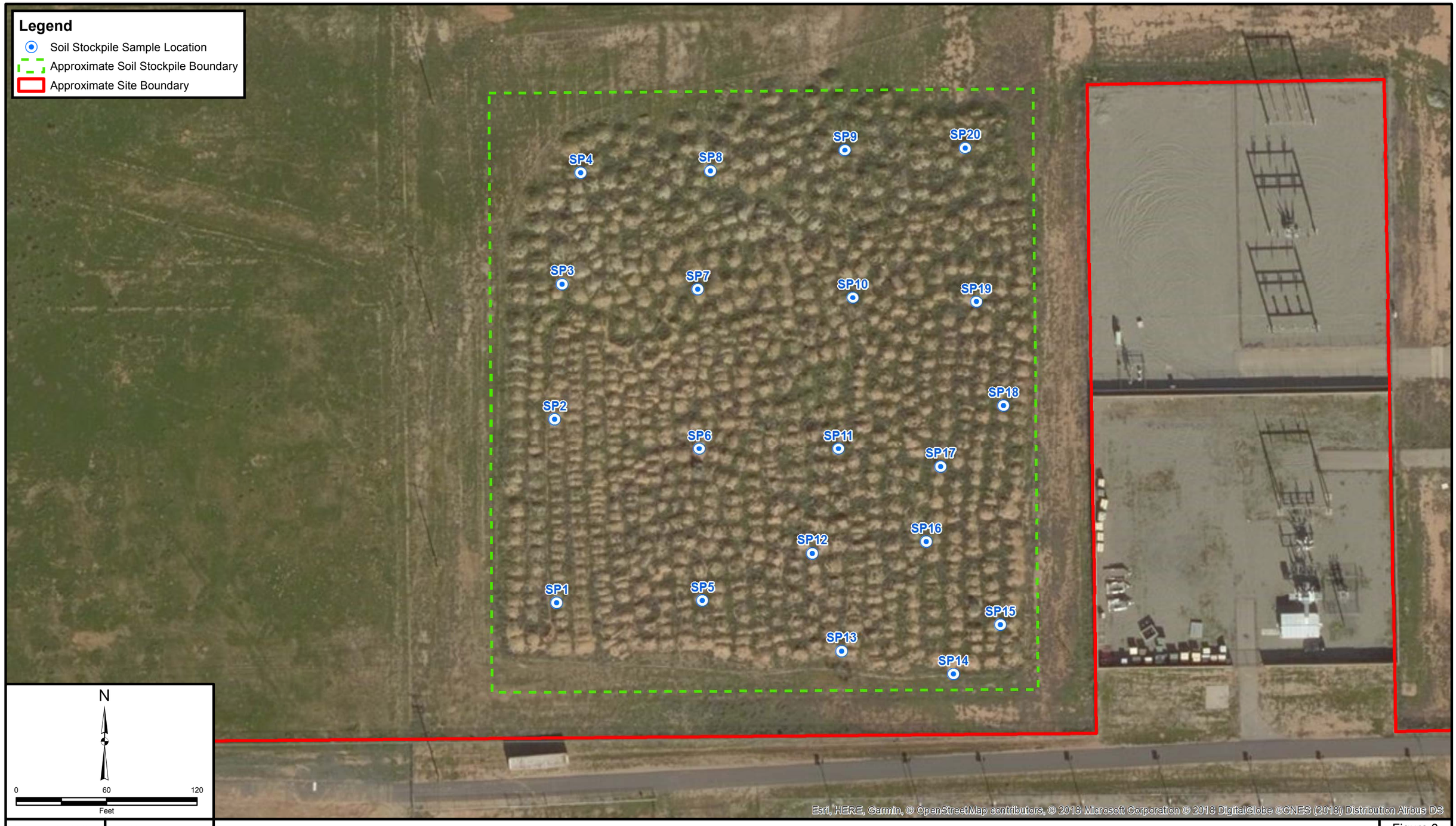
SITE PLAN

Proposed Industrial Warehouse Site K-4
Unincorporated Riverside County,
Moreno Valley, California

Figure 2

Leighton

Map Saved as V:\Drafting\11979\001\Maps\11979-001_F02_SP_2018-05-14.mxd on 5/11/2018 4:37:43 PM



Project: 11979.001	Eng/Geol: ZAF
Scale:1 " = 60 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SAMPLING PLAN

Proposed Industrial Warehouse Site K-4
Unincorporated Riverside County,
Moreno Valley, California

Figure 3

Leighton

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Table 1
Summary of OCPs and Arsenic in Soil
Limited Phase II Soil Investigation
Meridian Park, LLC
Proposed Industrial Warehouse site K-4
Unincorporated Riverside County, California

Sample Number (Depth in Feet)	*Sample Date*	*Arsenic*	*4,4'-DDE*	*4,4'-DDT*	*DF*
		(mg/kg)			
SP1	4/27/2018	***1.65***	< 0.001	< 0.001	1
SP2	4/27/2018	***2.02***	< 0.001	< 0.001	1
SP3	4/27/2018	***2.74***	***0.003***	***0.0007J***	1
SP4	4/27/2018	***1.39***	< 0.001	< 0.001	1
SP5	4/27/2018	***1.78***	< 0.001	< 0.001	1
SP6	4/27/2018	***1.82***	< 0.001	< 0.001	1
SP7	4/27/2018	***1.47***	***0.003***	***0.001***	1
SP8	4/27/2018	***1.26***	***0.001***	0.001	1
SP9	4/27/2018	***1.25***	***0.009***	0.002	2
SP10	4/27/2018	***1.60***	***0.008***	***0.002J***	2
SP11	4/27/2018	***1.76***	< 0.001	< 0.001	1
SP12	4/27/2018	***1.76***	< 0.001	< 0.001	1
SP13	4/27/2018	***2.03***	< 0.001	< 0.001	1
SP14	4/27/2018	***1.97***	< 0.020	< 0.020	20
SP15	4/27/2018	***1.72***	< 0.001	< 0.001	1
SP16	4/27/2018	***2.14***	< 0.001	< 0.001	1
SP17	4/27/2018	***1.73***	< 0.001	< 0.001	1
SP18	4/27/2018	***2.68***	***0.007***	***0.004***	2
SP19	4/27/2018	***1.84***	< 0.001	< 0.001	1
SP20	4/27/2018	***1.66***	***0.002***	< 0.001	1
Maximum Site Concentration		***2.740***	***0.02***	***<2.00***	***-***
Residential RSLs			***2.0***	***1.9***	***-***
Commercial/Industrial RSLs			***9.3***	***8.5***	***-***
Southern California Background Concentration		***12***	--	--	--

Bolded analytical results are above the method detection limit
RSL = US EPA Region IX Regional Screening Levels November 2017
J = Indicates a trace concentration between method detection limit and practical quantitation limit
mg/kg = milligrams per kilogram
<0.001 = analyte not detected above practical quantitation limit

APPENDIX A
REFERENCES

APPENDIX A

References

ASTM International, 2013, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation E1527-13, dated November 06, 2013.

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Environmental Data Resources, Inc., Environmental Lien and AUL Search, April 06, 2018.

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State Water Resources Control Board, Geotracker Online Database, accessed April 09, 2018.

United States Geologic Survey (USGS), 2012, Riverside East 7.5-Minute Quadrangle, dated 2012.

APPENDIX B

SITE RECONNAISSANCE PHOTOS

Leighton

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 1	
View of Direction of Photo: West	
Description: Pad-mounted transformer near the eastern edge of the subject site.	

Photo No. 2	
View of Direction of Photo: Southwest	
Description: View of the end-dump soil piles on the south side of the subject site.	

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 3	
View of Direction of Photo: Northwest	
Description: View across the subject property and adjacent offsite structures.	

Photo No. 4	
View of Direction of Photo: South	
Description: View of the western edge of the soil piles and the adjacent offsite electrical substation.	

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 5	
View of Direction of Photo: Southwest	
Description: View across the western portion of subject site.	

Photo No. 6	
View of Direction of Photo: South	
Description: Eastern Municipal Water District water line that crosses through the middle of the subject site east-west.	

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 7	
View of Direction of Photo: Northeast	
Description: View of an area of poor drainage on the northern portion of the subject site.	

Photo No. 8	
View of Direction of Photo: South	
Description: Electrical vent line for an underground powerline that crosses the middle of the subject site east-west.	

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 9 **View of Direction of Photo:** South **Description**: Manway servicing the underground electrical line on the subject site.	

Photo No. 10 **View of Direction of Photo:** South **Description**: View Across the middle of the subject site.	

Leighton Consulting, Inc.	**PHOTOGRAPHIC RECORD** **April 12, 2018**	
Client Name: Meridian Park, L.L.C.	**Site Location: Proposed Warehouse Site K-4** **Unincorporated Riverside County, California**	**Project No.** **11979.001**

Photo No. 11 **View of Direction of Photo:** East **Description**: View across the middle of the subject site.	

Photo No. 12 **View of Direction of Photo:** Northwest **Description**: View across the western portion of the subject site.	

APPENDIX C

CLIENT SUPPLIED DOCUMENTATION

Leighton

Leighton

Phase I ESA Users Questionnaire

Project Name: K4

Project Address or APN: See attached sheet for APM numbers

Client (or user of the Phase I Environmental Site Assessment): Meridian Park K4, LLC

Name/Title: Timothy C. Reeves/Vice President

Client Phone: 909-581-2609

Reason Phase I is required: Entitlements

Type of property: Vacant

Type of property transaction (e.g., Sale, purchase, exchange): None

Complete and Correct Address of the property and APN(s): See attached sheet for APN's

Any scope of services beyond the ASTM Practice E 1527: Soils Report

All Parties that will rely on the Phase I report: March JPA. potential tenants, lenders, and others

Name and Contact Information for Site Contact: Timothy C. Reeves 909-581-2609

Any special terms or conditions: Site is difficult to access

Any other pertinent knowledge or experience with the property (e.g., prior reports, documents, correspondence concerning the environmental conditions of the property): nothing at this time

(1). Environmental cleanup liens that are filed or recorded against the site (40 CFR 312.25).

Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law? ☐ Yes | ☑ No

If Yes, Describe:

(2). Activity and land use limitations (AULs) that are in place on the site or that have been filed or recorded in a registry (40 CFR 312.26).

Are you aware of any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law? ☐ Yes | ☑ No

If Yes, Describe:

(3). Specialized knowledge or experience of the person seeking to qualify for the Landowners Liability Protections (LLP) (40 CFR 312.28).

As the user of this ESA do you have any specialized knowledge or experience related to the property or the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? ☐ Yes | ☑ No

If Yes, Describe:

(4). Relationship of the purchase price to the fair market value of the property if it were not contaminated (40 DRF 312.29).

Does the purchase price being paid for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? ☐ Yes | ☑ No

If Yes, Describe:

(5). Commonly known or reasonable ascertainable information about the property (40 CFR 312.30).

Are you aware of commonly known or *reasonably ascertainable* information about the property that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example, as user,

(a.) Do you know the past uses of the property? ☑ Yes | ☐ No

(b.) Do you know of specific chemicals that are present or once were present at the property? ☐ Yes | ☑ No

(c.) Do you know of spills or other chemical releases that have taken place at the property? ☐ Yes | ☑ No

(d.) Do you know of any environmental cleanups that have taken place at the property? ☐ Yes | ☑ No

If Yes, Describe: March Air Force Base

(6). The degree of obviousness of the presence of likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).

As the *user of this ESA,* based on your knowledge and experience related to the *property* are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property?* ☐ Yes | ☑ No

If Yes, Describe:

Leighton Consulting, Inc.

A LEIGHTON GROUP COMPANY

Phase I ESA Owner/Site Contact Interview Form

Interviewee Name: Timothy C. Reeves Title: Vice President

Address: 1156 N. Mountain Avenue Upland, CA 91785 Phone: 909-581-2609

Relationship to Property: Project manager for property owner Meridian Park, LLC

Name and Address of Owner of the Property: Meridian Park, LLC 1156 N. Mountain Avenue Upland, CA 91785

Date of Ownership: 08/07/2015 Site Name: K4

Property Address: N/A

Previous Street Names/Numbers: N/A

General Business Type/Present Property Use: Vacant

Assessor Parcel Number: Multiple (See Attached) Total # of Buildings: 0

Grand Total Square Footage: N/A Date Built: N/A

Past Property Uses (include dates): Air Force Base

Source of Potable Water Supply (municipal/groundwater wells): None

Sewage Disposal (municipal/septic) (provide name of utility): None

Means of Heating/Cooling (gas, electric, heating oil, etc.): None

Fuel Source for Heating/Air Conditioning (provide name of utility): None

Neighboring Property Types (commercial/industrial/residential): Industrial/MRAB

Current Uses of Adjoining Properties: North: Industrial

South: March Air Reserve Base

East: Vacant

West: Vacant

ARE THERE NOW, OR HAVE THERE BEEN IN THE PAST, ANY OF THESE ITEMS ONSITE OR ON ADJACENT PROPERTIES:

ITEM	YES	NO	UNK	ADJACENT PROPERTY
• Hazardous Materials			✓	
• Hazardous Waste			✓	
• MSDS Sheets			✓	
• Underground Storage Tanks		✓		
• Aboveground Storage Tanks		✓		
• Vent Pipes, fill pipes, or access ways indicating a fill pipe to an underground storage area		✓		
• Odors		✓		
• Drums		✓		
• Electrical or hydraulic equipment known to contain PCBs		✓		
• Stained soil or surfaces			✓	
• Drains		✓		
• Sumps		✓		
• Clarifier		✓		
• Pits, ponds, or lagoons		✓		
• Stressed vegetation		✓		
• Areas for dumping solid waste (landfill)		✓		
• Wastewater		✓		
• Wells (oil or gas)		✓		
• Septic Systems		✓		
• Fill Material (if fill material is on site, please state source of fill)		✓		

ADDITIONAL QUESTIONS:	YES	NO	UNK	REMARKS
Has the Site been used as any of the following: gas station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard, or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility? If so, state which type of facility.		✓		
Are you aware of any regulatory compliance audit reports, geotechnical reports, Phase I Environmental Site Assessments, or Phase II Environmental Site Assessments, or soil sampling reports prepared for the Site?		✓		
Do you know of any notices or correspondence from any government agency relating to past or current violations of environmental laws with respect to the Site or relating to environmental liens encumbering the Site?		✓		
Do you know of any pending, threatened, or past litigation or administrative proceedings relevant to hazardous substances or petroleum products in, on or from the Site?		✓		
Do you know of any notices from any governmental entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products?		✓		
Do you know of any environmental concerns associated with the Site? If so please state in remarks column.		✓		
Do you know of any environmental concerns associated with any adjacent or nearby properties? If so please state in remarks column.		✓		

Current Property Owner's Time Period of Ownership: Two years seven months

Property Utilization During Ownership: Vacant

Name and Address of Past Owners: LNR Riverside, LLC

Additional Comments: None

Preparer presents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's actual knowledge no material facts have been suppressed or misstated.

Signature

4/9/18
Date

EXHIBIT A-1 to EXHIBIT E-1

Legal Description of the Purchase Lots

LOT 1-A (1.05 acres):
PARCEL 2 OF PARCEL MAP NO. 35682 FILED IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY IN BOOK 228, PAGES 28 TO 30, INCLUSIVE, OF MAPS.
APN: 297-230-029-6

LOT U1-8 (5.85 acres):
LOT 8 OF TRACT NO. 30857-1 AS SHOWN BY TRACT MAP ON FILE IN BOOK 371 PAGES 28 THROUGH 38 OF TRACT MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.
APN: 297-232-002-7

K-4 LAND DESCRIPTION
The land is situated in the City of Moreno Valley, County of Riverside, State of California, and is described as follows:
THAT PORTION OF SECTIONS 13 AND 14, TOWNSHIP 3 SOUTH, RANGE 4 WEST, SAN BERNARDINO BASE AND MERIDIAN, THE LAND ALSO BEING SHOWN AS PARCEL 12 ON RECORD OF SURVEY 000-135 ON FILE IN BOOK 110 PAGES 30 AND 40, INCLUSIVE, OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT THE EASTERLY TERMINUS OF THAT CERTAIN COURSE AS SHOWN ON SHEET 10 OF 11 SHEETS, DETAIL B, OF SAID RECORD OF SURVEY, SAID COURSE BEARS NORTH 89° 34' 15" WEST, 1,724.21 FEET;
THENCE SOUTH 89° 33' 47" EAST, 639.78 FEET;
THENCE SOUTH 00° 40' 11" WEST, 658.68 FEET;
THENCE SOUTH 89° 36' 42" WEST, 134.96 FEET;
THENCE NORTH 00° 12' 17" EAST, 429.49 FEET;
THENCE SOUTH 89° 56' 43" WEST, 202.22 FEET;
THENCE SOUTH 00° 01' 55" WEST, 427.89 FEET;
THENCE NORTH 89° 36' 13" WEST, 2,028.00 FEET;
THENCE NORTH 00° 39' 39" EAST, 690.12 FEET TO THE WESTERLY TERMINUS OF SAID COURSE SHOWN ON SAID RECORD OF SURVEY;
THENCE SOUTH 89° 34' 15" EAST, 1,724.21 FEET TO THE POINT OF BEGINNING;
RESERVING THEREFROM ALL OIL, GAS AND OTHER MINERAL RESOURCES OF ANY KIND OF NATURE IN THE MINERAL ESTATE OF THE PROPERTY, PROVIDED, HOWEVER, THAT SUCH RESERVATION SHALL NOT INCLUDE THE RIGHT OF ACCESS TO OR ANY RIGHT TO USE ANY PORTION OF THE SURFACE OF THE PROPERTY.

APN: 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, 297-200-004-0

APPENDIX D

ENVIRONMENTAL LIEN REPORT

Leighton

March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.7
April 06, 2018

EDR Environmental Lien and AUL Search

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Environmental Lien and AUL Search

The EDR Environmental Lien and AUL Search Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied address information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' offices, registries of deeds, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved, and description); and
- provide a copy of the deed or cite documents reviewed.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EDR Environmental Lien and AUL Search

TARGET PROPERTY INFORMATION

ADDRESS

Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Base
March Air Reserve Ba, CA 92518

RESEARCH SOURCE

Source 1:

Riverside Recorder
Riverside, CA

PROPERTY INFORMATION

Deed 1:

Type of Deed:	deed
Title is vested in:	Meridian Park LLC
Title received from:	LNR Riverside LLC
Deed Dated	8/3/2015
Deed Recorded:	8/7/2015
Book:	NA
Page:	na
Volume:	na
Instrument:	na
Docket:	NA
Land Record Comments:	
Miscellaneous Comments:	
Legal Description:	See Exhibit
Legal Current Owner:	Meridian Park LLC
Parcel # / Property Identifier:	297-150-006, 297-150-007, 297-150-038, 297-160-005, 297-200-004
Comments:	See Exhibit

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

AULs: Found ☐ Not Found ☒

Deed Exhibit 1

2

DOC # 2015-0351190
08/07/2015 08:00 AM Fees: $27.00
Page 1 of 5
Recorded in Official Records
County of Riverside
Peter Aldana
Assessor-County Clerk-Recorder

This document was electronically submitted to the County of Riverside for recording
Receipted by: CARAGON

RECORDING REQUESTED BY
AND WHEN RECORDED MAIL
THIS GRANT DEED AND ALL
TAX STATEMENTS TO:

Meridian Park, LLC
c/o Lewis Operating Corp.
1156 N North Mountain Avenue
Upland, California 91786
Attention: John Goodman and David Linden

NCS 734786

(Space Above For Recorder's Use)

GRANT DEED

APN ITRA:
ATTACHED

THE UNDERSIGNED GRANTOR DECLARES:
Documentary transfer tax is $ 2,640 —
(X) computed on full value of property conveyed, or
( ) computed on full value, less value of liens and encumbrances remaining at time of sale.

FOR VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, LNR RIVERSIDE, LLC, a California limited liability company (the "**Grantor**"), hereby GRANTS to MERIDIAN PARK, LLC, a Delaware limited liability company (the "**Grantee**"), the following described real property (the "**Property**") located in the jurisdiction of the March Joint Powers Authority, in the County of Riverside, State of California:

SEE SCHEDULE "1" ATTACHED HERETO AND
INCORPORATED HEREIN BY THIS REFERENCE

SUBJECT TO AND GRANTEE SHALL HEREBY BE BOUND BY:

1. That certain Assignment of Agreement (Development Agreement) and that certain Assignment of Agreement (Disposition and Development Agreement), each recorded concurrently herewith.

2. The Grantee herein covenants by and for itself, its successors and assigns, heirs, executors, administrators and all persons claiming under or through them, that there shall be no discrimination against or segregation of, any person or group of persons on account of any basis listed in subdivision (a) or (d) of Section 12955 of the Government Code, as those bases are defined in Sections 12926, 12926.1, subdivision (m) and Section (1) of subdivision (p) of Section 12955, and Section 12955.2 of the Government Code, in the sale, lease, sublease, rental, transfer, use, occupancy, tenure or enjoyment of all or any portion of the Property, nor shall the Grantee or any

person claiming under or through the Grantee, establish or permit any practice or practices of discrimination or segregation with reference to the selection, location, number, use or occupancy of tenants, lessees, subtenants, sublessees, or vendees in any portion of the Property. The foregoing covenants shall run with the land in perpetuity.

Notwithstanding the preceding paragraph, with respect to familial status, the preceding paragraph shall not be construed to apply to housing for older persons, as defined in Section 12955.9 of the Government Code. With respect to familial status, nothing in Section (1) shall be construed to affect Section 51.2, 51.2, 51.4, 51.10, 51.11 and 799.5 of the Civil Code, relating to housing for senior citizens. Subdivision (d) of Section 51 and Section 1360 of the Civil Code and subdivision (n), (o) and (p) of Section 12955 of the Government Code shall apply to the preceding paragraph.

[Signature on Next Page]

IN WITNESS WHEREOF, Grantor has caused this Grant Deed to be executed as of the 3 Rd day of August, 2015.

"GRANTOR":

LNR RIVERSIDE, LLC,
a California limited liability company

By: _____
Name: J. PATRICK GALVIN
Title: VICE PRESIDENT

ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California)
County of ORANGE)

On Aug 3, 2015, before me, AUDREY M. HAYES (insert name of notary),
Notary Public, personally appeared J. PATRICK GALVIN,
who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature Audrey M. Hayes (Seal)

AUDREY M. HAYES
Commission # 1954869
Notary Public - California
Orange County
My Comm. Expires Oct 2, 2015

SCHEDULE 1

LEGAL DESCRIPTION OF THE PROPERTY

LOT 1-A (1.05 acres):

The land situated in the County of Riverside, State of California, and is described as follows:

PARCEL 2 OF PARCEL MAP NO. 35682 FILED IN THE OFFICE OF THE COUNTY RECORDER OF RIVERSIDE COUNTY IN BOOK 228, PAGES 28 TO 30, INCLUSIVE, OF MAPS.

APN: 297-230-029-6 TRA: 080-011

LOT U1-8 (5.85 acres):

The land situated in the County of Riverside, State of California, and is described as follows:

LOT 8 OF TRACT NO. 30857-1 AS SHOWN BY TRACT MAP ON FILE IN BOOK 371 PAGES 28 THROUGH 38 OF TRACT MAPS, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

APN: 297-232-002-7 TRA: 080-011

K-4 LAND DESCRIPTION:

The land situated in the County of Riverside, State of California, and is described as follows:

THAT PORTION OF SECTIONS 13 AND 14, TOWNSHIP 3 SOUTH, RANGE 4 WEST, SAN BERNARDINO BASE AND MERIDIAN, THE LAND ALSO BEING SHOWN AS PARCEL 12 ON RECORD OF SURVEY 000-135 ON FILE IN BOOK 110 PAGES 30 AND 40, INCLUSIVE, OF RECORDS OF SURVEY, RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE EASTERLY TERMINUS OF THAT CERTAIN COURSE AS SHOWN ON SHEET 10 OF 11 SHEETS, DETAIL B, OF SAID RECORD OF SURVEY, SAID COURSE BEARS NORTH 89° 34' 15" WEST, 1,724.21 FEET;

THENCE SOUTH 89° 33' 47" EAST, 639.78 FEET;

THENCE SOUTH 00° 40' 11" WEST, 658.68 FEET;

THENCE SOUTH 89° 36' 42" WEST, 134.96 FEET;

THENCE NORTH 00° 12' 17" EAST, 429.49 FEET;

THENCE SOUTH 89° 56' 43" WEST, 202.22 FEET;

THENCE SOUTH 00° 01' 55" WEST, 427.89 FEET;

THENCE NORTH 89° 36' 13" WEST, 2,028.00 FEET;

THENCE NORTH 00° 39' 39" EAST, 690.12 FEET TO THE WESTERLY TERMINUS OF SAID COURSE SHOWN ON SAID RECORD OF SURVEY;

THENCE SOUTH 89° 34' 15" EAST, 1,724.21 FEET TO THE POINT OF BEGINNING;

RESERVING THEREFROM ALL OIL, GAS AND OTHER MINERAL RESOURCES OF ANY KIND OF NATURE IN THE MINERAL ESTATE OF THE PROPERTY, PROVIDED, HOWEVER, THAT SUCH RESERVATION SHALL NOT INCLUDE THE RIGHT OF ACCESS TO OR ANY RIGHT TO USE ANY PORTION OF THE SURFACE OF THE PROPERTY.

APN: 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, 297-200-004-0

TRA: 080-011

APPENDIX E
ENVIRONMENTAL RADIUS REPORT

Leighton

March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.2s
April 06, 2018

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

CACTUS AVENUE BETWEEN VETERNS WAY AND FREDERICK ST
MARCH AIR RESERVE BA, CA 92518

COORDINATES

Latitude (North):	33.9089210 - 33° 54' 32.11''
Longitude (West):	117.2639540 - 117° 15' 50.23''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	475597.8
UTM Y (Meters):	3751894.5
Elevation:	1550 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012
Northeast Map:	5641326 SUNNYMEAD, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140527, 20140603
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
CACTUS AVENUE BETWEEN VETERNS WAY AND FREDERICK ST
MARCH AIR RESERVE BA, CA 92518

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	MARCH AIR RESERVE BA	CACTUS AVENUE	FINDS		TP
A2	MARCH AIR RESERVE BA	CACTUS AVENUE	MCS		TP
Reg	MARCH AIR FORCE BASE		DOD	Same	1 ft.
Reg	MARCH AIR FORCE BASE	22 CSG/CC	NPL, SEMS, RCRA-LQG, US ENG CONTROLS, US INST...	Same	1 ft.
B3	CHEVRON STATION #200	22520 CACTUS AVE	UST	Higher	875, 0.166, WNW
B4	CHEVRON STATION NO 2	22520 CACTUS AVE	RCRA-LQG, LUST, CHMIRS, FINDS, ECHO, HAZNET	Higher	875, 0.166, WNW
B5	CHEVRON #200908	22520 CACTUS AVE	LUST, SWEEPS UST, CA FID UST, CHMIRS, HIST CORTESE	Higher	875, 0.166, WNW
6	ALPER CLEANERS	14420 ELSWORTH ST.,	ENVIROSTOR	Higher	1037, 0.196, WNW
B7	TEXACO SERVICE STATI	22470 CACTUS AVE	RCRA-LQG, UST, FINDS, ECHO, HAZNET	Higher	1069, 0.202, WNW
B8	TEXACO (SHELL) CACTU	22470 CACTUS AVE	LUST	Higher	1069, 0.202, WNW
9	MARCH FIELD SKEET RA		UXO	Higher	1429, 0.271, NNE
10	MENLO RECYCLING CENT	22405 GOLDEN CREST D	SWRCY	Higher	1677, 0.318, WNW
11	MARCH FIELD	14310 FREDERICK STRE	ENVIROSTOR, HWT	Higher	1681, 0.318, NNE
12	MARCH MIL AIRFIELD		ENVIROSTOR	Lower	3328, 0.630, SE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
MARCH AIR RESERVE BA CACTUS AVENUE RIVERSIDE, CA 92518	FINDS Registry ID:: 110065639704	N/A
MARCH AIR RESERVE BA CACTUS AVENUE RIVERSIDE, CA 92518	MCS Global Id: T10000005654 Status: Open - Remediation	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

EXECUTIVE SUMMARY

Federal RCRA generators list

RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land
SLIC ---------- Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS ---------- Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT ---------- Waste Management Unit Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations

ODI ---------- Open Dump Inventory
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
CDL ---------- Clandestine Drug Labs
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
US CDL ---------- National Clandestine Laboratory Register

Local Lists of Registered Storage Tanks

HIST UST ---------- Hazardous Substance Storage Container Database

Local Land Records

LIENS ---------- Environmental Liens Listing
LIENS 2 ---------- CERCLA Lien Information
DEED ---------- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
CHMIRS ---------- California Hazardous Material Incident Report System
LDS ---------- Land Disposal Sites Listing
SPILLS 90 ---------- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---------- RCRA - Non Generators / No Longer Regulated
FUDS ---------- Formerly Used Defense Sites
SCRD DRYCLEANERS ---------- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---------- Financial Assurance Information
EPA WATCH LIST ---------- EPA WATCH LIST
2020 COR ACTION ---------- 2020 Corrective Action Program List
TSCA ---------- Toxic Substances Control Act
TRIS ---------- Toxic Chemical Release Inventory System
SSTS ---------- Section 7 Tracking Systems
RMP ---------- Risk Management Plans
RAATS ---------- RCRA Administrative Action Tracking System
PADS ---------- PCB Activity Database System
ICIS ---------- Integrated Compliance Information System
FTTS ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS ---------- Material Licensing Tracking System
COAL ASH DOE ---------- Steam-Electric Plant Operation Data
COAL ASH EPA ---------- Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER ---------- PCB Transformer Registration Database
RADINFO ---------- Radiation Information Database
HIST FTTS ---------- FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS ---------- Incident and Accident Data
CONSENT ---------- Superfund (CERCLA) Consent Decrees
INDIAN RESERV ---------- Indian Reservations

FUSRAP ---- Formerly Utilized Sites Remedial Action Program
UMTRA ---- Uranium Mill Tailings Sites
LEAD SMELTERS ---- Lead Smelter Sites
US AIRS ---- Aerometric Information Retrieval System Facility Subsystem
US MINES ---- Mines Master Index File
ABANDONED MINES ---- Abandoned Mines
ECHO ---- Enforcement & Compliance History Information
DOCKET HWC ---- Hazardous Waste Compliance Docket Listing
FUELS PROGRAM ---- EPA Fuels Program Registered Listing
CA BOND EXP. PLAN ---- Bond Expenditure Plan
Cortese ---- "Cortese" Hazardous Waste & Substances Sites List
CUPA Listings ---- CUPA Resources List
DRYCLEANERS ---- Cleaner Facilities
EMI ---- Emissions Inventory Data
ENF ---- Enforcement Action Listing
Financial Assurance ---- Financial Assurance Information Listing
HAZNET ---- Facility and Manifest Data
ICE ---- ICE
HWP ---- EnviroStor Permitted Facilities Listing
HWT ---- Registered Hazardous Waste Transporter Database
MINES ---- Mines Site Location Listing
MWMP ---- Medical Waste Management Program Listing
NPDES ---- NPDES Permits Listing
PEST LIC ---- Pesticide Regulation Licenses Listing
PROC ---- Certified Processors Database
Notify 65 ---- Proposition 65 Records
UIC ---- UIC Listing
WASTEWATER PITS ---- Oil Wastewater Pits Listing
WDS ---- Waste Discharge System
WIP ---- Well Investigation Program Case List

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 NPL site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*9*

Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*9*

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 12/11/2017 has revealed that there are 3 RCRA-LQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*9*
CHEVRON STATION NO 2	*22520 CACTUS AVE*	*WNW 1/8 - 1/4 (0.166 mi.)*	*B4*	*35*
TEXACO SERVICE STATI	*22470 CACTUS AVE*	*WNW 1/8 - 1/4 (0.202 mi.)*	*B7*	*49*

Federal institutional controls / engineering controls registries

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 11/13/2017 has revealed that there is 1 US ENG CONTROLS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***9***

US INST CONTROL: A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

A review of the US INST CONTROL list, as provided by EDR, and dated 11/13/2017 has revealed that there is 1 US INST CONTROL site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***9***

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 01/30/2018 has revealed that there are 3 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALPER CLEANERS Facility Id: 33720002 Status: Refer: 1248 Local Agency	14420 ELSWORTH ST.,	WNW 1/8 - 1/4 (0.196 mi.)	6	48
MARCH FIELD Facility Id: 80000870 Status: Inactive - Action Required	***14310 FREDERICK STRE***	***NNE 1/4 - 1/2 (0.318 mi.)***	***11***	***62***

Lower Elevation	Address	Direction / Distance	Map ID	Page
MARCH MIL AIRFIELD Facility Id: 80000012		SE 1/2 - 1 (0.630 mi.)	12	64

Status: Inactive - Needs Evaluation

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the LUST list, as provided by EDR, has revealed that there are 3 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON STATION NO 2	***22520 CACTUS AVE***	***WNW 1/8 - 1/4 (0.166 mi.)***	***B4***	***35***
Database: RIVERSIDE CO. LUST, Date of Government Version: 01/18/2018 Database: LUST, Date of Government Version: 03/12/2018 Status: Completed - Case Closed Facility Id: 971155 Global Id: T0606500508 Facility Status: 9				
CHEVRON #200908	***22520 CACTUS AVE***	***WNW 1/8 - 1/4 (0.166 mi.)***	***B5***	***42***
Database: LUST REG 8, Date of Government Version: 02/14/2005 Facility Status: Leak being confirmed Global ID: T0606500508				
TEXACO (SHELL) CACTU	22470 CACTUS AVE	WNW 1/8 - 1/4 (0.202 mi.)	B8	53
Database: RIVERSIDE CO. LUST, Date of Government Version: 01/18/2018 Database: LUST, Date of Government Version: 03/12/2018 Status: Completed - Case Closed Facility Id: 200219022 Global Id: T0606566676 Facility Status: 9				

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, has revealed that there are 2 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON STATION #200	22520 CACTUS AVE	WNW 1/8 - 1/4 (0.166 mi.)	B3	35
Database: RIVERSIDE CO. UST, Date of Government Version: 01/18/2018 Database: UST, Date of Government Version: 03/12/2018 Facility Id: 193 Facility Id: FA0014084				
TEXACO SERVICE STATI	***22470 CACTUS AVE***	***WNW 1/8 - 1/4 (0.202 mi.)***	***B7***	***49***
Database: RIVERSIDE CO. UST, Date of Government Version: 01/18/2018 Database: UST, Date of Government Version: 03/12/2018				

Facility Id: 750
Facility Id: FA0048257

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: A listing of recycling facilities in California.

A review of the SWRCY list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 SWRCY site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MENLO RECYCLING CENT Cert Id: RC248793.001	22405 GOLDEN CREST D	WNW 1/4 - 1/2 (0.318 mi.)	10	62

Local Lists of Registered Storage Tanks

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there is 1 SWEEPS UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908 Status: A Tank Status: A Comp Number: 1855	***22520 CACTUS AVE***	***WNW 1/8 - 1/4 (0.166 mi.)***	***B5***	***42***

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there is 1 CA FID UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908 Facility Id: 33004997 Status: A	***22520 CACTUS AVE***	***WNW 1/8 - 1/4 (0.166 mi.)***	***B5***	***42***

Other Ascertainable Records

DOD: Consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 DOD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE		0 - 1/8 (0.000 mi.)	0	9

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 ROD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***9***

PRP: A listing of verified Potentially Responsible Parties

A review of the PRP list, as provided by EDR, and dated 10/25/2013 has revealed that there is 1 PRP site within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***9***

UXO: A listing of unexploded ordnance site locations

A review of the UXO list, as provided by EDR, and dated 09/30/2016 has revealed that there is 1 UXO site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH FIELD SKEET RA		NNE 1/4 - 1/2 (0.271 mi.)	9	61

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there is 1 HIST CORTESE site within approximately 0.5 miles of the target property.

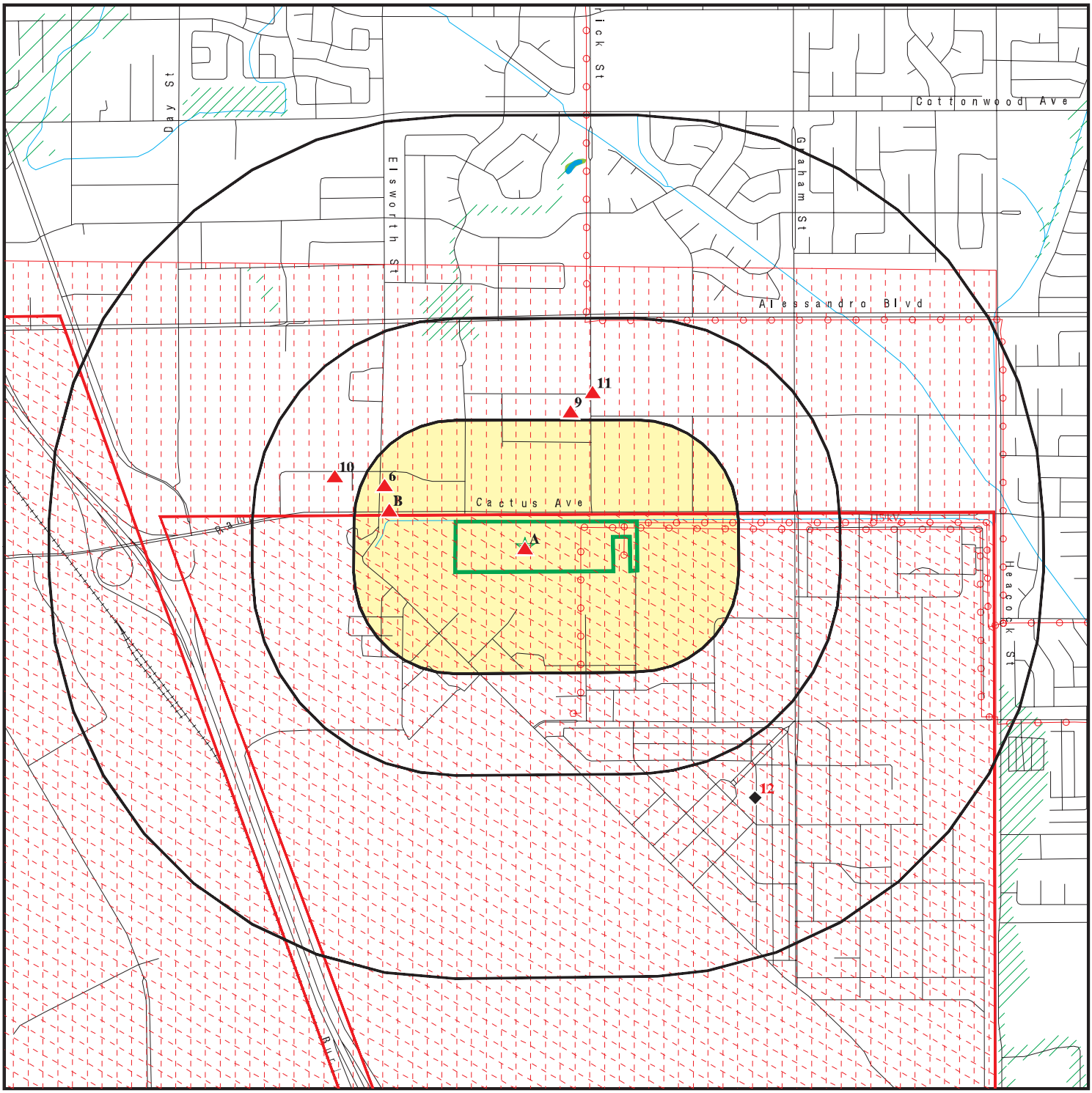
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908 Reg Id: 083303096T	***22520 CACTUS AVE***	***WNW 1/8 - 1/4 (0.166 mi.)***	***B5***	***42***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 5 records.

Site Name	Database(s)
	CDL
UCR - PARKING LOT 6	LUST
U.S. AIR FORCE - MARCH AFB (FORMER	SLIC
RIVERSIDE PLUME	SLIC
UCR (PESTICIDE PITS)	SLIC

OVERVIEW MAP - 5249358.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

Upgradient Area

Areas of Concern

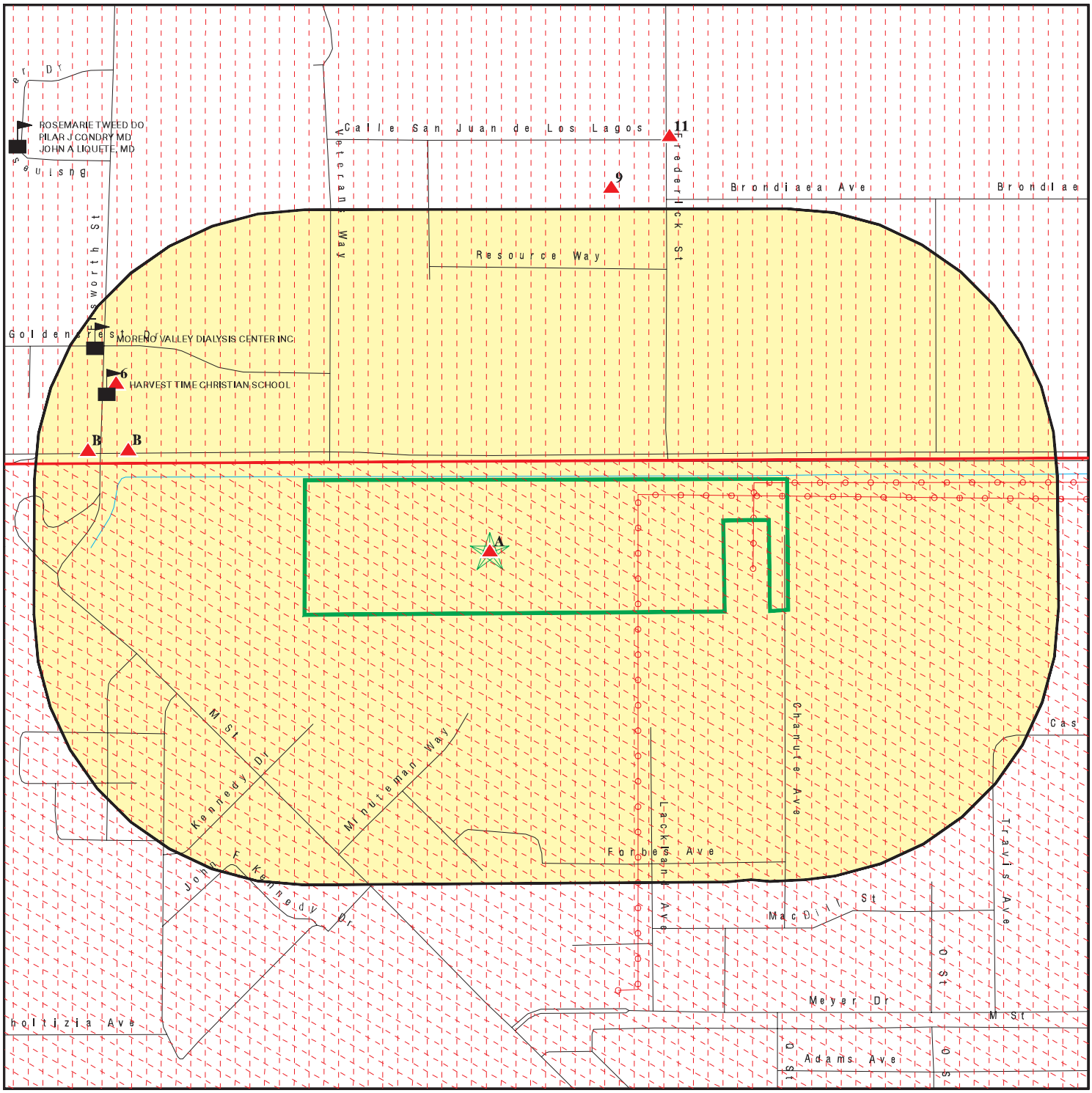
N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
LAT/LONG:	33.908921 / 117.263954	INQUIRY #:	5249358.2s
		DATE:	April 06, 2018 5:40 pm

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DETAIL MAP - 5249358.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
		INQUIRY #:	5249358.2s
LAT/LONG:	33.908921 / 117.263954	DATE:	April 06, 2018 5:41 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		1	0	0	0	NR	1
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		1	0	0	NR	NR	1
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		1	2	NR	NR	NR	3
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		1	0	0	NR	NR	1
US INST CONTROL	0.500		1	0	0	NR	NR	1
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	1	1	1	NR	3
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	3	0	NR	NR	3

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	2	NR	NR	NR	2
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	1	NR	NR	1
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	1	NR	NR	NR	1
HIST UST	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	1	NR	NR	NR	1
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001	1	0	NR	NR	NR	NR	1
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		1	0	0	0	NR	1
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		1	0	0	0	NR	1
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		1	NR	NR	NR	NR	1
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001	1	0	NR	NR	NR	NR	1
UXO	1.000		0	0	1	0	NR	1
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	1	0	NR	NR	1
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.001		0	NR	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		2	8	11	3	1	0	25

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1 **MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU** **FINDS** **1023273819**
Target **CACTUS AVENUE** **N/A**
Property **RIVERSIDE, CA 92518**

Site 1 of 2 in cluster A

Actual: FINDS:
1550 ft.

Registry ID: 110065639704

Environmental Interest/Information System
STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

A2 **MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU** **MCS** **S116287545**
Target **CACTUS AVENUE** **N/A**
Property **RIVERSIDE, CA 92518**

Site 2 of 2 in cluster A

Actual: MCS:
1550 ft.

Global Id:	T10000005654
Latitude:	33.89970
Longitude:	-117.2599
Case Type:	Military Cleanup Site
Status:	Open - Remediation
Status Date:	02/13/2014
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Caseworker:	SN
Local Agency:	US ENVIRONMENTAL PROTECTION AGENCY
RB Case Number:	Not reported
LOC Case Number:	33970004
File Location:	All Files are on GeoTracker or in the Local Agency Database
Potential Media Affect:	Aquifer used for drinking water supply, Other Groundwater (uses other than drinking water)
EDR Link ID:	T10000005654
Potential Contaminants of Concern:	Other Chlorinated Hydrocarbons, Tetrachloroethylene (PCE), Trichloroethylene (TCE)
Site History:	IRP Site CG049 includes the decoupled groundwater components from Operable Units (OU) -1 (IRP Sites FT007, SS031) and OU-2 (IRP Sites OT008) as of June 2013. Groundwater monitoring wells from OU-1 (IRP Sites LF005, SD009, FT015, FT029 And ST034) and OU-2 (IRP Sites WP002, ST027, and ST039)

Click here to access the California GeoTracker records for this facility:

DOD **MARCH AIR FORCE BASE (CLOSED)** **DOD** **CUSA143538**
Region **N/A**

MARCH AIR FORCE BASE (CLO (County), CA

< 1/8
1 ft.

DOD:
- Feature 1: Air Force DOD
- Feature 2: Not reported
- Feature 3: Not reported
- URL: Not reported
- Name 1: March Air Force Base (Closed)
- Name 2: Not reported
- Name 3: Not reported
- State: CA
- DOD Site: Yes
- Tile name: CARIVERSIDE

NPL **MARCH AIR FORCE BASE** **NPL** **1000169261**
Region **22 CSG/CC** **SEMS** **CA4570024527**
RIVERSIDE, CA 92518 **RCRA-LQG**

< 1/8 **US ENG CONTROLS**
1 ft. **US INST CONTROL**
ROD
PRP

NPL:
- EPA ID: CA4570024527
- Cerclis ID: 902761
- EPA Region: 9
- Federal: Y
- Final Date: 1989-11-21 00:00:00
- Site Score: 31.940000000000001
- Latitude: 33.906388999999997
- Longitude: -117.2557

Category Details:
- NPL Status: Currently on the Final NPL
- Category Description: Depth To Aquifer-> 50 And <= 100 Feet
- Category Value: 65

- NPL Status: Currently on the Final NPL
- Category Description: Distance To Nearest Population-> 0 And <= 1/4 Mile
- Category Value: 10

Site Details:
- Site Name: MARCH AIR FORCE BASE
- Site Status: Final
- Site Zip: 92518
- Site City: RIVERSIDE
- Site State: CA
- Federal Site: Yes
- Site County: RIVERSIDE
- EPA Region: 09
- Date Proposed: 07/14/89
- Date Deleted: Not reported
- Date Finalized: 11/21/89

MARCH AIR FORCE BASE (Continued) **1000169261**

Substance Details:

NPL Status:	Currently on the Final NPL
Substance ID:	Not reported
Substance:	Not reported
CAS #:	Not reported
Pathway:	Not reported
Scoring:	Not reported

NPL Status:	Currently on the Final NPL
Substance ID:	A046
Substance:	POLYCHLORINATED BIPHENYLS
CAS #:	1336-36-3
Pathway:	GROUND WATER PATHWAY
Scoring:	3

NPL Status:	Currently on the Final NPL
Substance ID:	U210
Substance:	TETRACHLOROETHENE
CAS #:	127-18-4
Pathway:	GROUND WATER PATHWAY
Scoring:	2

NPL Status:	Currently on the Final NPL
Substance ID:	U228
Substance:	TRICHLOROETHYLENE (TCE)
CAS #:	79-01-6
Pathway:	GROUND WATER PATHWAY
Scoring:	2

Summary Details:

Conditions at proposal July 14, 1989): March Air Force Base MAFB) covers approximately 7,000 acres near Riverside in the Moreno Valley in Riverside County, California. MAFB is adjacent to light industrial, agricultural, and residential areas. Established in 1918 as the Alessandro Aviation Field, MAFB has served as a training base and refueling operations base. Industrial operations including aircraft maintenance and repair) involved use of solvents and disposal of solvent wastes. MAFB is participating in the Installation Restoration Program IRP), established in 1978. Under this program, the Department of Defense seeks to identify, investigate, and clean up contamination from ha ardous materials. As part ofIRP, the Air Force investigated 28 potentially contaminated disposal areas. MAFB Well No. 1 on-base was found to be contaminated with trichloroethylene, tetrachloroethylene, and cis-1,2-dichloroethylene at levels that exceed State drinking water standards. It was taken out of service. Soils on the base are contaminated with toluene and ben ene. An estimated 11,600 people obtain drinking water from municipal wells within 3 miles of ha ardous substances on MAFB. The Air Forceis conducting a remedial investigation/ feasibility study RI/FS) to determine the type and extent of contamination at the base and identify alternatives for remedial action. Status November 21, 1989): Field work continues on the RI/FS.

Site Status Details:

NPL Status:	Final
Proposed Date:	07/14/1989
Final Date:	11/21/1989
Deleted Date:	Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Narratives Details:
NPL Name: MARCH AIR FORCE BASE
City: RIVERSIDE
State: CA

SEMS:
Site ID: 902761
EPA ID: CA4570024527
Cong District: Not reported
FIPS Code: 6065
Latitude: 33.906388999999997
Longitude: -117.2557
FF: Y
NPL: Currently on the Final NPL
Non NPL Status: Not reported

SEMS Detail:
Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: HR
Action Name: HAZRANK
SEQ: 1
Start Date: 1987-06-01 00:00:00
Finish Date: 6/1/1987
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: NP
Action Name: PROPOSED
SEQ: 1
Start Date: 1989-07-14 00:00:00
Finish Date: 7/14/1989
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: NF
Action Name: NPL FINL

MARCH AIR FORCE BASE (Continued) **1000169261**

SEQ: 1
Start Date: 1989-11-21 00:00:00
Finish Date: 11/21/1989
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: AR
Action Name: ADMIN REC
SEQ: 1
Start Date: 2000-10-24 00:00:00
Finish Date: Not reported
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 4
Action Code: RO
Action Name: ROD
SEQ: 3
Start Date: 2005-09-29 00:00:00
Finish Date: 9/29/2005
Qual: Not reported
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: SI
Action Name: SI
SEQ: 1
Start Date: 1987-06-01 00:00:00
Finish Date: 6/1/1987
Qual: L
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y

MARCH AIR FORCE BASE (Continued) **1000169261**

OU:	1
Action Code:	LX
Action Name:	FF RD
SEQ:	1
Start Date:	1996-04-07 00:00:00
Finish Date:	4/18/1996
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LY
Action Name:	FF RA
SEQ:	1
Start Date:	1996-03-05 00:00:00
Finish Date:	Not reported
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	PA
Action Name:	PA
SEQ:	1
Start Date:	1987-02-01 00:00:00
Finish Date:	2/1/1987
Qual:	L
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	RO
Action Name:	ROD
SEQ:	1
Start Date:	1996-06-20 00:00:00
Finish Date:	6/20/1996
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527

MARCH AIR FORCE BASE (Continued) **1000169261**

Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	1
Start Date:	1990-09-27 00:00:00
Finish Date:	6/20/1996
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	7
Start Date:	2004-04-01 00:00:00
Finish Date:	4/1/2004
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	6
Start Date:	1995-07-01 00:00:00
Finish Date:	7/1/1997
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	DS
Action Name:	DISCVRY
SEQ:	1
Start Date:	1985-02-01 00:00:00
Finish Date:	2/1/1985
Qual:	Not reported
Current Action Lead:	Fed Fac

MARCH AIR FORCE BASE (Continued) **1000169261**

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	4
Start Date:	1992-01-24 00:00:00
Finish Date:	4/30/1995
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	4
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	2
Start Date:	1990-09-27 00:00:00
Finish Date:	9/29/2005
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	5
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	5
Start Date:	2005-10-30 00:00:00
Finish Date:	Not reported
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	5
Start Date:	2005-09-30 00:00:00
Finish Date:	9/30/2005

MARCH AIR FORCE BASE (Continued) **1000169261**

Qual: Not reported
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 2
Action Code: RO
Action Name: ROD
SEQ: 4
Start Date: 2004-05-11 00:00:00
Finish Date: 5/11/2004
Qual: Not reported
Current Action Lead: Fed Fac

RCRA-LQG:
Date form received by agency: 02/29/2016
Facility name: MARCH AIR RESERVE BASE
Facility address: 610 MEYER DR
BLDG 2403
MARCH ARB, CA 92518
EPA ID: CA4570024527
Mailing address: MEYER DR
BLDG 2403
MARCH ARB, CA 92518
Contact: CRAIG HUNTER
Contact address: MEYER DR BLDG 2403
MARCH ARB, CA 92518
Contact country: US
Contact telephone: 951-655-5082
Contact email: CRAIG.HUNTER.1@US.AF.MIL
EPA Region: 09
Land type: Federal
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:
Owner/operator name: US AIR FORCE
Owner/operator address: GRAEBER BLDG 470
MARCH ARB, CA 92518
Owner/operator country: US

MARCH AIR FORCE BASE (Continued) **1000169261**

Owner/operator telephone: 951-655-4665
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Federal
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1945
Owner/Op end date: Not reported

Owner/operator name: GEN. RUSSELL A. MUNCY
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Federal
Owner/Operator Type: Operator
Owner/Op start date: 11/01/2013
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: No

. Waste code: 141
. Waste name: Off-specification, aged, or surplus inorganics

. Waste code: 151

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: Asbestos-containing waste

. Waste code: 181
. Waste name: Other inorganic solid waste

. Waste code: 223
. Waste name: Unspecified oil-containing waste

. Waste code: 241
. Waste name: Tank bottom waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 331
. Waste name: Off-specification, aged, or surplus organics

. Waste code: 343
. Waste name: Unspecified organic liquid mixture

. Waste code: 352
. Waste name: Other organic solids

. Waste code: 723
. Waste name: Liquids with chromium (VI) > 500 mg/l

. Waste code: 791
. Waste name: Liquids with pH < 2

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: D018

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

Historical Generators:
Date form received by agency: 10/22/2014
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

MARCH AIR FORCE BASE (Continued) **1000169261**

Date form received by agency: 03/20/2013
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

MARCH AIR FORCE BASE (Continued) **1000169261**

Date form received by agency: 07/15/2010
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: 181
. Waste name: Other inorganic solid waste

. Waste code: 214
. Waste name: Unspecified solvent mixture

. Waste code: 223
. Waste name: Unspecified oil-containing waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 342
. Waste name: Organic liquids with metals (see 121)

. Waste code: 343
. Waste name: Unspecified organic liquid mixture

. Waste code: 352
. Waste name: Other organic solids

. Waste code: 461
. Waste name: Degreasing sludge

. Waste code: 541
. Waste name: Photochemicals / photo processing waste

. Waste code: 792
. Waste name: Liquids with pH < 2 with metals

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE,

MARCH AIR FORCE BASE (Continued) **1000169261**

METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/26/2008
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D021
. Waste name: CHLOROBENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: U188
. Waste name: PHENOL

. Waste code: U227
. Waste name: 1,1,2-TRICHLOROETHANE (OR) ETHANE, 1,1,2-TRICHLORO-

Date form received by agency: 02/08/2006
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

MARCH AIR FORCE BASE (Continued) **1000169261**

Date form received by agency: 02/25/2004
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

Date form received by agency: 04/10/2002
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: MERCURY

. Waste code: P098
. Waste name: POTASSIUM CYANIDE (OR) POTASSIUM CYANIDE K(CN)

Date form received by agency: 10/12/2000
Site name: MARCH ARB CA
Classification: Large Quantity Generator

Date form received by agency: 07/14/2000
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: F001
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/04/1999
Site name: MARCH ARB, CA
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

Date form received by agency: 03/26/1996
Site name: MARCH AFB, CA
Classification: Large Quantity Generator

Date form received by agency: 03/31/1994
Site name: MARCH AIR FORCE BASE, CA
Classification: Large Quantity Generator

Date form received by agency: 03/30/1992
Site name: MARCH AIR FORCE BASE
Classification: Large Quantity Generator

Biennial Reports:

Last Biennial Reporting Year: 2017

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 15899.4

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 186

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF

MARCH AIR FORCE BASE (Continued) **1000169261**

DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 1

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 8

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 843

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 1026

Waste code: D008
Waste name: LEAD
Amount (Lbs): 843

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 2

Waste code: D011
Waste name: SILVER
Amount (Lbs): 1

Waste code: D018
Waste name: BENZENE
Amount (Lbs): 3436

Waste code: D035
Waste name: METHYL ETHYL KETONE
Amount (Lbs): 11381

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 04/27/1995
Date achieved compliance: 04/27/2000
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/28/1995
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 03/05/1984
Date achieved compliance: 04/04/1995
Violation lead agency: EPA

MARCH AIR FORCE BASE (Continued) **1000169261**

Enforcement action: WRITTEN INFORMAL
Enforcement action date: 05/18/1984
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 11/02/2006
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/06/1996
Evaluation: FOLLOW-UP INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/04/1995
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/27/2000
Evaluation lead agency: EPA

Evaluation date: 03/05/1984
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/04/1995
Evaluation lead agency: EPA

US ENG CONTROLS:
EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Actual Date: 09/30/2005
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: Explanation Of Significant Differences
Action Completion date: 08/24/2000
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Bioremediation (Ex-Situ)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Discharge
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Extraction
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Liquid Phase Carbon Adsorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Other, (N.O.S.)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Cap
Contact Name: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Disposal
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Excavation
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Impermeable Barrier
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Low Temperature Thermal Desorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01

MARCH AIR FORCE BASE (Continued) **1000169261**

Contaminated Media : Soil
Engineering Control: Operations & Maintenance (O&M)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Recycling
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Soil Vapor Extraction (in-situ)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 005

MARCH AIR FORCE BASE (Continued) **1000169261**

Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 005
Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

US INST CONTROL:
EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Deed Notices
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Subdivision regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Zoning regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004
Operable Unit: 02
Contaminated Media : Groundwater
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE

MARCH AIR FORCE BASE (Continued) **1000169261**

Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Base use plan change
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Building, demolition, or excavation regulation
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

ROD:
Full-text of USEPA Record of Decision(s) is available from EDR.

PRP:
PRP name: STATE OF CALIFORNIA/DEPT. OF HEALTH SERVICES

MARCH AIR FORCE BASE (Continued) **1000169261**

STATE OF CALIFORNIA/DEPT. OF WATER QUALITY
U.S. AIR FORCE
U.S. AIR FORCE

B3 **CHEVRON STATION #200908** **UST** **U003713600**
WNW **22520 CACTUS AVE** **N/A**
1/8-1/4 **MORENO VALLEY, CA 92553**
0.166 mi.
875 ft. **Site 1 of 5 in cluster B**

Relative:
Higher

Actual:
1552 ft.

UST:
Facility ID: FA0014084
Permitting Agency: Riverside County Department of Environmental Health
Latitude: Not reported
Longitude: Not reported

Facility ID: 193
Permitting Agency: RIVERSIDE COUNTY
Latitude: 33.9118543
Longitude: -117.2684658

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 4

B4 **CHEVRON STATION NO 200908** **RCRA-LQG** **1006805060**
WNW **22520 CACTUS AVE** **LUST** **CAR000120345**
1/8-1/4 **MORENO VALLEY, CA 92553** **CHMIRS**
0.166 mi. **FINDS**
875 ft. **Site 2 of 5 in cluster B** **ECHO**
HAZNET

Relative:
Higher

Actual:
1552 ft.

RCRA-LQG:
Date form received by agency: 03/01/2014
Facility name: CHEVRON 200908
Facility address: 22520 CACTUS AVE
MORENO VALLEY, CA 92553
EPA ID: CAR000120345
Mailing address: CACTUS AVE
MORENO VALLEY, CA 92553
Contact: KATHY NORRIS
Contact address: P.O. BOX 6004
SAN RAMON, CA 94583
Contact country: Not reported
Contact telephone: 877-386-6044
Contact email: NAWTDESK@CHEVRON.COM
EPA Region: 09
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less

CHEVRON STATION NO 200908 (Continued) **1006805060**

of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	CHEVRON USA INC
Owner/operator address:	Not reported
	Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	06/12/1990
Owner/Op end date:	Not reported

Owner/operator name:	CHEVRON USA INC
Owner/operator address:	P.O. BOX 6004
	SAN RAMON, CA 94583
Owner/operator country:	Not reported
Owner/operator telephone:	925-842-1000
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	06/12/1990
Owner/Op end date:	Not reported

Owner/operator name:	CHEVRON PRODUCTS CO
Owner/operator address:	P O BOX 6004
	SAN RAMON, CA 94583
Owner/operator country:	Not reported
Owner/operator telephone:	925-842-5931
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No

CHEVRON STATION NO 200908 (Continued) **1006805060**

User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: 134
. Waste name: Aqueous solution with <10% total organic residues

. Waste code: 352
. Waste name: Other organic solids

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D018
. Waste name: BENZENE

Historical Generators:
Date form received by agency: 05/16/2002
Site name: CHEVRON STATION NO 200908
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D018
. Waste name: BENZENE

Violation Status: No violations found

LUST:
Lead Agency: RIVERSIDE COUNTY LOP
Case Type: LUST Cleanup Site
Geo Track: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606500508
Global Id: T0606500508
Latitude: 33.9107059304108
Longitude: -117.269657428207
Status: Completed - Case Closed
Status Date: 08/21/1998
Case Worker: RIV
RB Case Number: 083303096T
Local Agency: RIVERSIDE COUNTY LOP
File Location: Local Agency Warehouse
Local Case Number: 971155
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

LUST:
Global Id: T0606500508
Contact Type: Local Agency Caseworker
Contact Name: Riverside County LOP
Organization Name: RIVERSIDE COUNTY LOP
Address: 3880 LEMON ST SUITE 200
City: RIVERSIDE
Email: Not reported
Phone Number: 9519558980

CHEVRON STATION NO 200908 (Continued) **1006805060**

Global Id: T0606500508
Contact Type: Regional Board Caseworker
Contact Name: TOM E. MBEKE-EKANEM
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: tmbeke-ekanem@waterboards.ca.gov
Phone Number: 9513202007

LUST:
Global Id: T0606500508
Action Type: Other
Date: 11/17/1997
Action: Leak Discovery

Global Id: T0606500508
Action Type: ENFORCEMENT
Date: 12/17/2008
Action: File review - #RCDEH Upload Site File 8/21/2015

Global Id: T0606500508
Action Type: Other
Date: 11/18/1997
Action: Leak Reported

Global Id: T0606500508
Action Type: Other
Date: 11/06/1997
Action: Leak Stopped

Global Id: T0606500508
Action Type: ENFORCEMENT
Date: 12/18/2008
Action: Closure/No Further Action Letter - #Site Closure

LUST:
Global Id: T0606500508
Status: Open - Case Begin Date
Status Date: 11/06/1997

Global Id: T0606500508
Status: Open - Site Assessment
Status Date: 11/17/1997

Global Id: T0606500508
Status: Completed - Case Closed
Status Date: 08/21/1998

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 971155
Employee: Boltinghous-LOP
Site Closed: Yes
Case Type: Soil only
Facility Status: closed/action completed

CHEVRON STATION NO 200908 (Continued) **1006805060**

Casetype Decode: Soil only is impacted
Fstatus Decode: Closed/Action completed

CHMIRS:

OES Incident Number:	4-0107
OES notification:	01/07/2014
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Service Station
Cleanup By:	No
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Type:	PETROLEUM
Measure:	Gal(s)
Other:	Not reported
Date/Time:	1124
Year:	2014
Agency:	NRC
Incident Date:	1/7/2014
Admin Agency:	Not reported
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Diesel
Quantity Released:	1.5
Unknown:	Not reported

CHEVRON STATION NO 200908 (Continued) **1006805060**

Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	No
#2 Pipeline:	No
#3 Pipeline:	No
#1 Vessel >= 300 Tons:	No
#2 Vessel >= 300 Tons:	No
#3 Vessel >= 300 Tons:	No
Evacs:	No
Injuries:	Human Error
Fatals:	No
Comments:	Not reported
Description:	Copy/Paste from the NRC Report: "CALLER STATED THAT A CUSTOMER OVERFILLED THEIR VEHICLE CAUSING A DISCHARGE OF DIESEL FUEL FROM THEIR VEHICLE." Remedial Actions: "SPILL WAS CONTAINED AND CLEANED."

FINDS:

Registry ID: 110013290438

Environmental Interest/Information System

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:

Envid:	1006805060
Registry ID:	110013290438
DFR URL:	http://echo.epa.gov/detailed-facility-report?fid=110013290438

HAZNET:

envid:	1006805060
Year:	2016
GEPAID:	CAR000120345
Contact:	KWAME AWUKU

CHEVRON STATION NO 200908 (Continued) **1006805060**

Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.0855
Cat Decode:	Other organic solids
Method Decode:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Facility County:	Riverside

envid:	1006805060
Year:	2016
GEPAID:	CAR000120345
Contact:	KWAME AWUKU
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Aqueous solution with total organic residues less than 10 percent
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.18
Cat Decode:	Aqueous solution with total organic residues less than 10 percent
Method Decode:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Facility County:	Riverside

envid:	1006805060
Year:	2015
GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.1875
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805060
Year:	2015

CHEVRON STATION NO 200908 (Continued) **1006805060**

GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Not reported
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	Not reported
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805060
Year:	2015
GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Aqueous solution with total organic residues less than 10 percent
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.1525
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
37 additional CA_HAZNET: record(s) in the EDR Site Report.

B5 **CHEVRON #200908** **LUST** **S101590159**
WNW **22520 CACTUS AVE** **SWEEPS UST** **N/A**
1/8-1/4 **MORENO VALLEY, CA 92388** **CA FID UST**
0.166 mi. **CHMIRS**
875 ft. **Site 3 of 5 in cluster B** **HIST CORTESE**

Relative: **Higher**

Actual: **1552 ft.**

LUST REG 8:

Region:	8
County:	Riverside
Regional Board:	Santa Ana Region
Facility Status:	Leak being confirmed
Case Number:	083303096T
Local Case Num:	971155
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Funding:	Not reported
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global ID:	T0606500508
How Stopped Date:	Not reported
Enter Date:	12/18/1997
Date Confirmation of Leak Began:	11/17/1997
Date Preliminary Assessment Began:	Not reported
Discover Date:	11/17/1997
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	12/18/1997
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9102353
Longitude:	-117.2697446
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	TME
Staff Initials:	UNK
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	SAN JACINTO (8-5)
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported

Summary: Not reported

SWEEPS UST:

Status:	Active
Comp Number:	1855
Number:	1
Board Of Equalization:	Not reported
Referral Date:	10-27-92
Action Date:	10-27-92
Created Date:	08-26-91
Owner Tank Id:	Not reported
SWRCB Tank Id:	33-000-001855-000001
Tank Status:	A
Capacity:	10000

CHEVRON #200908 (Continued) **S101590159**

Active Date:	10-27-92
Tank Use:	M.V. FUEL
STG:	P
Content:	MID GRADE UN
Number Of Tanks:	4
Status:	Active
Comp Number:	1855
Number:	1
Board Of Equalization:	Not reported
Referral Date:	10-27-92
Action Date:	10-27-92
Created Date:	08-26-91
Owner Tank Id:	Not reported
SWRCB Tank Id:	33-000-001855-000002
Tank Status:	A
Capacity:	10000
Active Date:	10-27-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported
Status:	Active
Comp Number:	1855
Number:	1
Board Of Equalization:	Not reported
Referral Date:	10-27-92
Action Date:	10-27-92
Created Date:	08-26-91
Owner Tank Id:	Not reported
SWRCB Tank Id:	33-000-001855-000003
Tank Status:	A
Capacity:	10000
Active Date:	10-27-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported
Status:	Active
Comp Number:	1855
Number:	1
Board Of Equalization:	Not reported
Referral Date:	10-27-92
Action Date:	10-27-92
Created Date:	08-26-91
Owner Tank Id:	Not reported
SWRCB Tank Id:	33-000-001855-000004
Tank Status:	A
Capacity:	10000
Active Date:	10-27-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

CHEVRON #200908 (Continued) **S101590159**

CA FID UST:

Facility ID:	33004997
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7146563161
Mail To:	Not reported
Mailing Address:	P O BOX 2833
Mailing Address 2:	Not reported
Mailing City,St,Zip:	MORENO VALLEY 92388
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

CHMIRS:

OES Incident Number:	13-2669
OES notification:	05/04/2013
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Service Station
Cleanup By:	Contractor
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Measure:	Qt.(s)
Other:	Not reported
Date/Time:	35
Year:	2013
Agency:	Chevron
Incident Date:	5/4/2013
Admin Agency:	Riverside County Environmental Health
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Oil
Quantity Released:	2
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Caller states substance was released from an auto due to unknown causes. The release was discovered when the vehicle was towed due to the customer leaving it.
OES Incident Number:	13-5930
OES notification:	09/20/2013
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Merchant/Business
Cleanup By:	On scene Personnel
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Gal(s)
Other:	Not reported
Date/Time:	1240
Year:	2013
Agency:	NRC
Incident Date:	9/20/2013
Admin Agency:	Riverside County Environmental Health
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Gasoline
Quantity Released:	2
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Per NRC: "Caller stated that a customer was distracted while fueling vehicle and overfilled the tank with gasoline." Remedial Actions: "Spill was contained and cleaned." Additional Info: Cal OES will be contacted next."

HIST CORTESE:

Region:	CORTESE
Facility County Code:	33
Reg By:	LTNKA
Reg Id:	083303096T

6
WNW
1/8-1/4
0.196 mi.
1037 ft.

ALPER CLEANERS
14420 ELSWORTH ST., SUITE 114
MORENO VALLEY, CA 92553

ENVIROSTOR **S106797644**
N/A

Relative:
Higher

Actual:
1553 ft.

ENVIROSTOR:

Facility ID:	33720002
Status:	Refer: 1248 Local Agency
Status Date:	06/07/2004
Site Code:	Not reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	0
NPL:	NO
Regulatory Agencies:	RIVERSIDE COUNTY
Lead Agency:	RIVERSIDE COUNTY
Program Manager:	Not reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not Applicable
Latitude:	33.91112
Longitude:	-117.2692
APN:	297140026, 297150012
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	297140026
Alias Type:	APN
Alias Name:	297150012
Alias Type:	APN
Alias Name:	33720002
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	Not reported
Completed Sub Area Name:	Not reported
Completed Document Type:	Not reported
Completed Date:	Not reported
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

B7 **TEXACO SERVICE STATION** **RCRA-LQG** **1006805485**
WNW **22470 CACTUS AVE** **UST** **CAR000128314**
1/8-1/4 **MORENO VALLEY, CA 92553** **FINDS**
0.202 mi. **ECHO**
1069 ft. **Site 4 of 5 in cluster B** **HAZNET**

Relative: Higher

Actual: 1553 ft.

RCRA-LQG:

Date form received by agency:	03/01/2014
Facility name:	TEXACO SERVICE STATION
Facility address:	22470 CACTUS AVE MORENO VALLEY, CA 92553
EPA ID:	CAR000128314
Mailing address:	PO BOX 2099 PO BOX 2099 HOUSTON, TX 77252
Contact:	MARVIN KATZ
Contact address:	PO BOX 2099 HOUSTON, TX 77252
Contact country:	Not reported
Contact telephone:	310-550-5846
Contact email:	MARVIN.KATZ@SHELL.COM
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	VAHID (DAVID) DELRAHIM
Owner/operator address:	VICCASA DR CALABASAS, CA 92553
Owner/operator country:	Not reported
Owner/operator telephone:	818-535-9322
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	04/01/2004
Owner/Op end date:	Not reported

Owner/operator name:	EQUILON ENTERPRISES LLC DBA
Owner/operator address:	P O BOX 2648 HOUSTON, TX 77252
Owner/operator country:	Not reported
Owner/operator telephone:	281-353-2069
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private

TEXACO SERVICE STATION (Continued) **1006805485**

Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: VAHID (DAVID) DELRAHIM
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 04/01/2004
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D002
. Waste name: CORROSIVE WASTE

Historical Generators:
Date form received by agency: 09/16/2002
Site name: TEXACO SERVICE STATION
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D018
. Waste name: BENZENE

Violation Status: No violations found

UST:
Facility ID: 750
Permitting Agency: RIVERSIDE COUNTY
Latitude: 33.911893
Longitude: -117.269386

Facility ID: FA0048257

TEXACO SERVICE STATION (Continued) **1006805485**

Permitting Agency: Riverside County Department of Environmental Health
Latitude: Not reported
Longitude: Not reported

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 3

FINDS:

Registry ID: 110013305191

Environmental Interest/Information System
California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

Registry ID: 110057123367

Environmental Interest/Information System
STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1006805485
Registry ID: 110013305191
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110013305191

HAZNET:
envid: 1006805485
Year: 2013
GEPAID: CAR000128314
Contact: Adam Estes
Telephone: 3172917007
Mailing Name: Not reported
Mailing Address: PO BOX 3127
Mailing City,St,Zip: HOUSTON, TX 772530000
Gen County: Riverside
TSD EPA ID: CAT080013352
TSD County: Los Angeles
Waste Category: Not reported
Disposal Method: Other Recovery Of Reclamation For Reuse Including Acid Regeneration,

TEXACO SERVICE STATION (Continued) **1006805485**

	Organics Recovery Ect
Tons:	1.14675
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Not reported
envid:	1006805485
Year:	2009
GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Other organic solids
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.05
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside
envid:	1006805485
Year:	2009
GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Tank bottom waste
Disposal Method:	Discharge To Sewer/Potw Or Npdes(With Prior Storage--With Or Without Treatment)
Tons:	0.10425
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside
envid:	1006805485
Year:	2007
GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAT080013352
TSD County:	Not reported
Waste Category:	Unspecified oil-containing waste
Disposal Method:	Discharge To Sewer/Potw Or Npdes(With Prior Storage--With Or Without

TEXACO SERVICE STATION (Continued) **1006805485**

	Treatment)
Tons:	0.2
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside
envid:	1006805485
Year:	2005
GEPAID:	CAR000128314
Contact:	N CORTEZ/ENVT'L DATA ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DRIVE MFT 240-G
Mailing City,St,Zip:	Houston, TX 770672508
Gen County:	Not reported
TSD EPA ID:	CAT080033681
TSD County:	Not reported
Waste Category:	Unspecified aqueous solution
Disposal Method:	Disposal, Land Fill
Tons:	0.16
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
3 additional CA_HAZNET: record(s) in the EDR Site Report.

B8 **TEXACO (SHELL) CACTUS AVE** **LUST** **S105747989**
WNW **22470 CACTUS AVE** **N/A**
1/8-1/4 **MORENO VALLEY, CA 92553**
0.202 mi.
1069 ft. **Site 5 of 5 in cluster B**

Relative: LUST:
Higher

Actual: Lead Agency:	RIVERSIDE COUNTY LOP
1553 ft. Case Type:	LUST Cleanup Site
Geo Track:	http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606566676
Global Id:	T0606566676
Latitude:	33.910583575
Longitude:	-117.270751973
Status:	Completed - Case Closed
Status Date:	10/15/2013
Case Worker:	Not reported
RB Case Number:	Not reported
Local Agency:	Not reported
File Location:	Local Agency
Local Case Number:	200219022
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminants of Concern:	Gasoline
Site History:	***Data prior to 2005 does not appear in GeoTracker. Consult agency files for all site data*** 3 USTs removed October 3, 2002. Up to 1800 ppm TPHg, 61 ppm MTBE and 2.4 ppm TBA was detected. The east end of T1, dispenser D5 and dispenser D2 were overexcavated. 243.97 tons of soil was taken to TPS for recycling. The site was entered into LOP October 22, 2002 4 gw mon wells (MW-1 through MW-4) were installed in April 2003. MW-1, MW-2, MW-3 were screened 20-50 ft bgs and MW-4 from 15-45 ft bgs. GW was not encountered in MW-4 at the time of installation, however, gw was present some time later. Wells MW-1,

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

MW-2, and MW-3 remained dry after installation. MTBE & other constituents were detected in the soil from MW-2 (5 to 50) and in the bottom of MW-4 (35-50). The gw was impacted in MW-4 (2300 ppb TPHg, ND<0.5 ppb B, 3900 ppb MTBE, 450 ppb TBA). 12 CPT soil borings were drilled in February 2004. Soil samples were collected only from CPT1 and CPT9, however, gw samples were collected from all CPT locations and the new wells. Pore pressure dissipation test were conducted in 6 of the CPT borings. TPHg in the groundwater ranged from 84 ppb to 1700 ppb. MTBE ranged from 1.2 to 42 ppb. 3 gw mon wells (MW-5 through MW-7) were installed in August 2004. No TPHg or BTEX were detected in any soil sample. No oxygenates were detected in MW-5 and MW-6. MW-7 had 0.098 ppm at 20. MW-3 was destroyed in September 2004. A Batch Extraction Pilot Test was conducted in February 2006. 1332 gallons of gw and 12.4 lbs of hydrocarbons were extracted during the two events. The pneumatic and hydraulic ROI were interpreted to be <30. 2 monitoring wells (MW-8 and MW-9) were installed in January 2006. No TPHg, BTEX or fuel oxygenates were detected in the soil of MW-9 and MW-9. 1 extraction well MW-2R) was installed in June 2006. MW-2R had MTBE and TBA at 55 and 60. The groundwater extraction system was started October 12, 2006 using MW-2R and MW-7. Soil vapor extraction well SVE-1 was installed in November 2006. Two days of SVE testing were completed December 5 and 6, 2006. TPHg removal rate was 7 lb/day (2 lb were removed during the 7-hr extended test), 0.37 lb/day MTBE (0.11 lb removed) and 0.004 lb/day B (0.001 lb removed). MTBE concentrations increased during the test and the final concentration at the end of the test was 32 ppmV MTBE. 2 monitoring wells (MW-10 and MW-11) were installed in March 2007. A 5-day SVE test was conducted using SVE-1 in March 2007. 21.91 lb TPHg, 1.73 lb MTBE, and 0.021 lb B were removed. The max MTBE vapor concentration was 18 ppmV and decreased to 5.6 ppmV. No further SVE remediation was recommended and RCDEH concurred. 3 confirmation borings (SB-1 through SB-3) were drilled to 60 in July 2007. GW was encountered at 55-55.5 ft bgs. SB-2 and SB-3 were ND for all constituents. SB-1 detections: 0.24 ppm TPHg (15), 0.011 ppm M (25), 0.0093 ppm M (30). BTXE, oxygenates and ethanol were all ND. The groundwater extraction system was shut down Sept. 6, 2007. A total of 182650 gallons of groundwater, 4.546 lbs of TPHg, 15.32 lbs of MTBE and 5.77 lbs of TBA were recovered. MW-12 was installed in April 2008 to replace MW-2R which could not be sampled due to a pump lodged in its casing. Up to 0.69 ppm MTBE and 3.1 ppm TBA was detected in the soil. ~50 gallons of 3% hydrogen peroxide was added to MW-2R on August 12, 19, and 26, 2010 for a total of 165 gallons. Water samples were taken August 19, 2010 during hydrogen peroxide infiltration. Post-infiltration groundwater samples were taken September 10 and October 7, 2010. MW-2R TPHg went from 110 to <50 to 52 to <50 ppb. MTBE went from 8.8 to <1 to 6.1 to 6.5 ppb. TBA went from 1500 to <10 to 770 to 700 ppb. Chromium hexavalent went from <10 to 72 to 4.1 to 1.7 ppb 3 wells (MW-13 through MW-15) were installed March 18 and 22, 2011. TPHg was detected in only one soil sample at 222 ppm (MW-13@50). MTBE was detected in all the samples from MW-13 ranging from 1.6J to 203 ppb. TBA was detected from 40-50 in MW-13 ranging from 39.2J to 971 ppb. The RCDEH approved closure in April 2013 and the SARWQCB concurred with closure in May 2013. The 60 day public comment period for comments on site closure ended on August 2013 with no comments. The wells were destroyed September 9-13, 2013. The site was closed October 13, 2013.

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

LUST:
Global Id: T0606566676
Contact Type: Regional Board Caseworker
Contact Name: CARL BERNHARDT
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: cbernhardt@waterboards.ca.gov
Phone Number: 9517824495

LUST:
Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/06/2007
Action: Staff Letter - #RCDEH 060607

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 09/21/2011
Action: Meeting

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/14/2008
Action: File review

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 05/01/2012
Action: Meeting

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/10/2012
Action: Technical Correspondence / Assistance / Other - #RCDEH 071012

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/15/2013
Action: Closure/No Further Action Letter - #RCDEH Closure Documents

Global Id: T0606566676
Action Type: RESPONSE
Date: 06/21/2013
Action: Other Report / Document

Global Id: T0606566676
Action Type: REMEDIATION
Date: 10/12/2006
Action: Pump & Treat (P&T) Groundwater

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: REMEDIATION
Date: 11/01/2011
Action: In Situ Physical/Chemical Treatment (other than SVE)

Global Id: T0606566676
Action Type: REMEDIATION
Date: 08/12/2010
Action: In Situ Physical/Chemical Treatment (other than SVE)

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/31/2007
Action: Other Report / Document

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 08/13/2009
Action: Staff Letter - #RCDEH081309

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 05/30/2013
Action: Staff Letter - #RCDEH 053013

Global Id: T0606566676
Action Type: RESPONSE

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Date: 07/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/21/2011
Action: Well Installation Report

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2011
Action: Monitoring Report - Annually

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2012
Action: Monitoring Report - Annually

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/14/2013
Action: Other Report - #UST Sample Analytical Report

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/01/2007
Action: File review - #RCDEH110107

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/08/2010
Action: Pilot Study/ Treatability Report

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 09/15/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 091511

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 03/28/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 032811

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/07/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2009
Action: Monitoring Report - Quarterly

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: RESPONSE
Date: 05/18/2007
Action: Other Workplan

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 02/23/2011
Action: Meeting

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 04/25/2013
Action: LOP Case Closure Summary to RB

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2013
Action: Monitoring Report - Annually

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/04/2013
Action: Well Destruction Report

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: Other
Date: 10/03/2002
Action: Leak Stopped

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Date: 07/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/05/2008
Action: Staff Letter - #RCDEH060508

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/02/2008
Action: File review

Global Id: T0606566676
Action Type: RESPONSE
Date: 08/19/2013
Action: Verbal Communication

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: Other
Date: 10/21/2002
Action: Leak Discovery

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/20/2010
Action: Staff Letter - #RCDEH 072010

Global Id: T0606566676
Action Type: Other
Date: 10/23/2002
Action: Leak Reported

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/10/2012
Action: Technical Correspondence / Assistance / Other - #RCDEH 071012

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/01/2010
Action: Letter - Notice - #RCDEH 110110

Global Id: T0606566676
Action Type: RESPONSE
Date: 05/02/2008
Action: Other Report / Document

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 03/03/2008
Action: Staff Letter - #RCDEH030308

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/17/2013
Action: Notification - Public Notice of Case Closure - #RCDEH 061713

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 05/26/2009
Action: Staff Letter - #RCDEH 052609

Global Id: T0606566676
Action Type: REMEDIATION
Date: 03/13/2007
Action: Soil Vapor Extraction (SVE)

Global Id: T0606566676
Action Type: REMEDIATION
Date: 10/03/2002
Action: Excavation

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 02/23/2011
Action: Staff Letter - #RCDEH 022311

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2009
Action: Other Report / Document

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 04/16/2007
Action: Staff Letter - #04162007

Global Id: T0606566676
Action Type: REMEDIATION
Date: 12/05/2006
Action: Soil Vapor Extraction (SVE)

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2012
Action: Monitoring Report - Quarterly

LUST:
Global Id: T0606566676

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Status:	Open - Case Begin Date
Status Date:	10/03/2002
Global Id:	T0606566676
Status:	Open - Site Assessment
Status Date:	10/22/2002
Global Id:	T0606566676
Status:	Open - Remediation
Status Date:	10/12/2006
Global Id:	T0606566676
Status:	Open - Verification Monitoring
Status Date:	09/06/2007
Global Id:	T0606566676
Status:	Open - Remediation
Status Date:	07/20/2010
Global Id:	T0606566676
Status:	Open - Eligible for Closure
Status Date:	05/30/2013
Global Id:	T0606566676
Status:	Completed - Case Closed
Status Date:	10/15/2013

RIVERSIDE CO. LUST:

Region:	RIVERSIDE
Facility ID:	200219022
Employee:	Shurlow-LOP
Site Closed:	Yes
Case Type:	Drinking Water Aquifer affected
Facility Status:	closed/action completed
Casetype Decode:	An Aquifer used for Drinking Water supply has been contaminated.
Fstatus Decode:	Closed/Action completed

---

9 **MARCH FIELD SKEET RANGE** **UXO** **1018150389**
NNE **N/A**
1/4-1/2 **MARCH AIR FORCE BASE, CA**
0.271 mi.
1429 ft.

Relative:
Higher

Actual:
1563 ft.

UXO:

DoD Component:	FUDS
Installation Name:	MARCH FIELD
Facility Address 2:	Not reported
Site ID:	01OEW
Site Type:	Trap and Skeet Range
Latitude:	33.913799
Longitude:	-117.262001

10
WNW
1/4-1/2
0.318 mi.
1677 ft.

MENLO RECYCLING CENTER
22405 GOLDEN CREST DR BLDG A
MORENO VALLEY, CA 92553

SWRCY **S118822782**
N/A

Relative:
Higher

Actual:
1555 ft.

SWRCY:

Reg Id:	248793
Cert Id:	RC248793.001
Mailing Address:	23325 Westwood St
Mailing City:	Grand Terrace
Mailing State:	CA
Mailing Zip Code:	Not reported
Website:	Not reported
Email:	dnmenlo@yahoo.com
Phone Number:	(951) 653-5565
Grand Father:	N
Rural:	N
Operation Begin Date:	08/03/2016
Aluminium:	Y
Glass:	Y
Plastic:	Y
Bimetal:	Y
Agency:	N/A
Monday Hours Of Operation:	8:00 am - 5:00 pm
Tuesday Hours Of Operation:	8:00 am - 5:00 pm
Wednesday Hours Of Operation:	8:00 am - 5:00 pm
Thursday Hours Of Operation:	8:00 am - 5:00 pm
Friday Hours Of Operation:	8:00 am - 5:00 pm
Saturday Hours Of Operation:	8:00 am - 3:00 pm
Sunday Hours Of Operation:	CLOSED
Organization ID:	225956
Organization Name:	D & N Menlo National Corporation

11
NNE
1/4-1/2
0.318 mi.
1681 ft.

MARCH FIELD
14310 FREDERICK STREET
MORENO VALLEY, CA 92533

ENVIROSTOR **S109348567**
HWT **N/A**

Relative:
Higher

Actual:
1564 ft.

ENVIROSTOR:

Facility ID:	80000870
Status:	Inactive - Action Required
Status Date:	11/30/2010
Site Code:	401438
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	53.3
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Daniel Cordero
Supervisor:	Manny Alonzo
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA

MARCH FIELD (Continued) **S109348567**

Latitude: 33.89166
Longitude: -117.2597
APN: NONE SPECIFIED
Past Use: FIRING RANGE - SMALL ARMS ETC...
Potential COC: Explosives (UXO, MEC Munitions Debris (MD
Confirmed COC: 30011-NO 32000-NO
Potential Description: SOIL
Alias Name: CA99799F999100
Alias Type: Federal Facility ID
Alias Name: J09CA7168
Alias Type: INPR
Alias Name: 401438
Alias Type: Project Code (Site Code)
Alias Name: 80000870
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Tech Memo
Completed Date: 03/02/2009
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 07/02/2009
Comments: Final site specific work plan received.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment/Site Inspection Report (PA/SI)
Completed Date: 07/22/2009
Comments: Comments included the SI phase of this project is done.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 09/14/1998
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

HWT:
Reg Num: 3450
Expiration Date: 06/30/2018

12
SE
1/2-1
0.630 mi.
3328 ft.

MARCH MIL AIRFIELD
RIVERSIDE, CA

ENVIROSTOR **S107736675**
N/A

Relative:
Lower

Actual:
1527 ft.

ENVIROSTOR:

Facility ID:	80000012
Status:	Inactive - Needs Evaluation
Status Date:	07/01/2005
Site Code:	Not reported
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Not reported
Supervisor:	Douglas Bautista
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA
Latitude:	33.9
Longitude:	-117.2541
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	CA99799F523200
Alias Type:	Federal Facility ID
Alias Name:	J09CA0011
Alias Type:	INPR
Alias Name:	80000012
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Inventory Project Report (INPR)
Completed Date:	05/22/1995
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

Count: 5 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MORENO VALLEY	S107539751		ON CACTUS	92518	CDL
MORENO VALLEY	S108985918	U.S. AIR FORCE - MARCH AFB (FORMER	N/A GRAHAM		SLIC
RIVERSIDE	S108985920	RIVERSIDE PLUME	N/A RIVERSIDE II BASIN		SLIC
RIVERSIDE	S104970783	UCR - PARKING LOT 6	UNIVERSITY OF CALIF, RIVERSIDE		LUST
RIVERSIDE	S108985921	UCR (PESTICIDE PITS)	N/A UNIVERSITY AVENUE		SLIC

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 14

Source: EPA
Telephone: N/A
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/05/2018
Next Scheduled EDR Contact: 04/16/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/22/2017
Date Data Arrived at EDR: 06/13/2017
Date Made Active in Reports: 09/15/2017
Number of Days to Update: 94

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/09/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/13/2017
Date Data Arrived at EDR: 11/27/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 74

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/13/2017
Date Data Arrived at EDR: 11/27/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 74

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 63

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 02/12/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 48

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/25/2017
Date Data Arrived at EDR: 11/07/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 31

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/26/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 15
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/25/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/13/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/01/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 78
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/02/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/24/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 134
Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/26/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/14/2017
Date Data Arrived at EDR: 07/27/2017
Date Made Active in Reports: 10/06/2017
Number of Days to Update: 71

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/23/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 10/14/2016
Date Data Arrived at EDR: 01/27/2017
Date Made Active in Reports: 05/05/2017
Number of Days to Update: 98

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 12/22/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 01/31/2018
Number of Days to Update: 36
Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 21
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30
Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/12/2017
Date Made Active in Reports: 01/17/2018
Number of Days to Update: 36
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 02/08/2018
Date Data Arrived at EDR: 02/09/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 39

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 02/09/2018
Next Scheduled EDR Contact: 02/26/2018
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 01/30/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 02/02/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 16

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 01/30/2018
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 47

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2017
Date Data Arrived at EDR: 08/18/2017
Date Made Active in Reports: 09/21/2017
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 16

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 02/27/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 02/28/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 27

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/01/2017
Date Made Active in Reports: 01/11/2018
Number of Days to Update: 41

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 02/08/2018
Date Data Arrived at EDR: 02/08/2018
Date Made Active in Reports: 02/08/2018
Number of Days to Update: 0

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 01/19/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 63

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 02/15/2018
Date Data Arrived at EDR: 02/20/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 02/20/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 7

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/26/2017
Date Made Active in Reports: 02/09/2018
Number of Days to Update: 45

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/13/2017
Next Scheduled EDR Contact: 01/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/11/2017
Next Scheduled EDR Contact: 01/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63
Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/16/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 01/11/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 42
Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6
Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/08/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 03/23/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/25/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/22/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 21

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/09/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/12/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 03/09/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/26/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/02/2017
Date Data Arrived at EDR: 10/05/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 8

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 11/10/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 63

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 03/19/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 02/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 10/29/2017
Date Data Arrived at EDR: 11/28/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 45

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 12/20/2017
Date Data Arrived at EDR: 12/21/2017
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 92

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 03/07/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 02/23/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 01/02/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/27/2017
Date Data Arrived at EDR: 11/21/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 03/02/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/13/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 03/02/2018
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 03/07/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 30

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 02/08/2018
Date Data Arrived at EDR: 02/08/2018
Date Made Active in Reports: 02/08/2018
Number of Days to Update: 0

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 12/01/2017
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/16/2018
Number of Days to Update: 42

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 08/15/2017
Number of Days to Update: 147

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 03/23/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 54

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 55

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 02/14/2018
Date Data Arrived at EDR: 02/16/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 46

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 02/08/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/12/2017
Date Made Active in Reports: 10/17/2017
Number of Days to Update: 97

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/08/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 41

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing
Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 41
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database
A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 01/08/2018
Date Data Arrived at EDR: 01/09/2018
Date Made Active in Reports: 02/06/2018
Number of Days to Update: 28
Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/09/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing
A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/12/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 31
Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 11/29/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 42
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 02/14/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 29
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 12/04/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 42
Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 03/05/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/12/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 35
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 12/14/2017
Date Data Arrived at EDR: 12/15/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 32
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 12/11/2017
Date Data Arrived at EDR: 12/12/2017
Date Made Active in Reports: 01/17/2018
Number of Days to Update: 36
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water board?s review found that more than one-third of the region?s active disposal pits are operating without permission.

Date of Government Version: 04/15/2015
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/23/2015
Number of Days to Update: 67
Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 01/12/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9
Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 03/21/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 01/11/2018
Date Made Active in Reports: 02/22/2018
Number of Days to Update: 42

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 63

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 10

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 01/25/2018
Date Data Arrived at EDR: 01/26/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 47

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 03/26/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 02/26/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 14

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/20/2017
Date Data Arrived at EDR: 11/29/2017
Date Made Active in Reports: 01/19/2018
Number of Days to Update: 51

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 01/29/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 01/05/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 40

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 01/29/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 12/04/2017
Date Data Arrived at EDR: 12/06/2017
Date Made Active in Reports: 12/27/2017
Number of Days to Update: 21

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 01/29/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 9

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 08/03/2017
Date Data Arrived at EDR: 08/08/2017
Date Made Active in Reports: 10/16/2017
Number of Days to Update: 69

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/26/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 47

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 06/08/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 08/04/2017
Number of Days to Update: 56

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 03/28/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 02/02/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 54

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 02/01/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 11/14/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 28

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 02/06/2018
Date Data Arrived at EDR: 02/09/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 33

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/16/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206
Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 56
Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 01/16/2018
Date Data Arrived at EDR: 01/16/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 29
Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/16/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 04/21/2017
Date Made Active in Reports: 10/09/2017
Number of Days to Update: 171
Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/10/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/01/2018
Date Data Arrived at EDR: 01/17/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 28
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/17/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/10/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/10/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 54
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/05/2018
Date Made Active in Reports: 01/18/2018
Number of Days to Update: 13

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 04/05/2018
Next Scheduled EDR Contact: 07/23/2018
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/22/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 40

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 01/05/2018
Date Made Active in Reports: 01/17/2018
Number of Days to Update: 12

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 01/11/2018
Date Data Arrived at EDR: 01/12/2018
Date Made Active in Reports: 02/08/2018
Number of Days to Update: 27

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 15

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 01/09/2018
Date Data Arrived at EDR: 01/11/2018
Date Made Active in Reports: 01/31/2018
Number of Days to Update: 20
Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 02/20/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 30
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 01/31/2018
Date Data Arrived at EDR: 02/01/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 41
Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 01/29/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 02/05/2018
Date Data Arrived at EDR: 02/13/2018
Date Made Active in Reports: 04/03/2018
Number of Days to Update: 49
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 02/05/2018
Date Data Arrived at EDR: 02/13/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 35
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 02/07/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 49
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 02/07/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 12/08/2017
Date Data Arrived at EDR: 12/12/2017
Date Made Active in Reports: 01/31/2018
Number of Days to Update: 50
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 03/15/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 50
Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 01/18/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 56
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/19/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 01/18/2018
Date Data Arrived at EDR: 01/23/2018
Date Made Active in Reports: 03/28/2018
Number of Days to Update: 64
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 03/19/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 01/03/2018
Date Made Active in Reports: 02/05/2018
Number of Days to Update: 33

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 01/03/2018
Date Made Active in Reports: 02/14/2018
Number of Days to Update: 42

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 04/04/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 11/01/2017
Date Data Arrived at EDR: 11/03/2017
Date Made Active in Reports: 11/17/2017
Number of Days to Update: 14

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 11/30/2017
Date Data Arrived at EDR: 12/01/2017
Date Made Active in Reports: 01/16/2018
Number of Days to Update: 46

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 02/05/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 12/04/2017
Date Data Arrived at EDR: 12/05/2017
Date Made Active in Reports: 01/11/2018
Number of Days to Update: 37

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 03/07/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/01/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 02/01/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/07/2017
Date Made Active in Reports: 12/19/2017
Number of Days to Update: 42
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 04/02/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 12/20/2017
Date Data Arrived at EDR: 12/21/2017
Date Made Active in Reports: 02/01/2018
Number of Days to Update: 42
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 07/02/2018
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 11/16/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/18/2017
Number of Days to Update: 31
Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 12/12/2017
Date Data Arrived at EDR: 12/14/2017
Date Made Active in Reports: 01/11/2018
Number of Days to Update: 28
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/07/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 12/12/2017
Date Data Arrived at EDR: 12/14/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 29
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 03/07/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28
Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/20/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 27
Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22
Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 02/22/2018
Next Scheduled EDR Contact: 06/11/2018
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 02/04/2018
Date Data Arrived at EDR: 02/06/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 42

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 02/01/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 02/15/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 12/14/2017
Date Data Arrived at EDR: 12/15/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 28

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 03/29/2018
Number of Days to Update: 16

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 12/20/2017
Date Data Arrived at EDR: 12/21/2017
Date Made Active in Reports: 01/31/2018
Number of Days to Update: 41

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 03/22/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/09/2018
Date Made Active in Reports: 02/06/2018
Number of Days to Update: 28

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 03/22/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 02/06/2018
Date Data Arrived at EDR: 02/07/2018
Date Made Active in Reports: 03/16/2018
Number of Days to Update: 37

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 01/16/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 01/08/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 03/30/2018
Number of Days to Update: 29

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 02/28/2018
Next Scheduled EDR Contact: 06/18/2018
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List

Cupa facilities

Date of Government Version: 01/26/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 47

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 02/01/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/19/2018
Number of Days to Update: 53

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 09/27/2017
Date Data Arrived at EDR: 09/28/2017
Date Made Active in Reports: 10/16/2017
Number of Days to Update: 18

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 03/06/2018
Next Scheduled EDR Contact: 05/21/2018
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/16/2018
Number of Days to Update: 50

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 12/26/2017
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 48

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/08/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: Quarterly

Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 12/26/2017
Date Data Arrived at EDR: 01/25/2018
Date Made Active in Reports: 03/20/2018
Number of Days to Update: 54

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/22/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 02/28/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 03/30/2018
Number of Days to Update: 16
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/14/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 01/02/2018
Date Data Arrived at EDR: 01/09/2018
Date Made Active in Reports: 01/19/2018
Number of Days to Update: 10
Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 03/29/2018
Next Scheduled EDR Contact: 07/16/2018
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 02/01/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 47
Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 01/29/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/22/2018
Number of Days to Update: 36
Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/14/2018
Next Scheduled EDR Contact: 05/28/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 07/27/2017
Number of Days to Update: 107
Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/05/2018
Next Scheduled EDR Contact: 04/23/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 01/31/2018
Date Made Active in Reports: 03/09/2018
Number of Days to Update: 37

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 01/31/2018
Next Scheduled EDR Contact: 05/14/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/16/2018
Next Scheduled EDR Contact: 04/30/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/19/2015
Date Made Active in Reports: 07/15/2015
Number of Days to Update: 26

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 02/21/2018
Next Scheduled EDR Contact: 06/04/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/13/2017
Date Made Active in Reports: 07/14/2017
Number of Days to Update: 92

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 03/08/2018
Next Scheduled EDR Contact: 06/25/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

MARCH AIR RESERVE BASE
CACTUS AVENUE BETWEEN VETERNS WAY AND FREDERICK ST
MARCH AIR RESERVE BA, CA 92518

TARGET PROPERTY COORDINATES

Latitude (North):	33.908921 - 33° 54' 32.12''
Longitude (West):	117.263954 - 117° 15' 50.23''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	475597.8
UTM Y (Meters):	3751894.5
Elevation:	1550 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012
Northeast Map:	5641326 SUNNYMEAD, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

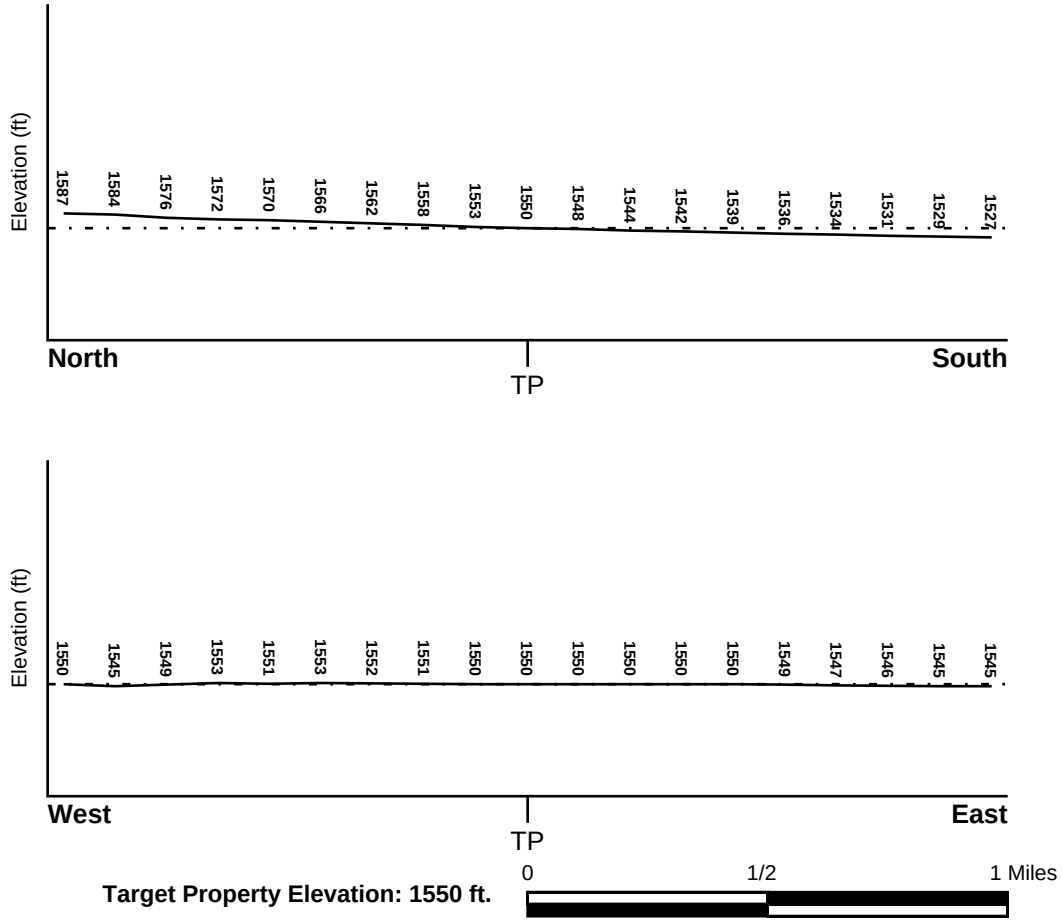
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06065C0745G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06065C0761G	FEMA FIRM Flood data
06065C0765G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
2	1/2 - 1 Mile NNE	Not Reported
1G	1/2 - 1 Mile NNE	Not Reported

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

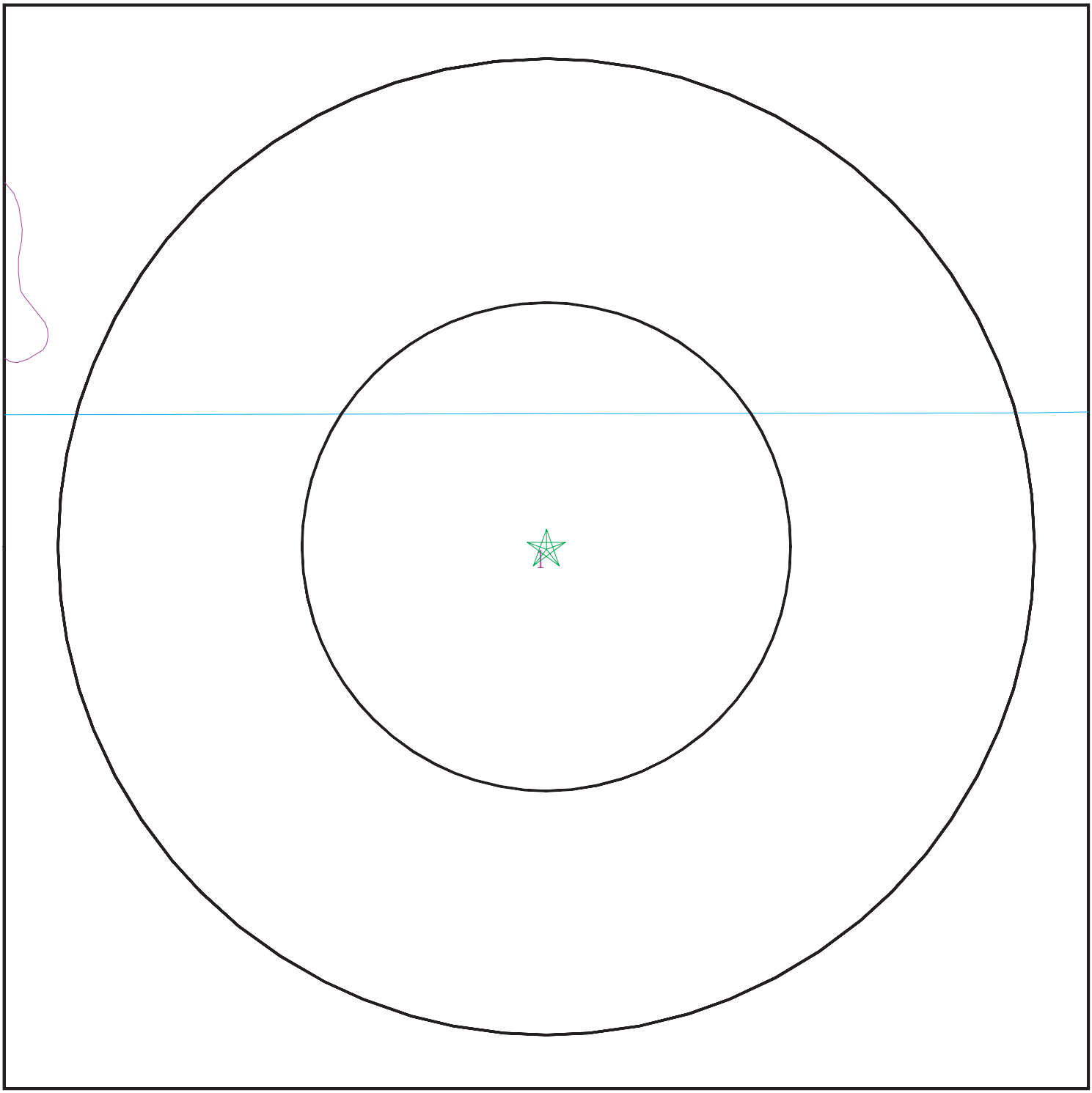
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5249358.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
		INQUIRY #:	5249358.2s
LAT/LONG:	33.908921 / 117.263954	DATE:	April 06, 2018 5:42 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: MONSERATE

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 7.3 Min: 6.1
3	27 inches	44 inches	indurated	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
4	44 inches	57 inches	cemented	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
5	57 inches	70 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A3	USGS40000138876	1/2 - 1 Mile SE
A4	USGS40000138875	1/2 - 1 Mile SE
5	USGS40000138874	1/2 - 1 Mile SE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

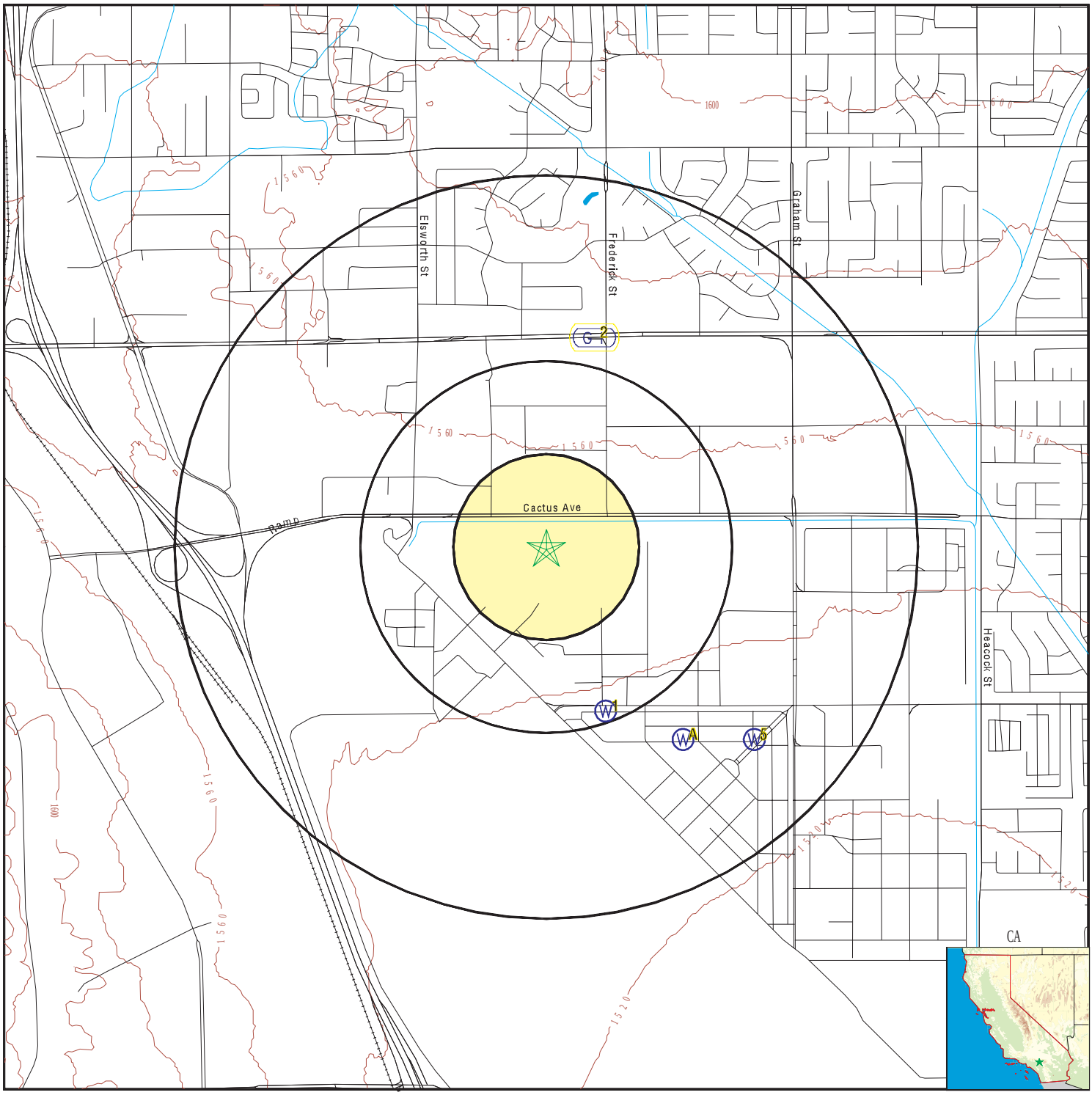
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	3523	1/4 - 1/2 Mile SSE

PHYSICAL SETTING SOURCE MAP - 5249358.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

0 1/4 1/2 1 Miles

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
LAT/LONG:	33.908921 / 117.263954	INQUIRY #:	5249358.2s
		DATE:	April 06, 2018 5:42 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation			Database	EDR ID Number
1 **SSE** **1/4 - 1/2 Mile** **Lower**			**CA WELLS**	**3523**

Water System Information:

Prime Station Code:	03S/04W-24D01 S	User ID:	WAT
FRDS Number:	3310700001	County:	Riverside
District Number:	14	Station Type:	WELL/AMBNT
Water Type:	Well/Groundwater	Well Status:	Abandoned
Source Lat/Long:	335409.0 1171537.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01 - ABANDONED		
System Number:	3310700		
System Name:	MARCH AFB		
Organization That Operates System:			
	722 CES/CC 840 MACDILL,BLD2506 MARCH AFB, CA 92518		
Pop Served:	8186	Connections:	2348
Area Served:	MARCH AFB		

---

2 **NNE** **1/2 - 1 Mile** **Higher**	Site ID:	083302648T	**AQUIFLOW**	**50177**
	Groundwater Flow:	Not Reported		
	Shallow Water Depth:	100		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	08/21/1996		

A3 **SE** **1/2 - 1 Mile** **Lower**		**FED USGS**	**USGS40000138876**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117152402		
Monloc name:	003S004W24D002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014064
Longitude:	-117.2575397	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

A4
SE **FED USGS** **USGS40000138875**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117152401		
Monloc name:	003S004W24D001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014064
Longitude:	-117.2575397	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

5
SE **FED USGS** **USGS40000138874**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117151201		
Monloc name:	003S004W24C001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014065
Longitude:	-117.2542062	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

1G
NNE
1/2 - 1 Mile
Lower

Site ID:	083302648T
Groundwater Flow:	Not Reported
Shallow Water Depth:	100
Deep Water Depth:	Not Reported
Average Water Depth:	Not Reported
Date:	08/21/1996

AQUIFLOW **50177**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.2s
April 13, 2018

EDR Vapor Encroachment Screen

Prepared using EDR's Vapor Encroachment Worksheet

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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The EDR Vapor Encroachment Worksheet enables EDR's customers to make certain online modifications that effects maps, text and calculations contained in this Report. As a result, maps, text and calculations contained in this Report may have been so modified. EDR has not taken any action to verify any such modifications, and this report and the findings set forth herein must be read in light of this fact. Environmental Data Resources shall not be responsible for any customer's decision to include or not include in any final report any records determined to be within the relevant minimum search distances.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by EDR. The report was designed to assist parties seeking to meet the search requirements of the ASTM Standard Practice for Assessment of Vapor Encroachment into Structures on Property Involved in Real Estate Transactions (E 2600).

STANDARD ENVIRONMENTAL RECORDS	Default Area of Concern (Miles)*	property	1/10	> 1/10
Federal NPL site list	1.0	0	1	0
Federal Delisted NPL site list	1.0	0	0	0
Federal CERCLIS list	0.5	0	1	0
Federal CERCLIS NFRAP site list	0.5	0	0	0
Federal RCRA CORRACTS facilities list	1.0	0	0	0
Federal RCRA non-CORRACTS TSD facilities list	0.5	0	0	0
Federal RCRA generators list	0.25	0	1	0
Federal institutional controls / engineering controls registries	0.5	0	1	0
Federal ERNS list	0.001	0	0	-
State- and tribal - equivalent NPL	1.0	0	0	0
State- and tribal - equivalent CERCLIS	1.0	0	0	2
State and tribal landfill and/or solid waste disposal site lists	0.5	0	0	0
State and tribal leaking storage tank lists	0.5	0	0	0
State and tribal registered storage tank lists	0.25	0	0	0
State and tribal institutional control / engineering control registries	not searched	-	-	-
State and tribal voluntary cleanup sites	0.5	0	0	0
State and tribal Brownfields sites	0.5	0	0	0

ADDITIONAL ENVIRONMENTAL RECORDS				
Local Brownfield lists	0.5	0	0	0
Local Lists of Landfill / Solid Waste Disposal Sites	0.5	0	0	0
Local Lists of Hazardous waste / Contaminated Sites	1.0	0	0	0
Local Lists of Registered Storage Tanks	0.25	0	0	0
Local Land Records	0.5	0	0	0
Records of Emergency Release Reports	0.5	1	0	0
Other Ascertainable Records	1.0	1	1	2

EDR HIGH RISK HISTORICAL RECORDS				
EDR Exclusive Records	1.0	0	0	0
Exclusive Recovered Govt. Archives	0.001	0	0	-

EXECUTIVE SUMMARY

EDR RECOVERED GOVERNMENT ARCHIVES

EDR Exclusive Records	1.0	0	0	0
Exclusive Recovered Govt. Archives	0.001	0	0	-

*The Default Area of Concern may be adjusted by the environmental professional using experience and professional judgement. Each category may include several databases, and each database may have a different distance. A list of individual databases is provided at the back of this report.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

MARCH AIR RESERVE BASE
CACTUS AVENUE BETWEEN VETERNS WAY AND FREDERICK ST
MARCH AIR RESERVE BA, CA 92518

COORDINATES

Latitude (North):	33.908921 - 33° 54′ 32.113037″
Longitude (West):	117.263954 - 117° 15′ 50.234985″
Elevation:	1550 ft. above sea level

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records.

Site	Database(s)
MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5NA SITE CACTUS AVENUE RIVERSIDE, CA 92518	FINDS Registry ID:: 110065639704
MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5, SITE C CACTUS AVENUE RIVERSIDE, CA 92518	MCS Status: Open - Remediation Global Id: T10000005654

EXECUTIVE SUMMARY

SEARCH RESULTS

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Name	Address	Dist/Dir	Map ID	Page
MARCH AIR FORCE BASE ROD: ROD RCRA-LQG: RCRA-LQG US INST CONTROL: US INST CONTROL PRP: PRP NPL: NPL SEMS: SEMS US ENG CONTROLS: US ENG CONTROLS	22 CSG/CC	<1/10 N	Region	9
ALPER CLEANERS ENVIROSTOR: ENVIROSTOR	14420 ELSWORTH ST., SUITE 114	1/10 - 1/3 WNW	▲ 3	37
MARCH FIELD HWT: HWT ENVIROSTOR: ENVIROSTOR	14310 FREDERICK STREET	1/10 - 1/3 NNE	▲ 5	39

ADDITIONAL ENVIRONMENTAL RECORDS

Name	Address	Dist/Dir	Map ID	Page
MARCH AIR FORCE BASE ROD: ROD RCRA-LQG: RCRA-LQG US INST CONTROL: US INST CONTROL PRP: PRP NPL: NPL SEMS: SEMS US ENG CONTROLS: US ENG CONTROLS	22 CSG/CC	<1/10 N	Region	
MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5NA SITE FINDS: FINDS	CACTUS AVENUE	Property	▲ A1	36
MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5, SITE C MCS: MCS	CACTUS AVENUE	Property	▲ A2	36
MARCH FIELD SKEET RANGE UXO: UXO	Not Reported	1/10 - 1/3 NNE	▲ 4	38
MARCH FIELD HWT: HWT ENVIROSTOR: ENVIROSTOR	14310 FREDERICK STREET	1/10 - 1/3 NNE	▲ 5	39

EDR HIGH RISK HISTORICAL RECORDS

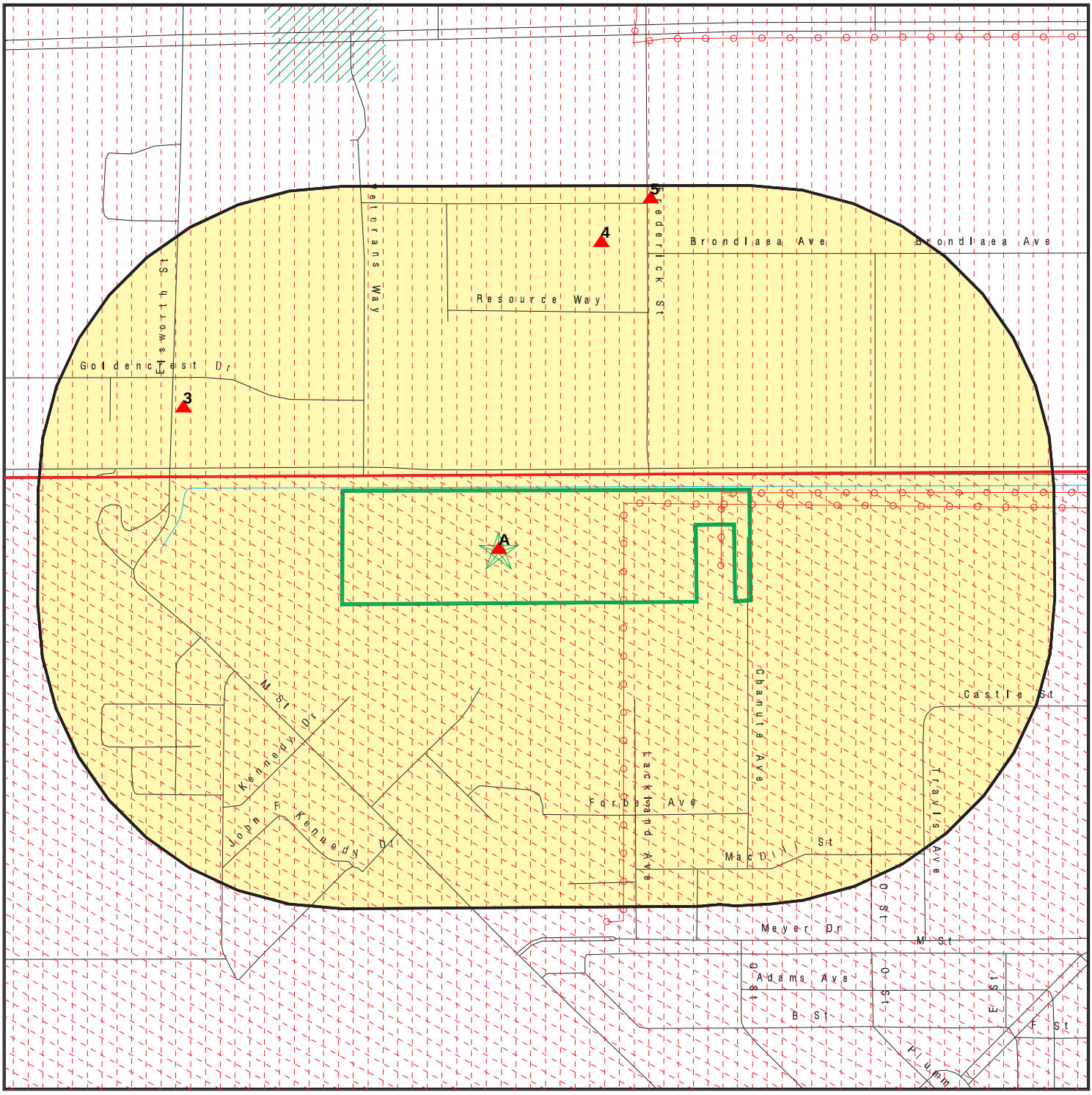
Name	Address	Dist/Dir	Map ID	Page
Not Reported				

EXECUTIVE SUMMARY

EDR RECOVERED GOVERNMENT ARCHIVES

Name	Address	Dist/Dir	Map ID	Page
Not Reported				

PRIMARY MAP - 5249358.2S



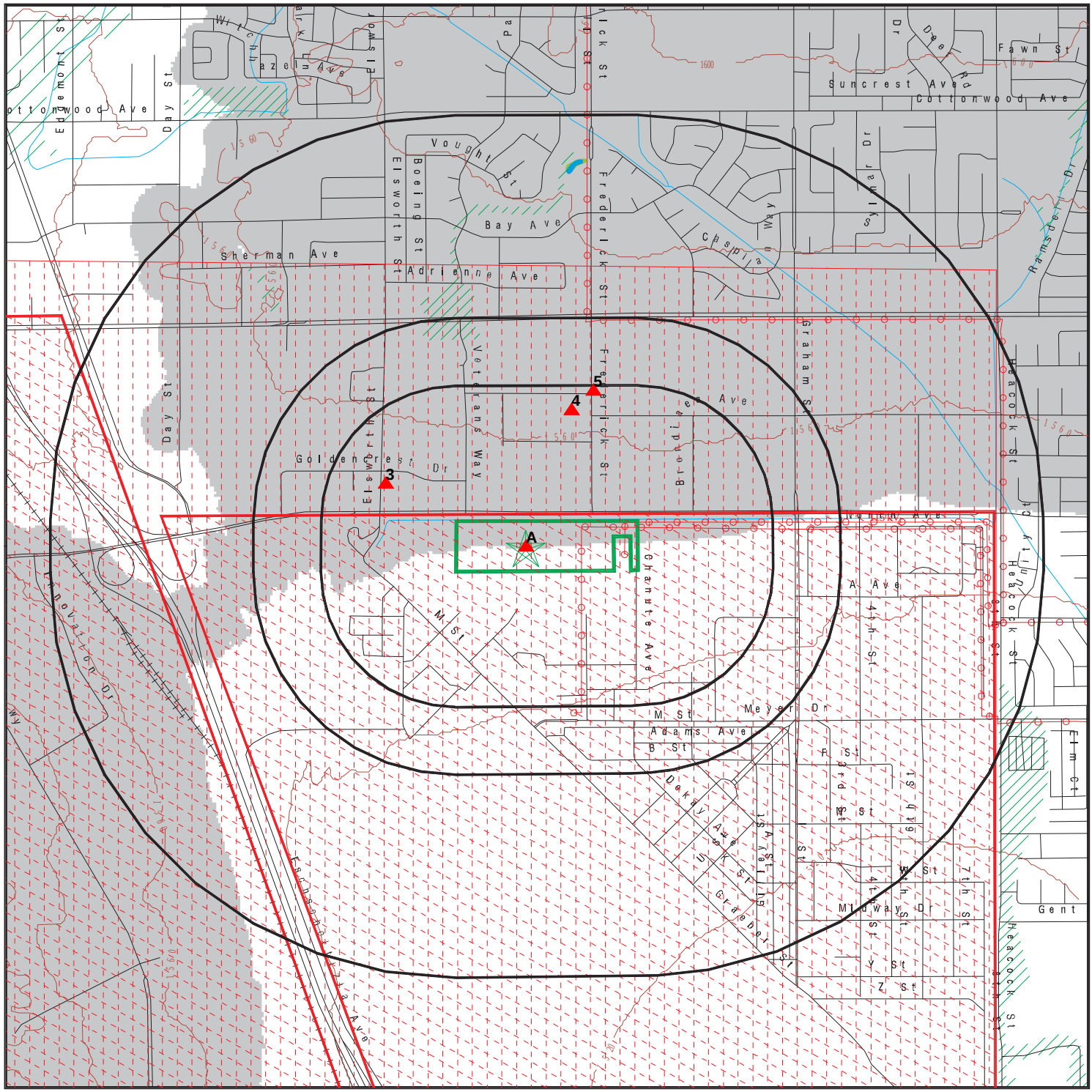
- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
LAT/LONG:	33.908921 / 117.263954	INQUIRY #:	5249358.2s
		DATE:	April 06, 2018 5:40 pm

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SECONDARY MAP - 5249358.2S



This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	March Air Reserve Base	CLIENT:	Leighton Consulting
ADDRESS:	Cactus Avenue Between Veterns Way and Frederick St March Air Reserve Ba CA 92518	CONTACT:	Michelle Manzano
		INQUIRY #:	5249358.2s
LAT/LONG:	33.908921 / 117.263954	DATE:	April 06, 2018 5:40 pm

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MAP FINDINGS

LEGEND

FACILITY NAME **FACILITY ADDRESS, CITY, ST, ZIP**		EDR SITE ID NUMBER
◆ **MAP ID#**	Direction Distance Range (Distance feet / miles) Relative Elevation Feet Above Sea Level	ASTM 2600 Record Sources found in this report. Each database searched has been assigned to one or more categories. For detailed information about categorization, see the section of the report Records Searched and Currency.

Worksheet:

Comments:
Comments may be added on the online Vapor Encroachment Worksheet.

DATABASE ACRONYM: Applicable categories (A hoverbox with database description).

MARCH AIR FORCE BASE 22 CSG/CC, RIVERSIDE, CA, 92518		1000169261
Region	N <1/10 (0 ft. / 0 mi.)	Federal NPL site list Federal CERCLIS list Federal RCRA generators list Federal institutional controls / engineering controls registries Other Ascertainable Records

Worksheet:

NPL: Federal NPL site list

EPA ID:	CA4570024527
Cerclis ID:	902761
EPA Region:	9
Federal:	Y
Final Date:	1989-11-21 00:00:00
Site Score:	31.940000000000001
Latitude:	33.906388999999997
Longitude:	-117.2557

Category Details:

NPL Status:	Currently on the Final NPL
Category Description:	Depth To Aquifer-> 50 And <= 100 Feet
Category Value:	65
NPL Status:	Currently on the Final NPL
Category Description:	Distance To Nearest Population-> 0 And <= 1/4 Mile
Category Value:	10

Site Details:

Site Name:	MARCH AIR FORCE BASE
Site Status:	Final

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Site Zip:	92518
Site City:	RIVERSIDE
Site State:	CA
Federal Site:	Yes
Site County:	RIVERSIDE
EPA Region:	09
Date Proposed:	07/14/89
Date Deleted:	Not Reported
Date Finalized:	11/21/89

Substance Details:

NPL Status:	Currently on the Final NPL
Substance ID:	Not Reported
Substance:	Not Reported
CAS #:	Not Reported
Pathway:	Not Reported
Scoring:	Not Reported
NPL Status:	Currently on the Final NPL
Substance ID:	A046
Substance:	POLYCHLORINATED BIPHENYLS
CAS #:	1336-36-3
Pathway:	GROUND WATER PATHWAY
Scoring:	3
NPL Status:	Currently on the Final NPL
Substance ID:	U210
Substance:	TETRACHLOROETHENE
CAS #:	127-18-4
Pathway:	GROUND WATER PATHWAY
Scoring:	2
NPL Status:	Currently on the Final NPL
Substance ID:	U228
Substance:	TRICHLOROETHYLENE (TCE)
CAS #:	79-01-6
Pathway:	GROUND WATER PATHWAY
Scoring:	2

Summary Details:

Conditions at proposal July 14, 1989): March Air Force Base MAFB) covers approximately 7,000 acres near Riverside in the Moreno Valley in Riverside County, California. MAFB is adjacent to light industrial, agricultural, and residential areas. Established in 1918 as the Alessandro Aviation Field, MAFB has served as a training base and refueling operations base. Industrial operations including aircraft maintenance and repair) involved use of solvents and disposal of solvent wastes. MAFB is participating in the Installation Restoration Program IRP), established in 1978. Under this

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

program, the Department of Defense seeks to identify, investigate, and clean up contamination from ha ardous materials. As part ofIRP, the Air Force investigated 28 potentially contaminated disposal areas. MAFB Well No. 1 on-base was found to be contaminated with trichloroethylene, tetrachloroethylene, and cis-1,2-dichloroethylene at levels that exceed State drinking water standards. It was taken out of service. Soils on the base are contaminated with toluene and ben ene. An estimated 11,600 people obtain drinking water from municipal wells within 3 miles of ha ardous substances on MAFB. The Air Forceis conducting a remedial investigation/ feasibility study RI/FS) to determine the type and extent of contamination at the base and identify alternatives for remedial action. Status November 21, 1989): Field work continues on the RI/FS.

Site Status Details:

NPL Status:	Final
Proposed Date:	07/14/1989
Final Date:	11/21/1989
Deleted Date:	Not Reported

Narratives Details:

NPL Name:	MARCH AIR FORCE BASE
City:	RIVERSIDE
State:	CA

SEMS: Federal CERCLIS list

Site ID:	902761
EPA ID:	CA4570024527
Cong District:	Not Reported
FIPS Code:	6065
Latitude:	33.906388999999997
Longitude:	-117.2557
FF:	Y
NPL:	Currently on the Final NPL
Non NPL Status:	Not Reported

SEMS Detail:

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	HR

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Action Name:	HAZRANK
SEQ:	1
Start Date:	1987-06-01 00:00:00
Finish Date:	6/1/1987
Qual:	Not Reported
Current Action Lead:	EPA Perf
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	NP
Action Name:	PROPOSED
SEQ:	1
Start Date:	1989-07-14 00:00:00
Finish Date:	7/14/1989
Qual:	Not Reported
Current Action Lead:	EPA Perf
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	NF
Action Name:	NPL FINL
SEQ:	1
Start Date:	1989-11-21 00:00:00
Finish Date:	11/21/1989
Qual:	Not Reported
Current Action Lead:	EPA Perf
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	AR
Action Name:	ADMIN REC
SEQ:	1
Start Date:	2000-10-24 00:00:00
Finish Date:	Not Reported
Qual:	Not Reported
Current Action Lead:	EPA Perf

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	4
Action Code:	RO
Action Name:	ROD
SEQ:	3
Start Date:	2005-09-29 00:00:00
Finish Date:	9/29/2005
Qual:	Not Reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	SI
Action Name:	SI
SEQ:	1
Start Date:	1987-06-01 00:00:00
Finish Date:	6/1/1987
Qual:	L
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LX
Action Name:	FF RD
SEQ:	1
Start Date:	1996-04-07 00:00:00
Finish Date:	4/18/1996
Qual:	Not Reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

OU:	1
Action Code:	LY
Action Name:	FF RA
SEQ:	1
Start Date:	1996-03-05 00:00:00
Finish Date:	Not Reported
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	PA
Action Name:	PA
SEQ:	1
Start Date:	1987-02-01 00:00:00
Finish Date:	2/1/1987
Qual:	L
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	RO
Action Name:	ROD
SEQ:	1
Start Date:	1996-06-20 00:00:00
Finish Date:	6/20/1996
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	1
Start Date:	1990-09-27 00:00:00
Finish Date:	6/20/1996

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	7
Start Date:	2004-04-01 00:00:00
Finish Date:	4/1/2004
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	6
Start Date:	1995-07-01 00:00:00
Finish Date:	7/1/1997
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	DS
Action Name:	DISCVRY
SEQ:	1
Start Date:	1985-02-01 00:00:00
Finish Date:	2/1/1985
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	4
Start Date:	1992-01-24 00:00:00
Finish Date:	4/30/1995
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	4
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	2
Start Date:	1990-09-27 00:00:00
Finish Date:	9/29/2005
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	5
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	5
Start Date:	2005-10-30 00:00:00
Finish Date:	Not Reported
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	5

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Start Date:	2005-09-30 00:00:00
Finish Date:	9/30/2005
Qual:	Not Reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	4
Start Date:	2004-05-11 00:00:00
Finish Date:	5/11/2004
Qual:	Not Reported
Current Action Lead:	Fed Fac

RCRA-LQG: Federal RCRA generators list

Date form received by agency:	02/29/2016
Facility name:	MARCH AIR RESERVE BASE
Facility address:	610 MEYER DR BLDG 2403 MARCH ARB, CA 92518
EPA ID:	CA4570024527
Mailing address:	MEYER DR BLDG 2403 MARCH ARB, CA 92518
Contact:	CRAIG HUNTER
Contact address:	MEYER DR BLDG 2403 MARCH ARB, CA 92518
Contact country:	US
Contact telephone:	951-655-5082
Contact email:	CRAIG.HUNTER.1@US.AF.MIL
EPA Region:	09
Land type:	Federal
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	US AIR FORCE

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Owner/operator address:	GRAEBER BLDG 470 MARCH ARB, CA 92518
Owner/operator country:	US
Owner/operator telephone:	951-655-4665
Owner/operator email:	Not Reported
Owner/operator fax:	Not Reported
Owner/operator extension:	Not Reported
Legal status:	Federal
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/1945
Owner/Op end date:	Not Reported
Owner/operator name:	GEN. RUSSELL A. MUNCY
Owner/operator address:	Not Reported
Owner/operator country:	Not Reported
Owner/operator telephone:	Not Reported
Owner/operator email:	Not Reported
Owner/operator fax:	Not Reported
Owner/operator extension:	Not Reported
Legal status:	Federal
Owner/Operator Type:	Operator
Owner/Op start date:	11/01/2013
Owner/Op end date:	Not Reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Universal Waste Summary:

Waste type:	Batteries
Accumulated waste on-site:	Yes
Generated waste on-site:	No
Waste type:	Lamps
Accumulated waste on-site:	Yes
Generated waste on-site:	No

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: No

. Waste code: 141
. Waste name: Off-specification, aged, or surplus inorganics

. Waste code: 151
. Waste name: Asbestos-containing waste

. Waste code: 181
. Waste name: Other inorganic solid waste

. Waste code: 223
. Waste name: Unspecified oil-containing waste

. Waste code: 241
. Waste name: Tank bottom waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 331
. Waste name: Off-specification, aged, or surplus organics

. Waste code: 343
. Waste name: Unspecified organic liquid mixture

. Waste code: 352
. Waste name: Other organic solids

. Waste code: 723
. Waste name: Liquids with chromium (VI) > 500 mg/l

. Waste code: 791
. Waste name: Liquids with pH < 2

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

Historical Generators:

Date form received by agency: 10/22/2014
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Date form received by agency:	03/20/2013
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
. Waste code:	D001
. Waste name:	IGNITABLE WASTE
. Waste code:	D002
. Waste name:	CORROSIVE WASTE
. Waste code:	D006
. Waste name:	CADMIUM
. Waste code:	D007
. Waste name:	CHROMIUM
. Waste code:	D008
. Waste name:	LEAD
. Waste code:	D011
. Waste name:	SILVER
. Waste code:	D018
. Waste name:	BENZENE
. Waste code:	F002
. Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F003
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F005
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Date form received by agency:	07/15/2010
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
. Waste code:	181
. Waste name:	Other inorganic solid waste
. Waste code:	214

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

- Waste name: Unspecified solvent mixture
- Waste code: 223
- Waste name: Unspecified oil-containing waste
- Waste code: 281
- Waste name: Adhesives
- Waste code: 342
- Waste name: Organic liquids with metals (see 121)
- Waste code: 343
- Waste name: Unspecified organic liquid mixture
- Waste code: 352
- Waste name: Other organic solids
- Waste code: 461
- Waste name: Degreasing sludge
- Waste code: 541
- Waste name: Photochemicals / photo processing waste
- Waste code: 792
- Waste name: Liquids with pH < 2 with metals
- Waste code: D001
- Waste name: IGNITABLE WASTE
- Waste code: D002
- Waste name: CORROSIVE WASTE
- Waste code: D006
- Waste name: CADMIUM
- Waste code: D007
- Waste name: CHROMIUM
- Waste code: D008
- Waste name: LEAD
- Waste code: D011
- Waste name: SILVER
- Waste code: D018
- Waste name: BENZENE
- Waste code: F002
- Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
- Waste code: F003

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F005
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Date form received by agency:	03/26/2008
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
. Waste code:	D001
. Waste name:	IGNITABLE WASTE
. Waste code:	D002
. Waste name:	CORROSIVE WASTE
. Waste code:	D004
. Waste name:	ARSENIC
. Waste code:	D005
. Waste name:	BARIUM
. Waste code:	D006
. Waste name:	CADMIUM
. Waste code:	D007
. Waste name:	CHROMIUM
. Waste code:	D008
. Waste name:	LEAD
. Waste code:	D009
. Waste name:	MERCURY
. Waste code:	D011
. Waste name:	SILVER
. Waste code:	D018
. Waste name:	BENZENE
. Waste code:	D021
. Waste name:	CHLOROBENZENE
. Waste code:	D035
. Waste name:	METHYL ETHYL KETONE
. Waste code:	F002

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

. Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F005
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	U188
. Waste name:	PHENOL
. Waste code:	U227
. Waste name:	1,1,2-TRICHLOROETHANE (OR) ETHANE, 1,1,2-TRICHLORO-
Date form received by agency:	02/08/2006
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
. Waste code:	D001
. Waste name:	IGNITABLE WASTE
. Waste code:	D002
. Waste name:	CORROSIVE WASTE
. Waste code:	D006
. Waste name:	CADMIUM
. Waste code:	D007
. Waste name:	CHROMIUM
. Waste code:	D008
. Waste name:	LEAD
Date form received by agency:	02/25/2004
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
. Waste code:	D001
. Waste name:	IGNITABLE WASTE
. Waste code:	D002
. Waste name:	CORROSIVE WASTE
. Waste code:	D004
. Waste name:	ARSENIC
. Waste code:	D005
. Waste name:	BARIUM
. Waste code:	D006
. Waste name:	CADMIUM

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

Date form received by agency: 04/10/2002
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D003
. Waste name: REACTIVE WASTE

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: P098
. Waste name: POTASSIUM CYANIDE (OR) POTASSIUM CYANIDE K(CN)

Date form received by agency: 10/12/2000
Site name: MARCH ARB CA
Classification: Large Quantity Generator

Date form received by agency: 07/14/2000
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: D008
. Waste name: LEAD

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

. Waste code:	D009
. Waste name:	MERCURY
. Waste code:	F001
. Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLORETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F002
. Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2, TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F003
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
. Waste code:	F005
. Waste name:	THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Date form received by agency:	03/04/1999
Site name:	MARCH ARB, CA
Classification:	Large Quantity Generator
Date form received by agency:	09/01/1996
Site name:	MARCH AIR RESERVE BASE
Classification:	Large Quantity Generator
Date form received by agency:	03/26/1996
Site name:	MARCH AFB, CA
Classification:	Large Quantity Generator
Date form received by agency:	03/31/1994
Site name:	MARCH AIR FORCE BASE, CA
Classification:	Large Quantity Generator
Date form received by agency:	03/30/1992
Site name:	MARCH AIR FORCE BASE
Classification:	Large Quantity Generator

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Biennial Reports:

Last Biennial Reporting Year: 2017

Annual Waste Handled:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs):	15899.4
Waste code:	D002
Waste name:	A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs):	186
Waste code:	D003
Waste name:	A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs):	1
Waste code:	D005
Waste name:	BARIUM
Amount (Lbs):	8
Waste code:	D006
Waste name:	CADMIUM
Amount (Lbs):	843
Waste code:	D007
Waste name:	CHROMIUM
Amount (Lbs):	1026
Waste code:	D008
Waste name:	LEAD
Amount (Lbs):	843
Waste code:	D009
Waste name:	MERCURY
Amount (Lbs):	2
Waste code:	D011
Waste name:	SILVER
Amount (Lbs):	1
Waste code:	D018
Waste name:	BENZENE

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Amount (Lbs):	3436
Waste code:	D035
Waste name:	METHYL ETHYL KETONE
Amount (Lbs):	11381

Facility Has Received Notices of Violations:

Regulation violated:	FR - 262.30-34.C
Area of violation:	Generators - General
Date violation determined:	04/27/1995
Date achieved compliance:	04/27/2000
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	04/28/1995
Enf. disposition status:	Not Reported
Enf. disp. status date:	Not Reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not Reported
Final penalty amount:	Not Reported
Paid penalty amount:	Not Reported
Regulation violated:	FR - 262.10-12.A
Area of violation:	Generators - General
Date violation determined:	03/05/1984
Date achieved compliance:	04/04/1995
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	05/18/1984
Enf. disposition status:	Not Reported
Enf. disp. status date:	Not Reported
Enforcement lead agency:	EPA
Proposed penalty amount:	Not Reported
Final penalty amount:	Not Reported
Paid penalty amount:	Not Reported

Evaluation Action Summary:

Evaluation date:	11/02/2006
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not Reported
Date achieved compliance:	Not Reported
Evaluation lead agency:	State
Evaluation date:	05/06/1996
Evaluation:	FOLLOW-UP INSPECTION
Area of violation:	Not Reported
Date achieved compliance:	Not Reported
Evaluation lead agency:	State
Evaluation date:	04/04/1995
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Area of violation:	Generators - General
Date achieved compliance:	04/27/2000
Evaluation lead agency:	EPA
Evaluation date:	03/05/1984
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	04/04/1995
Evaluation lead agency:	EPA

US ENG CONTROLS: Federal institutional controls / engineering controls registries

EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Address:	22 CSG/CC RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Actual Date:	09/30/2005
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	Explanation Of Significant Differences
Action Completion date:	08/24/2000
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Bioremediation (Ex-Situ)
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Discharge
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Extraction
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Liquid Phase Carbon Adsorption
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Monitoring
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Groundwater
Engineering Control:	Other, (N.O.S.)
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Cap
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Disposal
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Excavation
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Impermeable Barrier
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Low Temperature Thermal Desorption
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Monitoring
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Operations & Maintenance (O&M)
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Recycling
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	001
Action Name:	RECORD OF DECISION
Action Completion date:	06/20/1996
Operable Unit:	01
Contaminated Media :	Soil
Engineering Control:	Soil Vapor Extraction (in-situ)
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	003
Action Name:	RECORD OF DECISION
Action Completion date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Groundwater
Engineering Control:	No Action
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	003
Action Name:	RECORD OF DECISION
Action Completion date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Engineering Control:	Monitoring
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	003
Action Name:	RECORD OF DECISION
Action Completion date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Engineering Control:	No Action
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	005
Action Name:	RECORD OF DECISION
Action Completion date:	09/30/2005
Operable Unit:	02
Contaminated Media :	Groundwater

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Engineering Control:	No Action
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported
Action ID:	005
Action Name:	RECORD OF DECISION
Action Completion date:	09/30/2005
Operable Unit:	02
Contaminated Media :	Soil
Engineering Control:	No Action
Contact Name:	Not Reported
Contact Phone and Ext:	Not Reported
Event Code Description:	Not Reported

US INST CONTROL: Federal institutional controls / engineering controls registries

EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Covenant
Actual Date:	09/30/2005
Complet. Date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Deed Notices
Actual Date:	09/30/2005
Complet. Date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Contact Name :	Not Reported

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Subdivision regulation
Actual Date:	09/30/2005
Complet. Date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Zoning regulation
Actual Date:	09/30/2005
Complet. Date:	09/29/2005
Operable Unit:	04
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Covenant
Actual Date:	06/15/2004

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

Complet. Date:	05/11/2004
Operable Unit:	02
Contaminated Media :	Groundwater
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Covenant
Actual Date:	06/15/2004
Complet. Date:	05/11/2004
Operable Unit:	02
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09
County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Base use plan change
Actual Date:	09/30/2005
Complet. Date:	09/30/2005
Operable Unit:	02
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported
EPA ID:	CA4570024527
Site ID:	0902761
Name:	MARCH AIR FORCE BASE
Action Name:	RECORD OF DECISION
Address:	22 CSG/CC
	RIVERSIDE, CA 92518
EPA Region:	09

MARCH AIR FORCE BASE, 22 CSG/CC, RIVERSIDE, CA 92518 (Continued)

County:	RIVERSIDE
Event Code:	Not Reported
Inst. Control:	Building, demolition, or excavation regulation
Actual Date:	09/30/2005
Complet. Date:	09/30/2005
Operable Unit:	02
Contaminated Media :	Soil
Contact Name :	Not Reported
Contact Phone and Ext :	Not Reported
Event Code Description:	Not Reported

ROD: Other Ascertainable Records

Full-text of USEPA Record of Decision(s) is available from EDR.

PRP: Other Ascertainable Records

PRP name: STATE OF CALIFORNIA/DEPT. OF HEALTH SERVICES
STATE OF CALIFORNIA/DEPT. OF WATER QUALITY
U.S. AIR FORCE
U.S. AIR FORCE

MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5NA SITE CACTUS AVENUE, RIVERSIDE, CA, 92518		1023273819
▲ A1	Target Property 1550 ft. Above Sea Level	Other Ascertainable Records

Worksheet:

Impact on Target Property: VEC does not exist

FINDS: Other Ascertainable Records

Registry ID: 110065639704

Environmental Interest/Information System:

STATE MASTER

The FINDS: database contains 0 additional records for this site. Please contact your EDR Account Executive for more information.

MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5, SITE C CACTUS AVENUE, RIVERSIDE, CA, 92518		S116287545
▲ A2	Target Property 1550 ft. Above Sea Level	Records of Emergency Release Reports

Worksheet:

Impact on Target Property: VEC does not exist

MARCH AIR RESERVE BASE - MARCH AIR RESERVE BASE OU-5, SITE C, CACTUS AVENUE, RIVERSIDE, CA 92518 (Continued)

MCS: Records of Emergency Release Reports

Global Id:	T10000005654
Latitude:	33.89970
Longitude:	-117.2599
Case Type:	Military Cleanup Site
Status:	Open - Remediation
Status Date:	02/13/2014
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Caseworker:	SN
Local Agency:	US ENVIRONMENTAL PROTECTION AGENCY
RB Case Number:	Not Reported
LOC Case Number:	33970004
File Location:	All Files are on GeoTracker or in the Local Agency Database
Potential Media Affect:	Aquifer used for drinking water supply, Other Groundwater (uses other than drinking water)
EDR Link ID:	T10000005654
Potential Contaminants of Concern:	Other Chlorinated Hydrocarbons, Tetrachloroethylene (PCE), Trichloroethylene (TCE)
Site History:	IRP Site CG049 includes the decoupled groundwater components from Operable Units (OU) -1 (IRP Sites FT007, SS031) and OU-2 (IRP Sites OT008) as of June 2013. Groundwater monitoring wells from OU-1 (IRP Sites LF005, SD009, FT015, FT029 And ST034) and OU-2 (IRP Sites WP002, ST027, and ST039)
Click here to access the California GeoTracker records for this facility:	http://www.web.edrnet.com/ordering/switchboard/redirect.aspx?s=GRR_CA_MCS&global_id=T10000005654

ALPER CLEANERS
14420 ELSWORTH ST., SUITE 114, MORENO VALLEY, CA, 92553 S106797644

▲ 3	WNW 1/10 - 1/3	(1037 ft. / 0.196 mi.)	State- and tribal - equivalent CERCLIS
	3 ft. Higher Elevation	1553 ft. Above Sea Level	

Worksheet:

Impact on Target Property: VEC Exists
Conditions:

Chemicals of Concern: YES
Groundwater Flow Gradient:

Upgradient or Indeterminate: YES

Topographically: YES

ENVIROSTOR: State- and tribal - equivalent CERCLIS

Facility ID:	33720002
Status:	Refer: 1248 Local Agency
Status Date:	06/07/2004
Site Code:	Not Reported
Site Type:	Evaluation
Site Type Detailed:	Evaluation
Acres:	0

ALPER CLEANERS, 14420 ELSWORTH ST., SUITE 114, MORENO VALLEY, CA 92553 (Continued)

NPL:	NO
Regulatory Agencies:	RIVERSIDE COUNTY
Lead Agency:	RIVERSIDE COUNTY
Program Manager:	Not Reported
Supervisor:	Referred - Not Assigned
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not Reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	Not Applicable
Latitude:	33.91112
Longitude:	-117.2692
APN:	297140026, 297150012
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	297140026
Alias Type:	APN
Alias Name:	297150012
Alias Type:	APN
Alias Name:	33720002
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	Not Reported
Completed Sub Area Name:	Not Reported
Completed Document Type:	Not Reported
Completed Date:	Not Reported
Comments:	Not Reported
Future Area Name:	Not Reported
Future Sub Area Name:	Not Reported
Future Document Type:	Not Reported
Future Due Date:	Not Reported
Schedule Area Name:	Not Reported
Schedule Sub Area Name:	Not Reported
Schedule Document Type:	Not Reported
Schedule Due Date:	Not Reported
Schedule Revised Date:	Not Reported

MARCH FIELD SKEET RANGE Not Reported, MARCH AIR FORCE BASE, CA,		1018150389
▲ 4	NNE 1/10 - 1/3 (1429 ft. / 0.271 mi.) 13 ft. Higher Elevation 1563 ft. Above Sea Level	Other Ascertainable Records

Worksheet:

Impact on Target Property: VEC Exists
Conditions:

Chemicals of Concern: YES
Groundwater Flow Gradient:

Upgradient or Indeterminate: YES

Topographically: YES

UXO: Other Ascertainable Records

DoD Component:	FUDS
Installation Name:	MARCH FIELD
Facility Address 2:	Not Reported
Site ID:	01OEW
Site Type:	Trap and Skeet Range
Latitude:	33.913799
Longitude:	-117.262001

MARCH FIELD 14310 FREDERICK STREET, MORENO VALLEY, CA, 92533		S109348567
▲ 5	NNE 1/10 - 1/3 (1681 ft. / 0.318 mi.) 14 ft. Higher Elevation 1564 ft. Above Sea Level	State- and tribal - equivalent CERCLIS Other Ascertainable Records

Worksheet:

Impact on Target Property: VEC Exists
Conditions:

Both COC & PHC: YES
Groundwater Flow Gradient:

Upgradient or Indeterminate: YES

Topographically: YES

ENVIROSTOR: State- and tribal - equivalent CERCLIS

Facility ID:	80000870
Status:	Inactive - Action Required
Status Date:	11/30/2010
Site Code:	401438
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	53.3
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Daniel Cordero
Supervisor:	Manny Alonzo
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31

MARCH FIELD, 14310 FREDERICK STREET, MORENO VALLEY, CA 92533 (Continued)

Special Program:	Not Reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA
Latitude:	33.89166
Longitude:	-117.2597
APN:	NONE SPECIFIED
Past Use:	FIRING RANGE - SMALL ARMS ETC...
Potential COC:	Explosives (UXO, MEC Munitions Debris (MD
Confirmed COC:	30011-NO 32000-NO
Potential Description:	SOIL
Alias Name:	CA99799F999100
Alias Type:	Federal Facility ID
Alias Name:	J09CA7168
Alias Type:	INPR
Alias Name:	401438
Alias Type:	Project Code (Site Code)
Alias Name:	80000870
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not Reported
Completed Document Type:	Preliminary Endangerment Assessment Tech Memo
Completed Date:	03/02/2009
Comments:	Not Reported
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not Reported
Completed Document Type:	Preliminary Endangerment Assessment Workplan
Completed Date:	07/02/2009
Comments:	Final site specific work plan received.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not Reported
Completed Document Type:	Preliminary Assessment/Site Inspection Report (PA/SI)
Completed Date:	07/22/2009
Comments:	Comments included the SI phase of this project is done.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not Reported
Completed Document Type:	Correspondence
Completed Date:	09/14/1998
Comments:	Not Reported
Future Area Name:	Not Reported
Future Sub Area Name:	Not Reported
Future Document Type:	Not Reported
Future Due Date:	Not Reported
Schedule Area Name:	Not Reported
Schedule Sub Area Name:	Not Reported
Schedule Document Type:	Not Reported

MARCH FIELD, 14310 FREDERICK STREET, MORENO VALLEY, CA 92533 (Continued)

Schedule Due Date:	Not Reported
Schedule Revised Date:	Not Reported

HWT: Other Ascertainable Records

Reg Num:	3450
Expiration Date:	06/30/2018

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
ENVIRONMENTAL RECORDS						
Federal NPL site list						
US	NPL	National Priority List	EPA	12/11/2017	12/22/2017	01/05/2018
US	Proposed NPL	Proposed National Priority List Sites	EPA	12/11/2017	12/22/2017	01/05/2018
US	NPL LIENS	Federal Superfund Liens	EPA	10/15/1991	02/02/1994	03/30/1994
Federal CERCLIS list						
US	SEMS	Superfund Enterprise Management System	EPA	12/11/2017	12/22/2017	01/12/2018
Federal RCRA CORRACTS facilities list						
US	CORRACTS	Corrective Action Report	EPA	12/11/2017	12/26/2017	02/09/2018
Federal RCRA TSD facilities list						
US	RCRA-TSDF	RCRA - Treatment, Storage and Disposal	Environmental Protection Agency	12/11/2017	12/26/2017	02/09/2018
Federal RCRA generators list						
US	RCRA-LQG	RCRA - Large Quantity Generators	Environmental Protection Agency	12/11/2017	12/26/2017	02/09/2018
US	RCRA-SQG	RCRA - Small Quantity Generators	Environmental Protection Agency	12/11/2017	12/26/2017	02/09/2018
US	RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generators	Environmental Protection Agency	12/11/2017	12/26/2017	02/09/2018
Federal institutional controls / engineering controls registries						
US	LUCIS	Land Use Control Information System	Department of the Navy	05/22/2017	06/13/2017	09/15/2017
US	US ENG CONTROLS	Engineering Controls Sites List	Environmental Protection Agency	11/13/2017	11/27/2017	02/09/2018
US	US INST CONTROL	Sites with Institutional Controls	Environmental Protection Agency	11/13/2017	11/27/2017	02/09/2018
Federal ERNS list						
US	ERNS	Emergency Response Notification System	National Response Center, United States Coast	01/16/2018	01/19/2018	03/23/2018
State and tribal - equivalent NPL						
CA	RESPONSE	State Response Sites	Department of Toxic Substances Control	01/30/2018	01/31/2018	03/19/2018
State and tribal - equivalent CERCLIS						
CA	ENVIROSTOR	EnviroStor Database	Department of Toxic Substances Control	01/30/2018	01/31/2018	03/19/2018
State and tribal landfill / solid waste disposal						
CA	SWF/LF (SWIS)	Solid Waste Information System	Department of Resources Recycling and Recover	02/12/2018	02/14/2018	04/03/2018
State and tribal leaking storage tank lists						
CA	LUST REG 3	Leaking Underground Storage Tank Database	California Regional Water Quality Control Boa	05/19/2003	05/19/2003	06/02/2003
CA	LUST REG 9	Leaking Underground Storage Tank Report	California Regional Water Quality Control Boa	03/01/2001	04/23/2001	05/21/2001
CA	LUST	Leaking Underground Fuel Tank Report (GEOTRACKER)	State Water Resources Control Board	03/12/2018	03/14/2018	03/21/2018
CA	LUST REG 7	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	02/26/2004	02/26/2004	03/24/2004
CA	LUST REG 6V	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	06/07/2005	06/07/2005	06/29/2005
CA	LUST REG 6L	Leaking Underground Storage Tank Case Listing	California Regional Water Quality Control Boa	09/09/2003	09/10/2003	10/07/2003
CA	LUST REG 5	Leaking Underground Storage Tank Database	California Regional Water Quality Control Boa	07/01/2008	07/22/2008	07/31/2008

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CA	LUST REG 4	Underground Storage Tank Leak List	California Regional Water Quality Control Boa	09/07/2004	09/07/2004	10/12/2004
CA	LUST REG 8	Leaking Underground Storage Tanks	California Regional Water Quality Control Boa	02/14/2005	02/15/2005	03/28/2005
CA	LUST REG 2	Fuel Leak List	California Regional Water Quality Control Boa	09/30/2004	10/20/2004	11/19/2004
CA	LUST REG 1	Active Toxic Site Investigation	California Regional Water Quality Control Boa	02/01/2001	02/28/2001	03/29/2001
US	INDIAN LUST R6	Leaking Underground Storage Tanks on Indian Land	EPA Region 6	04/24/2017	07/27/2017	10/06/2017
US	INDIAN LUST R8	Leaking Underground Storage Tanks on Indian Land	EPA Region 8	05/01/2017	07/27/2017	10/13/2017
US	INDIAN LUST R9	Leaking Underground Storage Tanks on Indian Land	Environmental Protection Agency	04/13/2017	07/27/2017	10/13/2017
US	INDIAN LUST R5	Leaking Underground Storage Tanks on Indian Land	EPA, Region 5	04/26/2017	07/27/2017	10/13/2017
US	INDIAN LUST R1	Leaking Underground Storage Tanks on Indian Land	EPA Region 1	04/14/2017	07/27/2017	10/06/2017
US	INDIAN LUST R7	Leaking Underground Storage Tanks on Indian Land	EPA Region 7	04/14/2017	07/27/2017	10/06/2017
US	INDIAN LUST R4	Leaking Underground Storage Tanks on Indian Land	EPA Region 4	10/14/2016	01/27/2017	05/05/2017
US	INDIAN LUST R10	Leaking Underground Storage Tanks on Indian Land	EPA Region 10	04/25/2017	11/07/2017	12/08/2017
CA	SLIC	Statewide SLIC Cases (GEOTRACKER)	State Water Resources Control Board	03/12/2018	03/14/2018	03/21/2018
CA	SLIC REG 1	Active Toxic Site Investigations	California Regional Water Quality Control Boa	04/03/2003	04/07/2003	04/25/2003
CA	SLIC REG 2	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board San Fran	09/30/2004	10/20/2004	11/19/2004
CA	SLIC REG 3	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Regional Water Quality Control Boa	05/18/2006	05/18/2006	06/15/2006
CA	SLIC REG 4	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Region Water Quality Control Board Los Angele	11/17/2004	11/18/2004	01/04/2005
CA	SLIC REG 5	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board Central	04/01/2005	04/05/2005	04/21/2005
CA	SLIC REG 6V	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	Regional Water Quality Control Board, Victorv	05/24/2005	05/25/2005	06/16/2005
CA	SLIC REG 6L	SLIC Sites	California Regional Water Quality Control Boa	09/07/2004	09/07/2004	10/12/2004
CA	SLIC REG 7	SLIC List	California Regional Quality Control Board, Co	11/24/2004	11/29/2004	01/04/2005
CA	SLIC REG 8	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Region Water Quality Control Board	04/03/2008	04/03/2008	04/14/2008
CA	SLIC REG 9	Spills, Leaks, Investigation & Cleanup Cost Recovery Listing	California Regional Water Quality Control Boa	09/10/2007	09/11/2007	09/28/2007
State and tribal registered storage tank lists						
CA	UST	Active UST Facilities	SWRCB	03/12/2018	03/14/2018	03/29/2018
CA	UST MENDOCINO	Mendocino County UST Database	Department of Public Health	02/28/2018	03/01/2018	03/28/2018
CA	AST	Aboveground Petroleum Storage Tank Facilities	California Environmental Protection Agency	07/06/2016	07/12/2016	09/19/2016
US	INDIAN UST R5	Underground Storage Tanks on Indian Land	EPA Region 5	04/26/2017	07/27/2017	10/06/2017
US	INDIAN UST R6	Underground Storage Tanks on Indian Land	EPA Region 6	04/24/2017	07/27/2017	12/08/2017
US	INDIAN UST R4	Underground Storage Tanks on Indian Land	EPA Region 4	10/14/2016	01/27/2017	05/05/2017
US	INDIAN UST R1	Underground Storage Tanks on Indian Land	EPA, Region 1	04/14/2017	07/27/2017	10/06/2017
US	INDIAN UST R7	Underground Storage Tanks on Indian Land	EPA Region 7	05/02/2017	07/27/2017	10/06/2017
US	INDIAN UST R8	Underground Storage Tanks on Indian Land	EPA Region 8	05/01/2017	07/27/2017	10/13/2017
US	INDIAN UST R10	Underground Storage Tanks on Indian Land	EPA Region 10	04/25/2017	07/27/2017	10/13/2017
US	INDIAN UST R9	Underground Storage Tanks on Indian Land	EPA Region 9	04/13/2017	07/27/2017	10/13/2017
US	FEMA UST	Underground Storage Tank Listing	FEMA	05/15/2017	05/30/2017	10/13/2017
State and tribal voluntary cleanup sites						
US	INDIAN VCP R1	Voluntary Cleanup Priority Listing	EPA, Region 1	07/27/2015	09/29/2015	02/18/2016
CA	VCP	Voluntary Cleanup Program Properties	Department of Toxic Substances Control	01/30/2018	01/31/2018	03/19/2018
US	INDIAN VCP R7	Voluntary Cleanup Priority Lisitng	EPA, Region 7	03/20/2008	04/22/2008	05/19/2008

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
State and tribal Brownfields sites						
CA	BROWNFIELDS	Considered Brownfieds Sites Listing	State Water Resources Control Board	12/22/2017	12/26/2017	01/31/2018
Other Records						
US	CONSENT	Superfund (CERCLA) Consent Decrees	Department of Justice, Consent Decree Library	09/30/2017	11/10/2017	01/12/2018
US	ROD	Records Of Decision	EPA	12/11/2017	12/22/2017	01/12/2018
US	LIENS 2	CERCLA Lien Information	Environmental Protection Agency	12/11/2017	12/22/2017	01/12/2018
CA	HIST CAL-SITES	Calsites Database	Department of Toxic Substance Control	08/08/2005	08/03/2006	08/24/2006
US	DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations	EPA, Region 9	01/12/2009	05/07/2009	09/21/2009
CA	SWRCY	Recycler Database	Department of Conservation	12/11/2017	12/12/2017	01/17/2018
CA	CA FID UST	Facility Inventory Database	California Environmental Protection Agency	10/31/1994	09/05/1995	09/29/1995
CA	HIST UST	Hazardous Substance Storage Container Database	State Water Resources Control Board	10/15/1990	01/25/1991	02/12/1991
CA	SWEEPS UST	SWEEPS UST Listing	State Water Resources Control Board	06/01/1994	07/07/2005	08/11/2005
US	US HIST CDL	National Clandestine Laboratory Register	Drug Enforcement Administration	01/19/2018	01/24/2018	02/09/2018
US	LEAD SMELTER 2	Lead Smelter Sites	American Journal of Public Health	04/05/2001	10/27/2010	12/02/2010
US	LEAD SMELTER 1	Lead Smelter Sites	Environmental Protection Agency	01/09/2018	02/06/2018	03/02/2018
US	2020 COR ACTION	2020 Corrective Action Program List	Environmental Protection Agency	04/22/2013	03/03/2015	03/09/2015
US	PCB TRANSFORMER	PCB Transformer Registration Database	Environmental Protection Agency	05/24/2017	11/30/2017	12/15/2017
US	FUSRAP	Formerly Utilized Sites Remedial Action Program	Department of Energy	12/23/2016	12/27/2016	02/17/2017
US	EPA WATCH LIST	EPA WATCH LIST	Environmental Protection Agency	08/30/2013	03/21/2014	06/17/2014
US	US FIN ASSUR	Financial Assurance Information	Environmental Protection Agency	01/11/2018	01/19/2018	03/02/2018
US	SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing	Environmental Protection Agency	01/01/2017	02/03/2017	04/07/2017
US	COAL ASH EPA	Coal Combustion Residues Surface Impoundments List	Environmental Protection Agency	07/01/2014	09/10/2014	10/20/2014
US	COAL ASH DOE	Steam-Electric Plant Operation Data	Department of Energy	12/31/2005	08/07/2009	10/22/2009
US	US AIRS (AFS)	Aerometric Information Retrieval System Facility Subsystem (	EPA	10/12/2016	10/26/2016	02/03/2017
US	US AIRS MINOR	Air Facility System Data	EPA	10/12/2016	10/26/2016	02/03/2017
US	Delisted NPL	National Priority List Deletions	EPA	12/11/2017	12/22/2017	01/05/2018
US	SEMS-ARCHIVE	Superfund Enterprise Management System Archive	EPA	12/11/2017	12/22/2017	01/12/2018
US	RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated	Environmental Protection Agency	12/11/2017	12/26/2017	02/09/2018
US	HMIRS	Hazardous Materials Information Reporting System	U.S. Department of Transportation	01/19/2018	01/19/2018	03/23/2018
US	DOT OPS	Incident and Accident Data	Department of Transporation, Office of Pipeli	07/31/2012	08/07/2012	09/18/2012
US	US CDL	Clandestine Drug Labs	Drug Enforcement Administration	01/09/2018	01/24/2018	02/09/2018
US	US BROWNFIELDS	A Listing of Brownfields Sites	Environmental Protection Agency	01/19/2018	01/19/2018	02/09/2018
US	DOD	Department of Defense Sites	USGS	12/31/2005	11/10/2006	01/11/2007
US	FEDLAND	Federal and Indian Lands	U.S. Geological Survey	12/31/2005	02/06/2006	01/11/2007
US	FUDS	Formerly Used Defense Sites	U.S. Army Corps of Engineers	01/31/2015	07/08/2015	10/13/2015
US	UMTRA	Uranium Mill Tailings Sites	Department of Energy	06/23/2017	10/11/2017	11/03/2017
US	ODI	Open Dump Inventory	Environmental Protection Agency	06/30/1985	08/09/2004	09/17/2004
US	US MINES	Mines Master Index File	Department of Labor, Mine Safety and Health A	10/29/2017	11/28/2017	01/12/2018
US	US MINES 2	Ferrous and Nonferrous Metal Mines Database Listing	USGS	12/05/2005	02/29/2008	04/18/2008
US	US MINES 3	Active Mines & Mineral Plants Database Listing	USGS	04/14/2011	06/08/2011	09/13/2011
US	PRP	Potentially Responsible Parties	EPA	10/25/2013	10/17/2014	10/20/2014
US	TRIS	Toxic Chemical Release Inventory System	EPA	12/31/2016	01/10/2018	01/12/2018
US	TSCA	Toxic Substances Control Act	EPA	12/31/2016	06/21/2017	01/05/2018
US	FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA/Office of Prevention, Pesticides and Toxi	04/09/2009	04/16/2009	05/11/2009
US	FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fu	EPA	04/09/2009	04/16/2009	05/11/2009

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	HIST FTTS INSP	FIFRA/TSCA Tracking System Inspection & Enforcement Case Lis	Environmental Protection Agency	10/19/2006	03/01/2007	04/10/2007
US	SSTS	Section 7 Tracking Systems	EPA	12/31/2009	12/10/2010	02/25/2011
US	ICIS	Integrated Compliance Information System	Environmental Protection Agency	11/18/2016	11/23/2016	02/10/2017
US	PADS	PCB Activity Database System	EPA	06/01/2017	06/09/2017	10/13/2017
US	MLTS	Material Licensing Tracking System	Nuclear Regulatory Commission	08/30/2016	09/08/2016	10/21/2016
US	RADINFO	Radiation Information Database	Environmental Protection Agency	10/02/2017	10/05/2017	10/13/2017
US	FINDS	Facility Index System/Facility Registry System	EPA	02/21/2018	02/23/2018	03/23/2018
US	RAATS	RCRA Administrative Action Tracking System	EPA	04/17/1995	07/03/1995	08/07/1995
US	RMP	Risk Management Plans	Environmental Protection Agency	11/02/2017	11/17/2017	12/08/2017
US	BRS	Biennial Reporting System	EPA/NTIS	12/31/2015	02/22/2017	09/28/2017
US	PWS	Public Water System Data	EPA	12/17/2013	01/09/2014	10/15/2014
US	INDIAN RESERV	Indian Reservations	USGS	12/31/2014	07/14/2015	01/10/2017
US	INDIAN ODI	Report on the Status of Open Dumps on Indian Lands	Environmental Protection Agency	12/31/1998	12/03/2007	01/24/2008
CA	CA BOND EXP. PLAN	Bond Expenditure Plan	Department of Health Services	01/01/1989	07/27/1994	08/02/1994
CA	CDL	Clandestine Drug Labs	Department of Toxic Substances Control	06/30/2017	08/18/2017	09/21/2017
CA	CHMIRS	California Hazardous Material Incident Report System	Office of Emergency Services	02/15/2018	02/20/2018	04/03/2018
CA	CORTESE	"Cortese" Hazardous Waste & Substances Sites List	CAL EPA/Office of Emergency Information	02/08/2018	02/08/2018	02/08/2018
CA	DEED	Deed Restriction Listing	DTSC and SWRCB	02/08/2018	02/08/2018	02/08/2018
CA	DRYCLEANERS	Cleaner Facilities	Department of Toxic Substance Control	12/01/2017	02/02/2018	03/16/2018
CA	EMI	Emissions Inventory Data	California Air Resources Board	12/31/2015	03/21/2017	08/15/2017
CA	ENF	Enforcement Action Listing	State Water Resoruces Control Board	01/22/2018	01/24/2018	03/19/2018
CA	Financial Assurance 1	Financial Assurance Information Listing	Department of Toxic Substances Control	01/22/2018	01/24/2018	03/20/2018
CA	Financial Assurance 2	Financial Assurance Information Listing	California Integrated Waste Management Board	02/14/2018	02/16/2018	04/03/2018
CA	HAULERS	Registered Waste Tire Haulers Listing	Integrated Waste Management Board	02/08/2018	02/09/2018	03/20/2018
CA	HAZNET	Facility and Manifest Data	California Environmental Protection Agency	12/31/2016	07/12/2017	10/17/2017
CA	HIST CORTESE	Hazardous Waste & Substance Site List	Department of Toxic Substances Control	04/01/2001	01/22/2009	04/08/2009
CA	HWP	EnviroStor Permitted Facilities Listing	Department of Toxic Substances Control	02/20/2018	02/21/2018	04/03/2018
CA	HWT	Registered Hazardous Waste Transporter Database	Department of Toxic Substances Control	01/08/2018	01/09/2018	02/06/2018
CA	ICE	ICE	Department of Toxic Subsances Control	02/20/2018	02/21/2018	04/03/2018
CA	LDS	Land Disposal Sites Listing (GEOTRACKER)	State Water Qualilty Control Board	03/12/2018	03/14/2018	03/21/2018
CA	LIENS	Environmental Liens Listing	Department of Toxic Substances Control	11/30/2017	12/01/2017	01/11/2018
CA	MCS	Military Cleanup Sites Listing (GEOTRACKER)	State Water Resources Control Board	03/12/2018	03/14/2018	03/21/2018
CA	MINES	Mines Site Location Listing	Department of Conservation	12/11/2017	12/12/2017	01/12/2018
CA	MWMP	Medical Waste Management Program Listing	Department of Public Health	11/29/2017	12/05/2017	01/16/2018
CA	NPDES	NPDES Permits Listing	State Water Resources Control Board	02/14/2018	02/14/2018	03/15/2018
CA	PEST LIC	Pesticide Regulation Licenses Listing	Department of Pesticide Regulation	12/04/2017	12/05/2017	01/16/2018
CA	PROC	Certified Processors Database	Department of Conservation	12/11/2017	12/12/2017	01/16/2018
CA	NOTIFY 65	Proposition 65 Records	State Water Resources Control Board	12/14/2017	12/15/2017	01/16/2018
CA	SCH	School Property Evaluation Program	Department of Toxic Substances Control	01/30/2018	01/31/2018	03/19/2018
CA	SPILLS 90	SPILLS90 data from FirstSearch	FirstSearch	06/06/2012	01/03/2013	02/22/2013
CA	TOXIC PITS	Toxic Pits Cleanup Act Sites	State Water Resources Control Board	07/01/1995	08/30/1995	09/26/1995
CA	UIC	UIC Listing	Deaprtment of Conservation	12/11/2017	12/12/2017	01/17/2018
CA	WASTEWATER PITS	Oil Wastewater Pits Listing	RWQCB, Central Valley Region	04/15/2015	04/17/2015	06/23/2015
CA	WDS	Waste Discharge System	State Water Resources Control Board	06/19/2007	06/20/2007	06/29/2007
CA	WIP	Well Investigation Program Case List	Los Angeles Water Quality Control Board	07/03/2009	07/21/2009	08/03/2009
CA	WMUDS/SWAT	Waste Management Unit Database	State Water Resources Control Board	04/01/2000	04/10/2000	05/10/2000

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
US	UXO	Unexploded Ordnance Sites	Department of Defense	09/30/2016	10/31/2017	01/12/2018
US	ABANDONED MINES	Abandoned Mines	Department of Interior	12/20/2017	12/21/2017	03/23/2018
US	FUELS PROGRAM	EPA Fuels Program Registered Listing	EPA	02/20/2018	02/21/2018	03/23/2018
US	ECHO	Enforcement & Compliance History Information	Environmental Protection Agency	01/13/2018	01/19/2018	03/02/2018
US	DOCKET HWC	Hazardous Waste Compliance Docket Listing	Environmental Protection Agency	06/27/2017	11/21/2017	01/12/2018
US	IHS OPEN DUMPS	Open Dumps on Indian Land	Department of Health & Human Serivces, Indian	04/01/2014	08/06/2014	01/29/2015
HISTORICAL USE RECORDS						
US	EDR MGP	EDR Proprietary Manufactured Gas Plants	EDR, Inc.			
US	EDR Hist Auto	EDR Exclusive Historical Auto Stations	EDR, Inc.			
US	EDR Hist Cleaner	EDR Exclusive Historical Cleaners	EDR, Inc.			
CA	RGA LF	Recovered Government Archive Solid Waste Facilities List	Department of Resources Recycling and Recover		07/01/2013	01/13/2014
CA	RGA LUST	Recovered Government Archive Leaking Underground Storage Tan	State Water Resources Control Board		07/01/2013	12/30/2013
COUNTY RECORDS						
CA	CS ALAMEDA	Contaminated Sites	Alameda County Environmental Health Services	01/09/2018	01/11/2018	02/22/2018
CA	UST ALAMEDA	Underground Tanks	Alameda County Environmental Health Services	01/22/2018	01/24/2018	03/28/2018
CA	CUPA AMADOR	CUPA Facility List	Amador County Environmental Health	03/01/2018	03/05/2018	03/15/2018
CA	CUPA BUTTE	CUPA Facility Listing	Public Health Department	04/21/2017	04/25/2017	08/09/2017
CA	CUPA CALVERAS	CUPA Facility Listing	Calveras County Environmental Health	01/25/2018	01/26/2018	03/14/2018
CA	CUPA COLUSA	CUPA Facility List	Health & Human Services	02/26/2018	03/01/2018	03/15/2018
CA	SL CONTRA COSTA	Site List	Contra Costa Health Services Department	11/20/2017	11/29/2017	01/19/2018
CA	CUPA DEL NORTE	CUPA Facility List	Del Norte County Environmental Health Divisio	01/05/2018	02/02/2018	03/14/2018
CA	CUPA EL DORADO	CUPA Facility List	El Dorado County Environmental Management Dep	12/04/2017	12/06/2017	12/27/2017
CA	CUPA FRESNO	CUPA Resources List	Dept. of Community Health	03/01/2018	03/05/2018	03/14/2018
CA	CUPA GLENN	CUPA Facility List	Glenn County Air Pollution Control District	01/22/2018	01/24/2018	03/14/2018
CA	CUPA HUMBOLDT	CUPA Facility List	Humboldt County Environmental Health	08/03/2017	08/08/2017	10/16/2017
CA	CUPA IMPERIAL	CUPA Facility List	San Diego Border Field Office	01/22/2018	01/26/2018	03/14/2018
CA	CUPA INYO	CUPA Facility List	Inyo County Environmental Health Services	06/08/2017	06/09/2017	08/04/2017
CA	UST KERN	Underground Storage Tank Sites & Tank Listing	Kern County Environment Health Services Depar	02/02/2018	02/02/2018	03/28/2018
CA	CUPA KINGS	CUPA Facility List	Kings County Department of Public Health	11/14/2017	11/17/2017	12/15/2017
CA	CUPA LAKE	CUPA Facility List	Lake County Environmental Health	02/06/2018	02/09/2018	03/14/2018
CA	CUPA LASSEN	CUPA Facility List	Lassen County Environmental Health	01/22/2018	01/24/2018	03/14/2018
CA	AOCONCERN	San Gabriel Valley Areas of Concern	EPA Region 9	03/30/2009	03/31/2009	10/23/2009
CA	HMS LOS ANGELES	HMS: Street Number List	Department of Public Works	01/16/2018	01/23/2018	03/20/2018
CA	LF LOS ANGELES	List of Solid Waste Facilities	La County Department of Public Works	01/16/2018	01/16/2018	02/14/2018
CA	LF LOS ANGELES CITY	City of Los Angeles Landfills	Engineering & Construction Division	01/01/2017	04/21/2017	10/09/2017
CA	SITE MIT LOS ANGELES	Site Mitigation List	Community Health Services	01/01/2018	01/17/2018	02/14/2018
CA	UST EL SEGUNDO	City of El Segundo Underground Storage Tank	City of El Segundo Fire Department	01/21/2017	04/19/2017	05/10/2017
CA	UST LONG BEACH	City of Long Beach Underground Storage Tank	City of Long Beach Fire Department	03/09/2017	03/10/2017	05/03/2017
CA	UST TORRANCE	City of Torrance Underground Storage Tank	City of Torrance Fire Department	01/04/2018	01/05/2018	01/18/2018
CA	CUPA MADERA	CUPA Facility List	Madera County Environmental Health	02/21/2018	02/22/2018	04/03/2018
CA	UST MARIN	Underground Storage Tank Sites	Public Works Department Waste Management	01/02/2018	01/05/2018	01/17/2018
CA	CUPA MERCED	CUPA Facility List	Merced County Environmental Health	01/11/2018	01/12/2018	02/08/2018
CA	CUPA MONO	CUPA Facility List	Mono County Health Department	02/22/2018	02/27/2018	03/14/2018
CA	CUPA MONTEREY	CUPA Facility Listing	Monterey County Health Department	01/09/2018	01/11/2018	01/31/2018
CA	LUST NAPA	Sites With Reported Contamination	Napa County Department of Environmental Manag	01/09/2017	01/11/2017	03/02/2017

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date
CA	UST NAPA	Closed and Operating Underground Storage Tank Sites	Napa County Department of Environmental Manag	02/22/2018	02/27/2018	03/29/2018
CA	CUPA NEVADA	CUPA Facility List	Community Development Agency	01/31/2018	02/01/2018	03/14/2018
CA	IND_SITE ORANGE	List of Industrial Site Cleanups	Health Care Agency	02/05/2018	02/13/2018	04/03/2018
CA	LUST ORANGE	List of Underground Storage Tank Cleanups	Health Care Agency	02/05/2018	02/13/2018	03/20/2018
CA	UST ORANGE	List of Underground Storage Tank Facilities	Health Care Agency	01/02/2018	02/07/2018	03/28/2018
CA	MS PLACER	Master List of Facilities	Placer County Health and Human Services	12/08/2017	12/12/2017	01/31/2018
CA	CUPA PLUMAS	CUPA Facility List	Plumas County Environmental Health	01/22/2018	01/24/2018	03/15/2018
CA	LUST RIVERSIDE	Listing of Underground Tank Cleanup Sites	Department of Environmental Health	01/18/2018	01/23/2018	03/20/2018
CA	UST RIVERSIDE	Underground Storage Tank Tank List	Department of Environmental Health	01/18/2018	01/23/2018	03/28/2018
CA	CS SACRAMENTO	Toxic Site Clean-Up List	Sacramento County Environmental Management	11/02/2017	01/03/2018	02/05/2018
CA	ML SACRAMENTO	Master Hazardous Materials Facility List	Sacramento County Environmental Management	11/02/2017	01/03/2018	02/14/2018
CA	CUPA SAN BENITO	CUPA Facility List	San Benito County Environmental Health	11/01/2017	11/03/2017	11/17/2017
CA	PERMITS SAN BERNARDINO	Hazardous Material Permits	San Bernardino County Fire Department Hazardo	11/30/2017	12/01/2017	01/16/2018
CA	HMMD SAN DIEGO	Hazardous Materials Management Division Database	Hazardous Materials Management Division	12/04/2017	12/05/2017	01/11/2018
CA	LF SAN DIEGO	Solid Waste Facilities	Department of Health Services	10/31/2015	11/07/2015	01/04/2016
CA	SAN DIEGO CO. SAM	Environmental Case Listing	San Diego County Department of Environmental	03/23/2010	06/15/2010	07/09/2010
CA	LUST SAN FRANCISCO	Local Oversite Facilities	Department Of Public Health San Francisco Cou	09/19/2008	09/19/2008	09/29/2008
CA	UST SAN FRANCISCO	Underground Storage Tank Information	Department of Public Health	11/02/2017	11/07/2017	12/19/2017
CA	UST SAN JOAQUIN	San Joaquin Co. UST	Environmental Health Department	12/20/2017	12/21/2017	02/01/2018
CA	CUPA SAN LUIS OBISPO	CUPA Facility List	San Luis Obispo County Public Health Departme	11/16/2017	11/17/2017	12/18/2017
CA	BI SAN MATEO	Business Inventory	San Mateo County Environmental Health Service	12/12/2017	12/14/2017	01/11/2018
CA	LUST SAN MATEO	Fuel Leak List	San Mateo County Environmental Health Service	12/12/2017	12/14/2017	01/12/2018
CA	CUPA SANTA BARBARA	CUPA Facility Listing	Santa Barbara County Public Health Department	09/08/2011	09/09/2011	10/07/2011
CA	CUPA SANTA CLARA	Cupa Facility List	Department of Environmental Health	02/20/2018	02/20/2018	03/19/2018
CA	HIST LUST SANTA CLARA	HIST LUST - Fuel Leak Site Activity Report	Santa Clara Valley Water District	03/29/2005	03/30/2005	04/21/2005
CA	LUST SANTA CLARA	LOP Listing	Department of Environmental Health	03/03/2014	03/05/2014	03/18/2014
CA	SAN JOSE HAZMAT	Hazardous Material Facilities	City of San Jose Fire Department	02/04/2018	02/06/2018	03/20/2018
CA	CUPA SANTA CRUZ	CUPA Facility List	Santa Cruz County Environmental Health	01/21/2017	02/22/2017	05/23/2017
CA	CUPA SHASTA	CUPA Facility List	Shasta County Department of Resource Manageme	06/15/2017	06/19/2017	08/09/2017
CA	LUST SOLANO	Leaking Underground Storage Tanks	Solano County Department of Environmental Man	12/14/2017	12/15/2017	01/12/2018
CA	UST SOLANO	Underground Storage Tanks	Solano County Department of Environmental Man	03/08/2018	03/13/2018	03/29/2018
CA	CUPA SONOMA	Cupa Facility List	County of Sonoma Fire & Emergency Services De	12/20/2017	12/21/2017	01/31/2018
CA	LUST SONOMA	Leaking Underground Storage Tank Sites	Department of Health Services	01/04/2018	01/09/2018	02/06/2018
CA	CUPA STANISLAUS	CUPA Facility List	Stanislaus County Department of Ennvironmenta	02/06/2018	02/07/2018	03/16/2018
CA	UST SUTTER	Underground Storage Tanks	Sutter County Department of Agriculture	01/08/2018	03/01/2018	03/30/2018
CA	CUPA TEHAMA	CUPA Facility List	Tehama County Department of Environmental Hea	01/26/2018	02/02/2018	03/21/2018
CA	CUPA TRINITY	CUPA Facility List	Department of Toxic Substances Control	01/22/2018	01/25/2018	03/19/2018
CA	CUPA TULARE	CUPA Facility List	Tulare County Environmental Health Services D	09/27/2017	09/28/2017	10/16/2017
CA	CUPA TUOLUMNE	CUPA Facility List	Divison of Environmental Health	01/22/2018	01/25/2018	03/16/2018
CA	BWT VENTURA	Business Plan, Hazardous Waste Producers, and Operating Unde	Ventura County Environmental Health Division	12/26/2017	01/25/2018	03/14/2018
CA	LF VENTURA	Inventory of Illegal Abandoned and Inactive Sites	Environmental Health Division	12/01/2011	12/01/2011	01/19/2012
CA	LUST VENTURA	Listing of Underground Tank Cleanup Sites	Environmental Health Division	05/29/2008	06/24/2008	07/31/2008
CA	MED WASTE VENTURA	Medical Waste Program List	Ventura County Resource Management Agency	12/26/2017	01/25/2018	03/20/2018
CA	UST VENTURA	Underground Tank Closed Sites List	Environmental Health Division	02/28/2018	03/14/2018	03/30/2018
CA	UST YOLO	Underground Storage Tank Comprehensive Facility Report	Yolo County Department of Health	01/02/2018	01/09/2018	01/19/2018
CA	CUPA YUBA	CUPA Facility List	Yuba County Environmental Health Department	02/01/2018	02/02/2018	03/21/2018

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

St	Acronym	Full Name	Government Agency	Gov Date	Arvl. Date	Active Date

STREET AND ADDRESS INFORMATION

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APPENDIX F
REGULATORY RECORDS DOCUMENTATION

Leighton

County of Riverside

DEPARTMENT OF ENVIRONMENTAL HEALTH

www.rivcoeh.org

Environmental Protection & Oversight Division
Hazardous Materials Management Branch

REQUEST FOR RECORDS

Requests for review of records are processed on a first come, first serve basis and the processing time is approximately 2-4 weeks. As required by California Public Records Act Section 6250 et seq., a response will be given within ten (10) business days to confirm receipt of your request.

Pursuant to California Government Code, Section 6254 (f), records of pending investigations and informant's names, addresses, and telephone numbers, will not be released.

For access to electronic records available online, visit the Public Information section at www.rivcoeh.org for more details.

REQUESTOR INFORMATION		
NAME: Michelle Manzano	DATE OF REQUEST: 04/05/2018	
BUSINESS NAME (IF ANY): Leighton Consulting Inc		
RETURN LEGAL MAILING ADDRESS: 10532 Acacia Street Suite B-6		
CITY: Rancho Cucamonga	STATE: CA	ZIP: 91786
PHONE: (909) 527-8776		

The following information is required. **List each street address separately.**

	SITE STREET ADDRESS (NO APNs)	CITY
1.	South of Cactus Avenue (between Veterans Way and Fredrick St)	Moreno Valley
2.		
3.		
4.		
5.		
6.		
7.		

Requests must be made in writing and submitted by mail, email, or in person to the following office:

4065 County Circle Drive, Room 104, Riverside, CA 92503
Phone: (951) 358-5055
Email: DEHRecordsMgmt@rivco.org
Mailing Address: P.O. Box 7909, Riverside, CA 92513-7909

For our office locations call us at (888) 722-4234 or visit our website at www.rivcoeh.org

County of Riverside

DEPARTMENT OF ENVIRONMENTAL HEALTH

STEVE VAN STOCKUM, DIRECTOR

Incomplete Records Request Notice

April 11, 2018

Request No: 41333

Request Date: 04/05/2018

Leighton Consulting Inc
10532 Acacia St.
Suite B-6
Rancho Cucamonga, CA 91786
Attn: Michelle Manzano

Re: **SOUTH OF CACTUS AVE. (BETWEEN VETERANS WAY AND FREDRICK ST), MORENO VALLEY**

We have received your request for records however a search of our records cannot be conducted based on the information provided.

Please reference a specific site address(s) of inquiry and resubmit the records request.

The Hazardous Materials Management Division is unable to provide information about sites based on APN's or similar geographic site data.

Please direct questions or correspondence to:

Department of Environmental Health
Hazardous Materials Management Division
4065 County Circle Dr., Rm. 104
P.O. Box 7909
Riverside, CA 92513-7909
Attention: Records Management
Telephone: 951-358-5055
Fax: 951-358-5017

You may also visit our website at www.rivcoeh.org

Note: Records for disclosure information of the cities of Corona 951-736-2220, and Riverside 951-826-5737 will need to be directed to the City Fire Department.

From: Michelle Manzano
To: "glenn.castillo@dtsc.ca.gov"; "robert.hardison@dtsc.ca.gov"
Subject: File Search
Date: Thursday, April 05, 2018 1:24:00 PM

Dear Mr. Castillo and Mr. Hardison:

Leighton Consulting Inc. is requesting information for the property located south of Cactus Avenue, between Veterans Way and Fredrick Street. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786
909-527-8776 Office

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Barbara A. Lee, Director
9211 Oakdale Avenue
Chatsworth, California 91311

Edmund G. Brown ***Jr***
Governor

April 06, 2018

Ms. Michelle Manzano
Leighton Consulting Inc.
10532 Acacia Street, Suite B-6
Rancho Cucamonga, CA 91786

VARIOUS SITES
PR3-040518-03

Dear Ms. Manzano:

We have received your Public Records Act Request for records from the Department of Toxic Substances Control. After a thorough review of our files we have found that no such records exist at this office pertaining to the sites/facilities referenced below.

- Assessor Parcel Numbers 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038 Moreno Valley.

We would like to inform you about EnviroStor, a database that provides information and documents on over 5,000 DTSC cleanup sites. EnviroStor can be accessed at: http://www.envirostor.dtsc.ca.gov/public. Also, a computer is available in the Central Files of each DTSC Regional Office for use by community members to view EnviroStor.

If you have any questions or would like further information regarding your request, please contact me at (818) 717-6522.

Sincerely,

Glenn Castillo /JVT
Regional Records Coordinator

Printed on Recycled Paper

From: Michelle Manzano
To: "jone.barrio@DTSC.ca.gov"
Subject: File Search
Date: Thursday, April 05, 2018 1:26:00 PM

Dear Ms. Barrio:

Leighton Consulting Inc. is requesting information for the property located south of Cactus Avenue, between Veterans Way and Fredrick Street. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786
909-527-8776 Office

Matthew Rodriquez
Secretary for
Environmental Protection

Department of Toxic Substances Control

Barbara A. Lee, Director
5796 Corporate Ave
Cypress, California 90630

Edmund G. Brown Jr.
Governor

April 5, 2018

Ms. Michelle Manzano
Leighton
10532 Acacia St., Ste. B-6
Rancho Cucamonga, CA 91786
mmanzano@leightongroup.com

Various Sites
PR4-040518-01

Dear: Ms. Manzano:

We have received your Public Records Act Request for records from Department of Toxic Substances Control.

After a, thorough review of our files we have found that, no such records exist at this office pertaining to the sites/facilities referenced below.

N/R: S. Cactus Ave., between Veterans Way & Fredrick St., & 297-160-005, 297-200-004, 297-150-006, 297-150-007 & 297-150-038, Moreno Valley

We would like to inform you about Envirostor, a database that provides information and documents on over 5,000 DTSC cleanup sites. Envirostor can be accessed at: http://www.envirostor.dtsc.ca.gov/public.

If you have any questions, would like further information regarding your request, please contact our Regional Records Coordinator at (714) 484-5336

Sincerely,

Jone Barrio

Jone Barrio
Regional Records Coordinator
Cypress Administrative Services

future request please: fax: 714.484.5318 or

email both: Jone.Barrio@dtsc.ca.gov & Julie.Johnson@dtsc.ca.gov

From: Michelle Manzano
To: "FileReview8@waterboards.ca.gov"
Subject: File Search
Date: Thursday, April 05, 2018 1:22:00 PM

Good afternoon,

Leighton Consulting Inc. is requesting information for the property located south of Cactus Avenue, between Veterans Way and Fredrick Street. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786
909-527-8776 Office

From: Michelle Manzano
To: "WB-RB8-FileReview8"
Subject: File Search
Date: Friday, April 13, 2018 1:22:00 PM

Good afternoon,

Leighton Consulting Inc. is requesting information for the property located on March Air Reserve Base. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786
909-527-8776 Office

From: WB-RB8-FileReview8
To: Michelle Manzano
Subject: RE: File Search
Date: Friday, April 06, 2018 10:15:36 AM

Good morning,

I reviewed your request. We do not use APN numbers or cross streets to maintain our files. We only use facility names and/or physical address numbers to locate files. If you can provide a numerical address or facility name, we can carry out your request. If we can be of further assistance please do not hesitate to contact us again.

Katie Duprey
File Review Desk

From: Michelle Manzano <mmanzano@leightongroup.com>
Sent: Thursday, April 5, 2018 1:22 PM
To: WB-RB8-FileReview8 <FileReview8@waterboards.ca.gov>
Subject: File Search

Good afternoon,

Leighton Consulting Inc. is requesting information for the property located south of Cactus Avenue, between Veterans Way and Fredrick Street. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786
909-527-8776 Office

From: WB-RB8-FileReview8
To: Michelle Manzano
Subject: RE: File Search
Date: Monday, April 16, 2018 8:49:57 AM

Hello,
I reviewed your request for the following sites:
297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038

Unfortunately we do not use APN numbers or cross streets to maintain our files. We only use facility names and/or physical address numbers to locate files. If you can provide a numerical address or facility name, we can carry out your request.

If we can be of further assistance please do not hesitate to contact us again.

Katie Duprey
File Review Desk

From: Michelle Manzano <mmanzano@leightongroup.com>
Sent: Friday, April 13, 2018 1:22 PM
To: WB-RB8-FileReview8 <FileReview8@waterboards.ca.gov>
Subject: File Search

Good afternoon,

Leighton Consulting Inc. is requesting information for the property located on March Air Reserve Base. The Riverside County Assessor's Office identifies the subject site as Assessor Parcel Numbers (APNs) 297-160-005, 297-200-004, 297-150-006, 297-150-007, and 297-150-038, in the City of Moreno Valley.

Leighton Consulting Inc. is requesting any information concerning hazardous waste/materials, underground storage tanks, leaking underground storage tank cleanup, inspections, violations, or any other environmentally sensitive spills, responses, or concerns your agency may have on file associated with this site.

Thank you very much for your time and assistance.

Respectfully submitted,

Michelle Manzano
Staff Geologist
10532 Acacia Street Suite B-6
Rancho Cucamonga, CA 91786

909-527-8776 Office

APPENDIX G

HISTORICAL RESEARCH DOCUMENTATION

Leighton

March Air Reserve Base

Cactus Avenue Between Veterns Way and Frederick St

March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.12

April 05, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

04/05/18

Site Name:

March Air Reserve Base
Cactus Avenue Between Veter
March Air Reserve Ba, CA 925
EDR Inquiry # 5249358.12

Client Name:

Leighton Consulting
17781 Cowan
Irvine, CA 92614
Contact: Michelle Manzano

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	*Scale*	*Details*	*Source*
2014	1"=500'	Flight Year: 2014	USDA/NAIP
2010	1"=500'	Flight Year: 2010	USDA/NAIP
2006	1"=500'	Flight Year: 2006	USDA/NAIP
1994	1"=500'	Acquisition Date: June 01, 1994	USGS/DOQQ
1989	1"=500'	Flight Date: August 15, 1989	USDA
1985	1"=500'	Flight Date: July 28, 1985	USDA
1978	1"=500'	Flight Date: September 20, 1978	USDA
1967	1"=500'	Flight Date: May 15, 1967	USDA
1959	1"=500'	Flight Date: October 15, 1959	USGS
1953	1"=500'	Flight Date: September 22, 1953	USDA
1949	1"=500'	Flight Date: May 06, 1949	USDA
1938	1"=500'	Flight Date: June 14, 1938	USDA

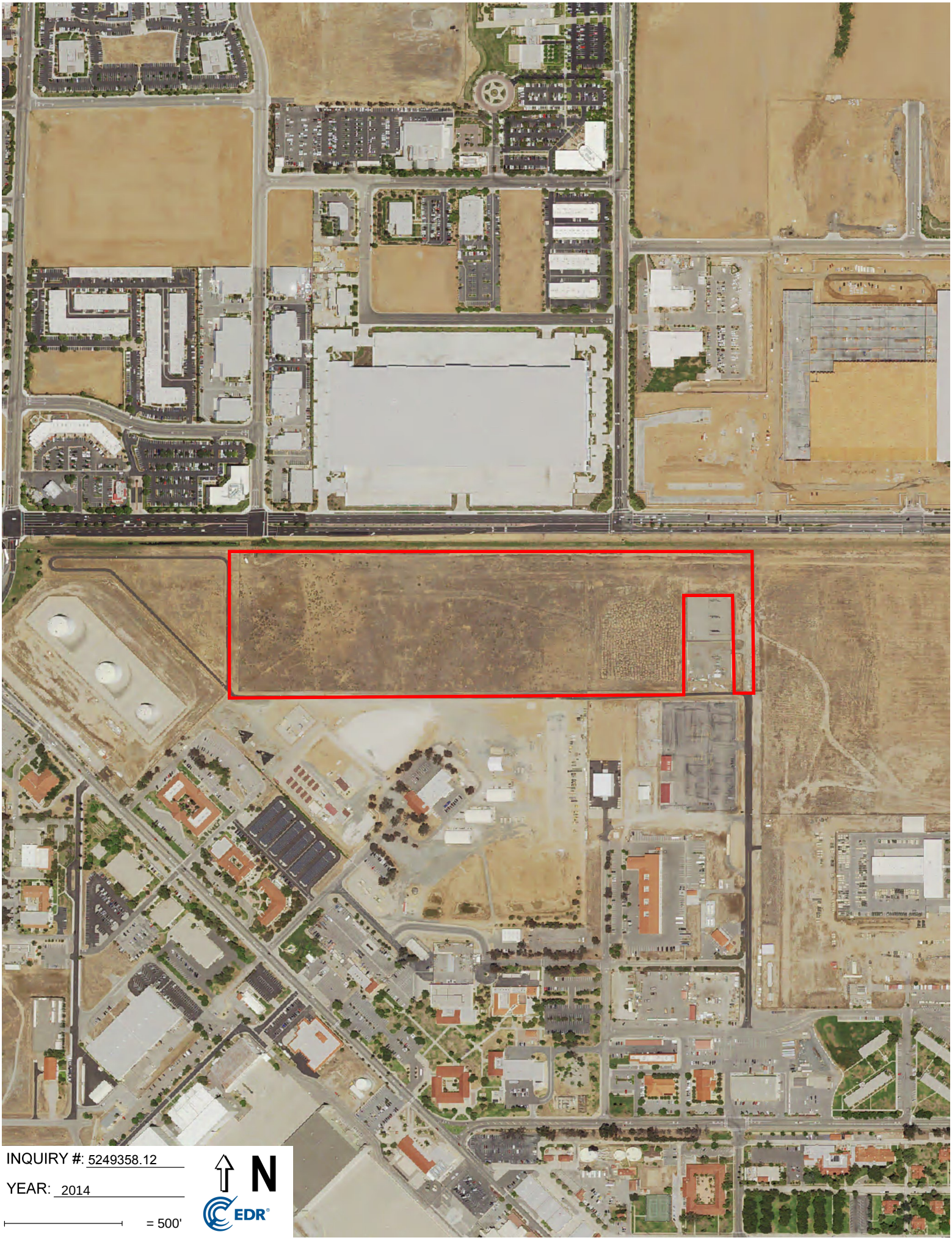
When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

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INQUIRY #: 5249358.12

YEAR: 2014

= 500'

N

EDR


INQUIRY #: 5249358.12
YEAR: 2010
= 500'
N
EDR



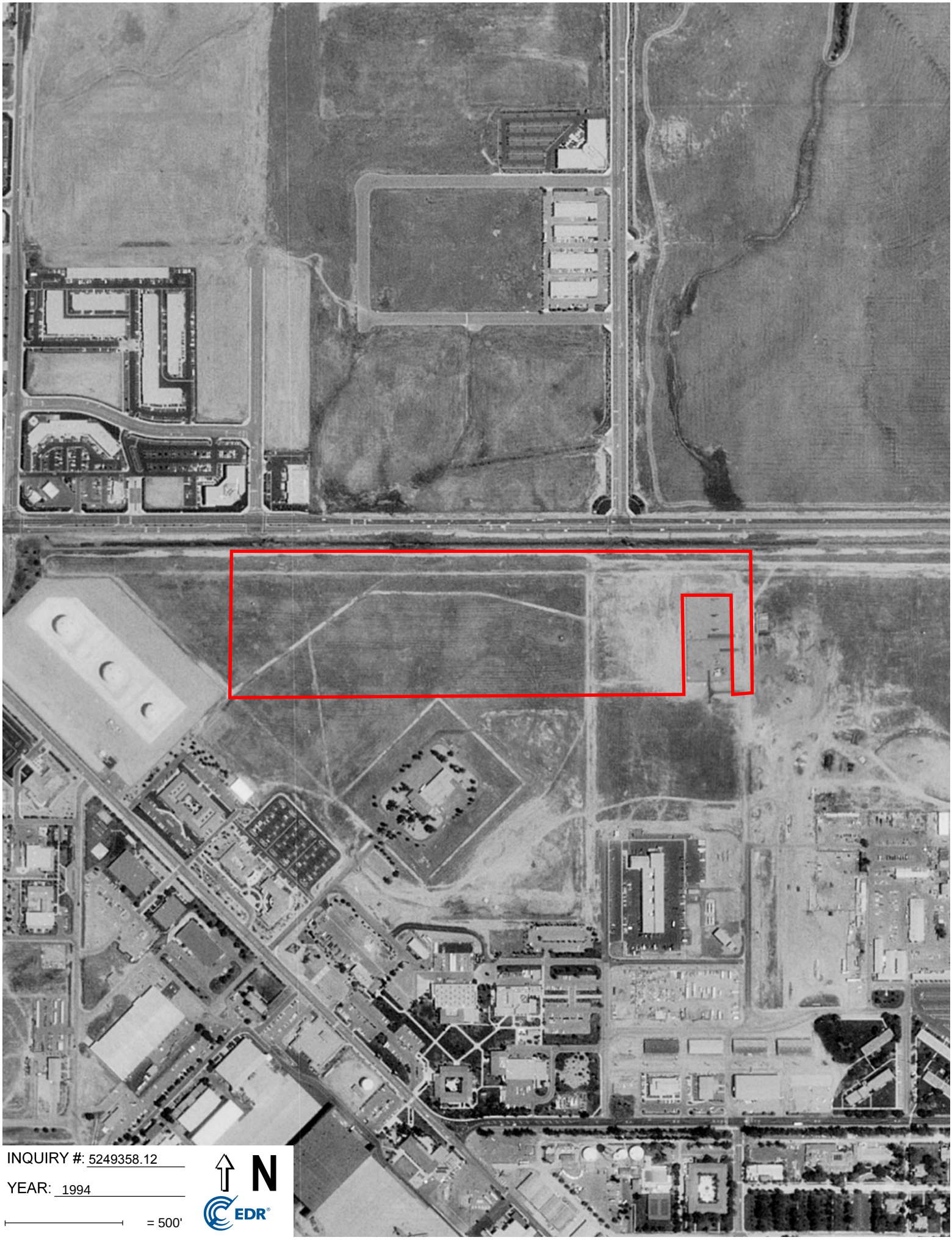
INQUIRY #: 5249358.12

YEAR: 2006

= 500'

N

EDR



INQUIRY #: 5249358.12

YEAR: 1994

= 500'

N

EDR


INQUIRY #: 5249358.12
YEAR: 1989
= 500'
N
EDR



INQUIRY #: 5249358.12

YEAR: 1985

= 500'

N

EDR



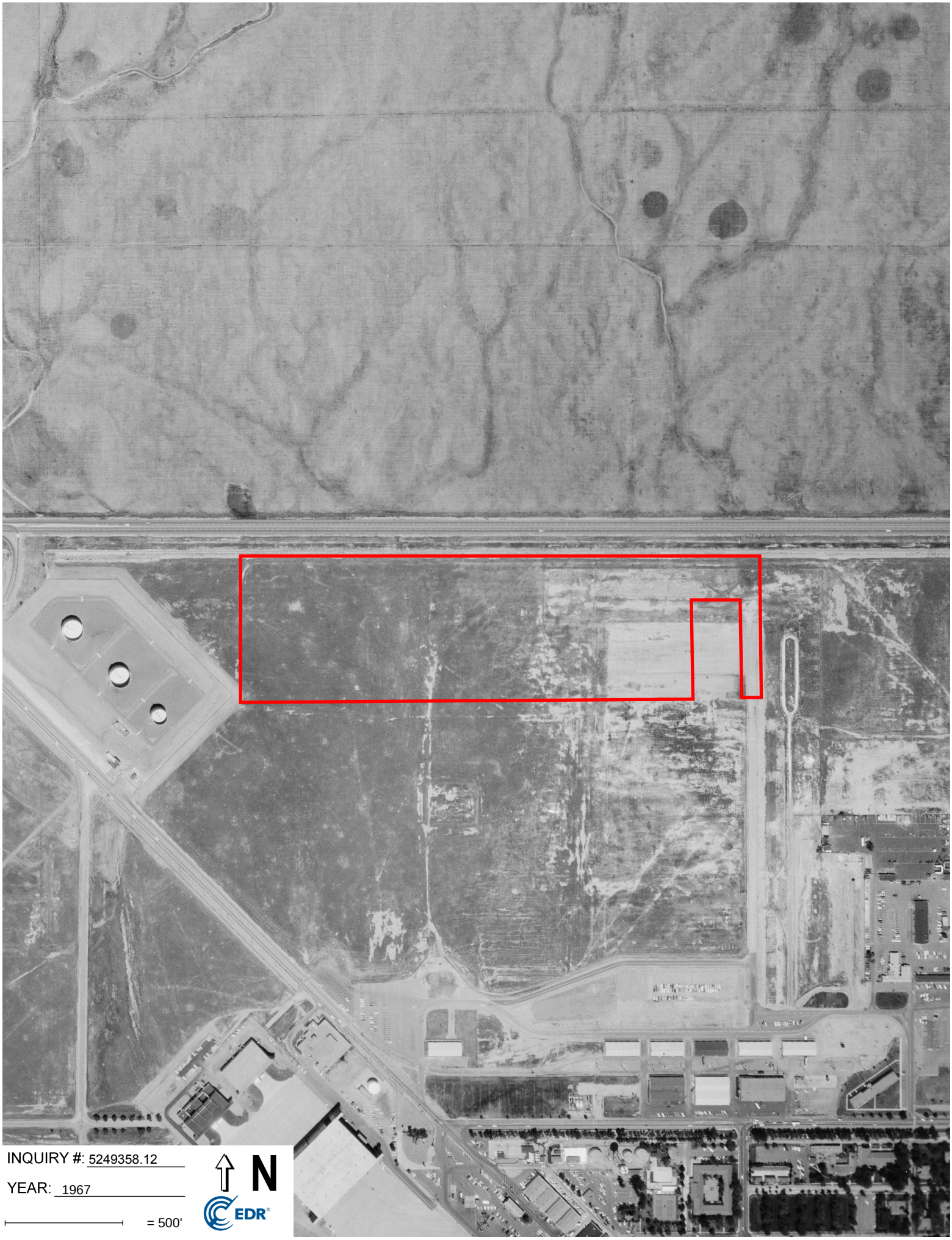
INQUIRY #: 5249358.12

YEAR: 1978

= 500'

N

EDR



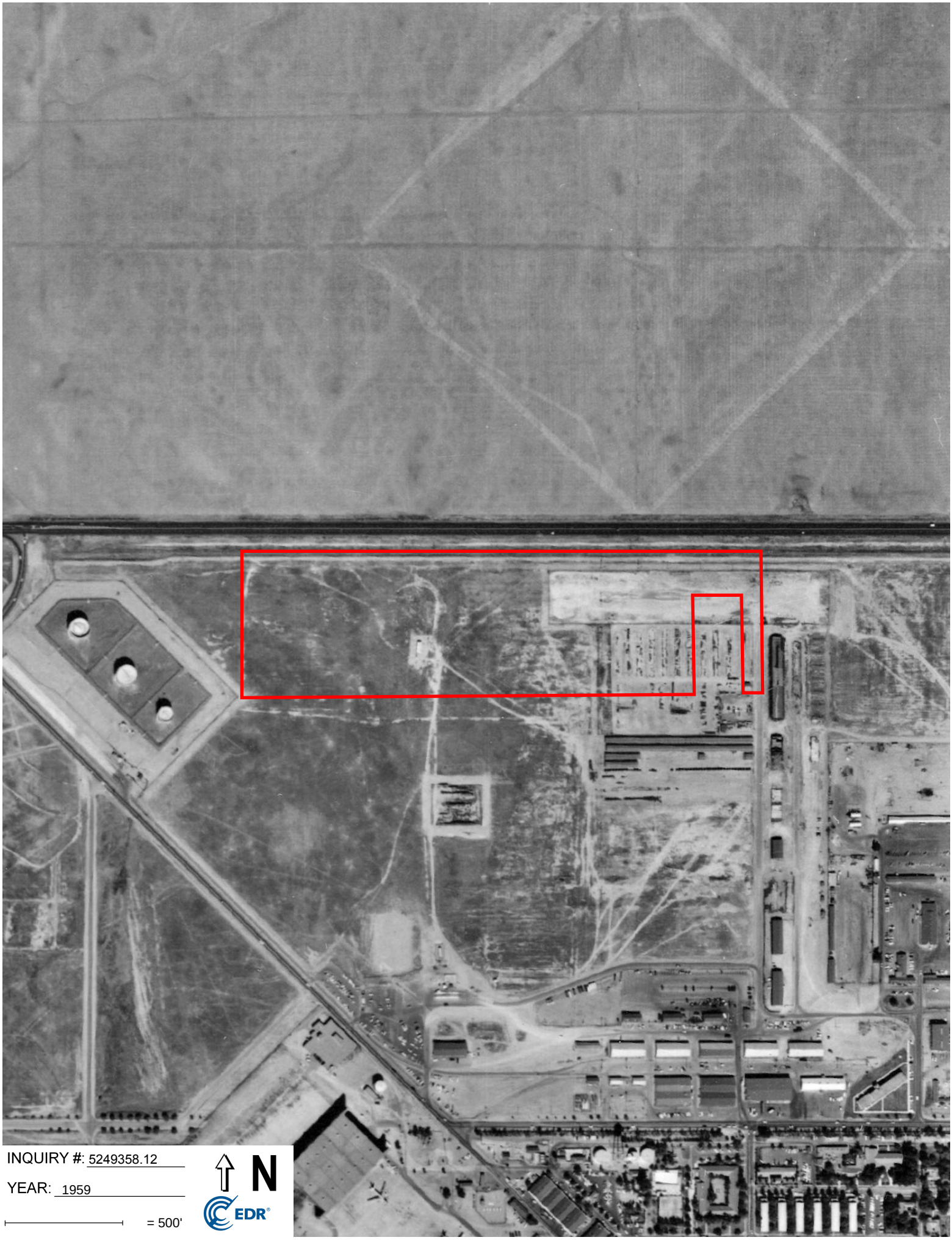
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YEAR: 1967

= 500'

N

EDR



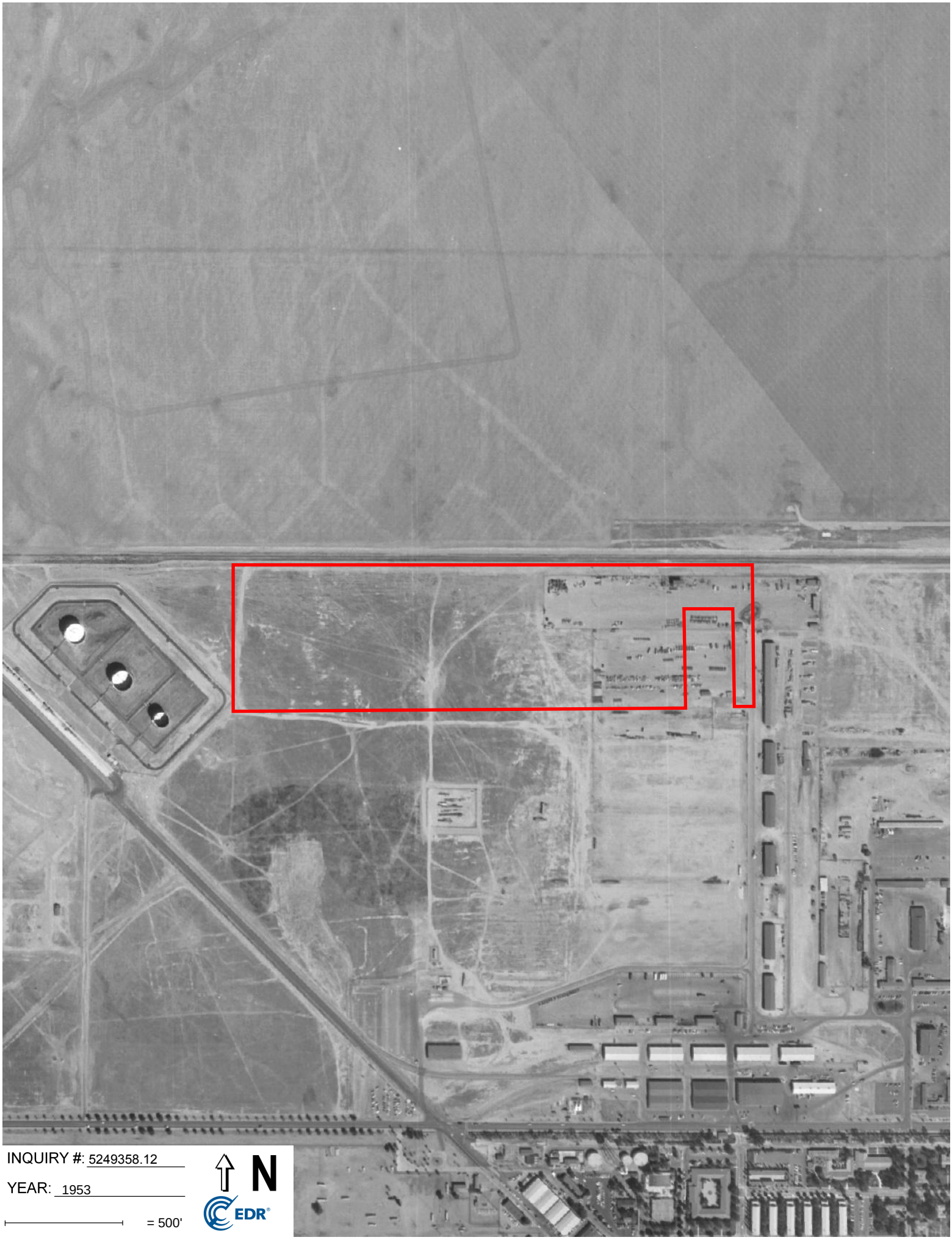
INQUIRY #: 5249358.12

YEAR: 1959

= 500'

N

EDR



INQUIRY #: 5249358.12

YEAR: 1953

= 500'

N

EDR



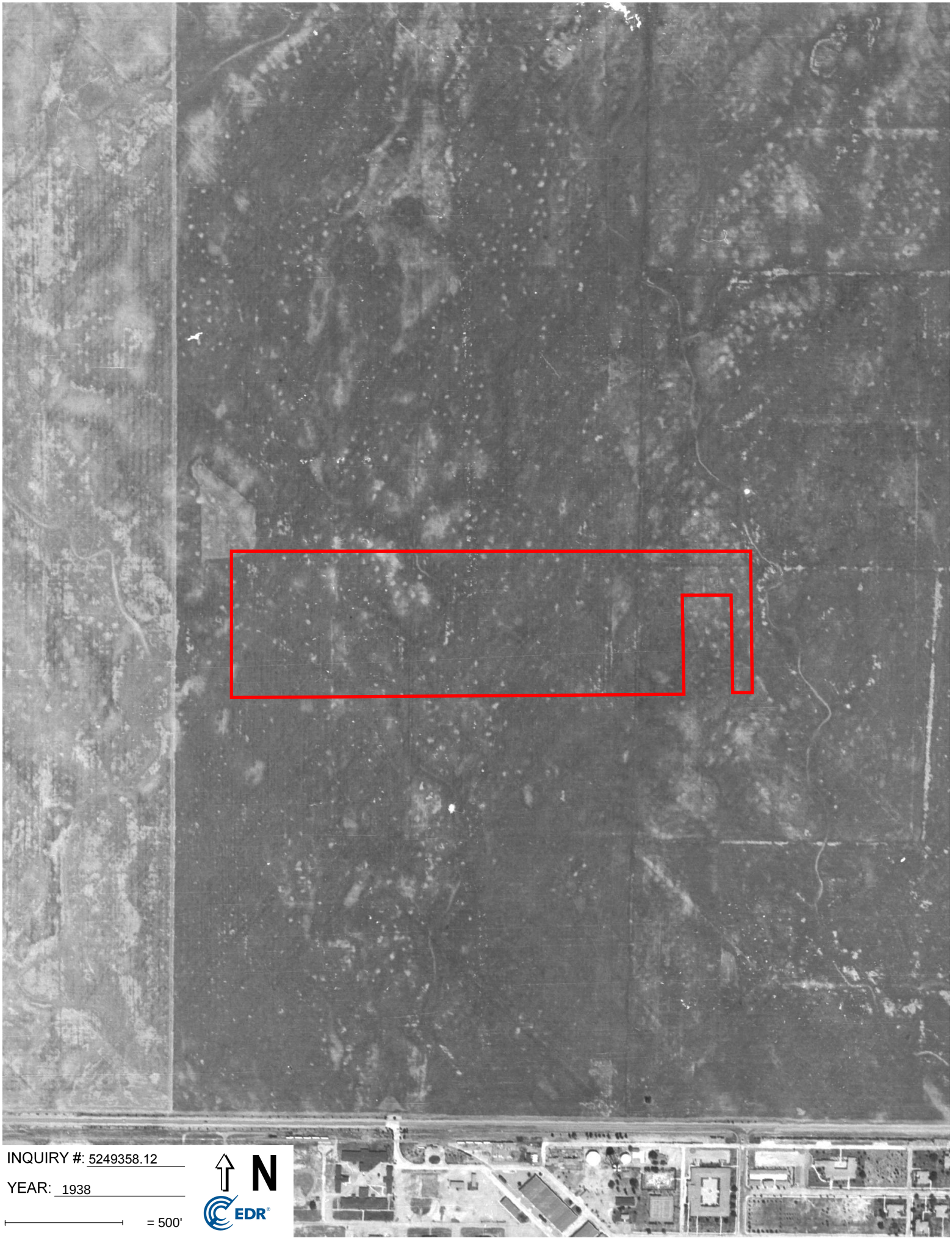
INQUIRY #: 5249358.12

YEAR: 1949

= 500'

N

EDR



INQUIRY #: 5249358.12

YEAR: 1938

= 500'

N

EDR

March Air Reserve Base

Cactus Avenue Between Veterns Way and Frederick St

March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.4

April 05, 2018

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

04/05/18

Site Name:	Client Name:
March Air Reserve Base	Leighton Consulting
Cactus Avenue Between Veter	17781 Cowan
March Air Reserve Ba, CA 925	Irvine, CA 92614
EDR Inquiry # 5249358.4	Contact: Michelle Manzano

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Leighton Consulting were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:		*Coordinates:*	
P.O.#	11979.001	**Latitude:**	33.908921 33° 54' 32" North
Project:	Meridian Park Warehouse	**Longitude:**	-117.263954 -117° 15' 50" West
		UTM Zone:	Zone 11 North
		UTM X Meters:	475598.40
		UTM Y Meters:	3752088.75
		Elevation:	1550.00' above sea level

Maps Provided:

2012
1980
1967
1953
1947
1942
1901

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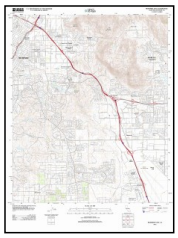
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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets

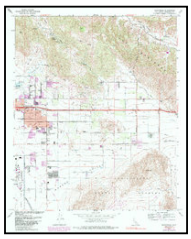


Riverside East
2012
7.5-minute, 24000

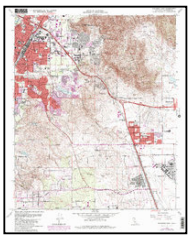


Sunnymead
2012
7.5-minute, 24000

1980 Source Sheets

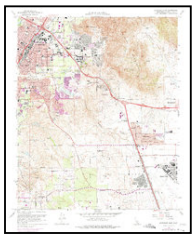


Sunnymead
1980
7.5-minute, 24000
Aerial Photo Revised 1978

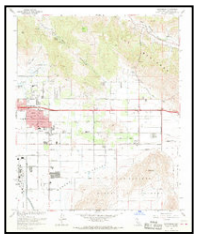


Riverside East
1980
7.5-minute, 24000
Aerial Photo Revised 1978

1967 Source Sheets

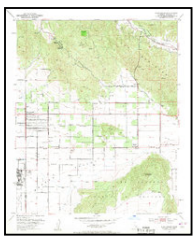


Riverside East
1967
7.5-minute, 24000
Aerial Photo Revised 1966



Sunnymead
1967
7.5-minute, 24000
Aerial Photo Revised 1966

1953 Source Sheets



Sunnymead
1953
7.5-minute, 24000
Aerial Photo Revised 1951



Riverside East
1953
7.5-minute, 24000
Aerial Photo Revised 1951

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1947 Source Sheets

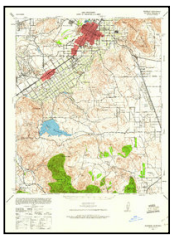


RIVERSIDE
1947
15-minute, 50000

1942 Source Sheets



Perris
1942
15-minute, 62500
Aerial Photo Revised 1939



Riverside
1942
15-minute, 62500
Aerial Photo Revised 1939

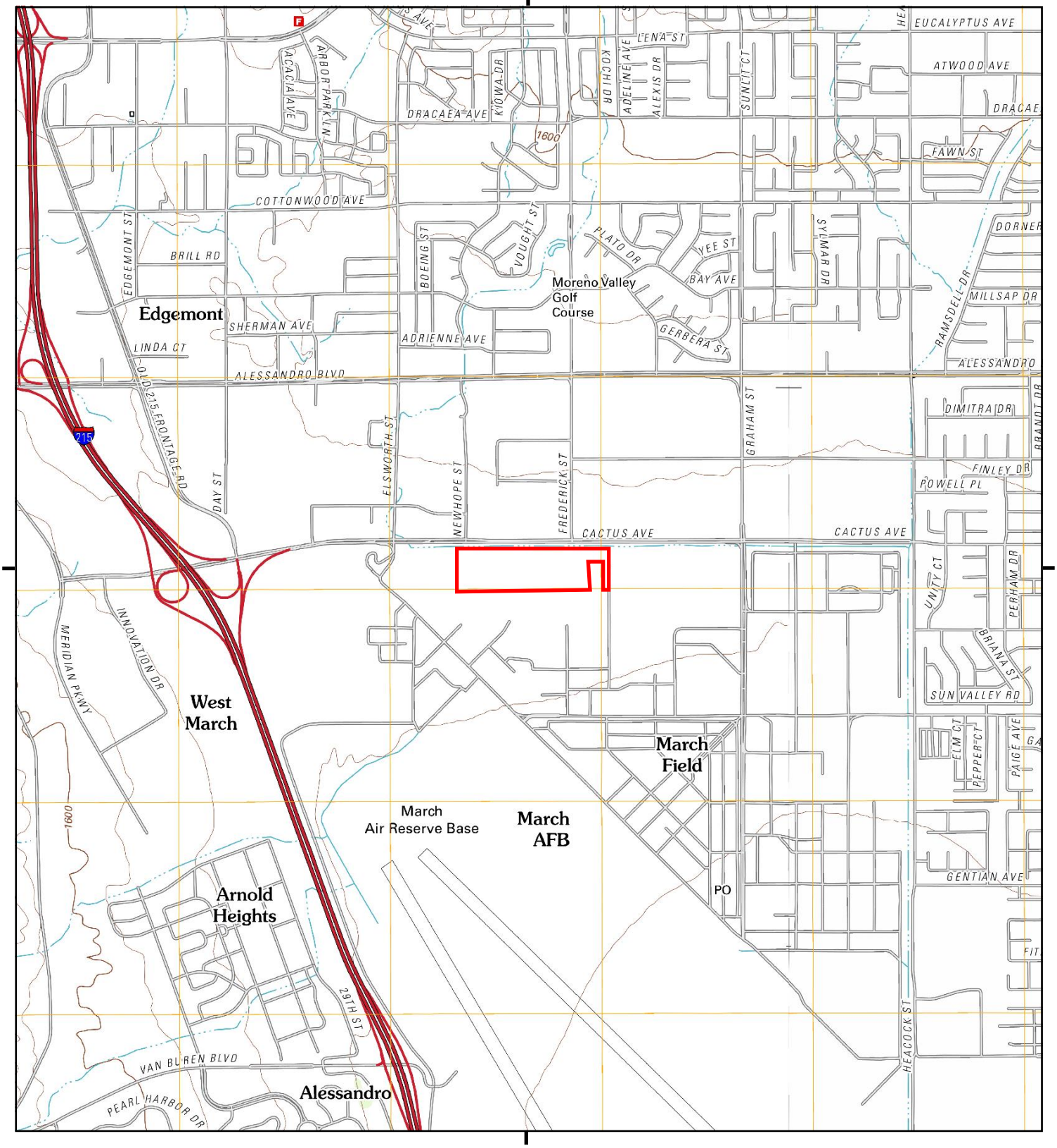
1901 Source Sheets



Riverside
1901
15-minute, 62500

Historical Topo Map

2012



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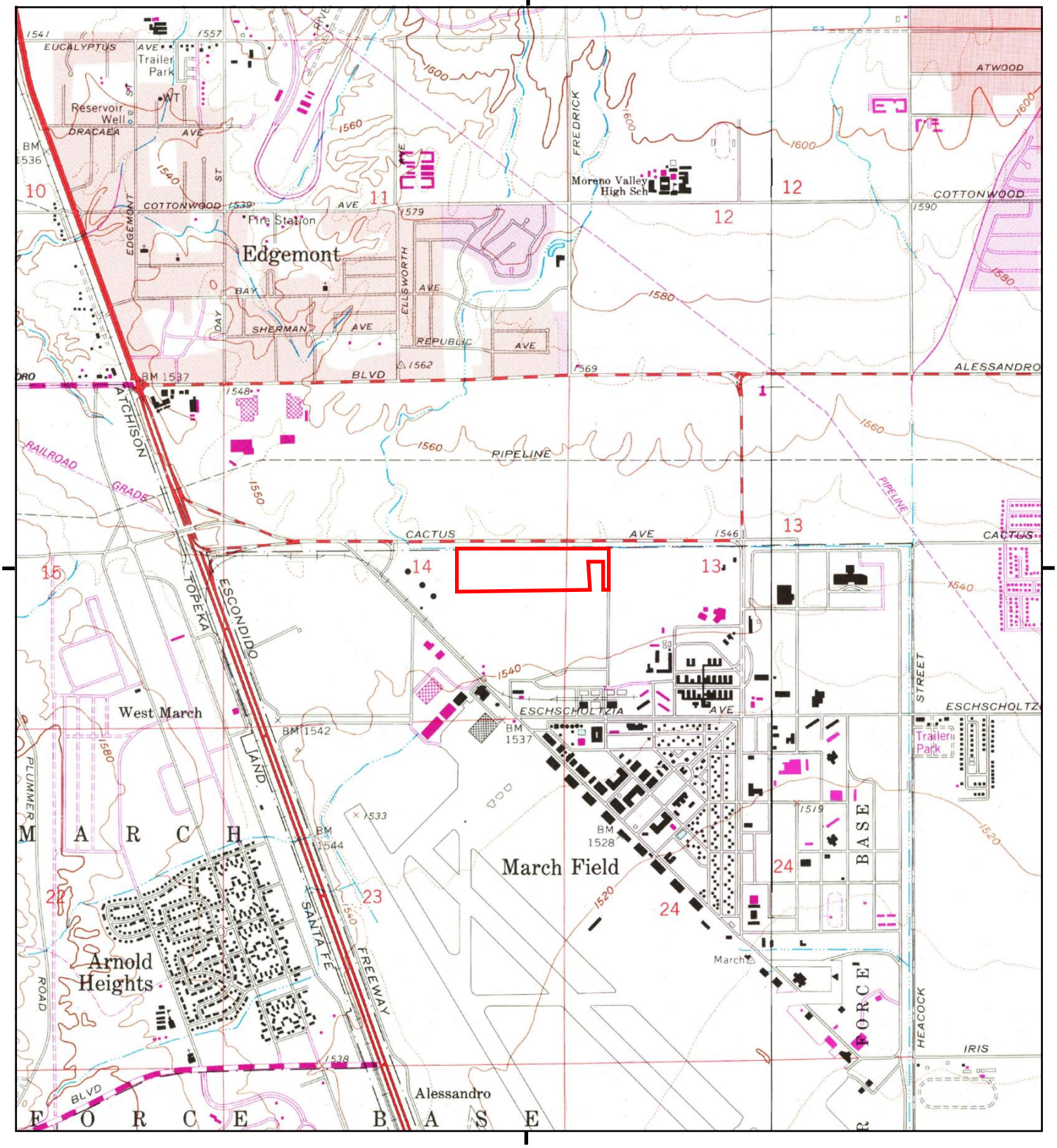
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside East, 2012, 7.5-minute
NE, Sunnymead, 2012, 7.5-minute

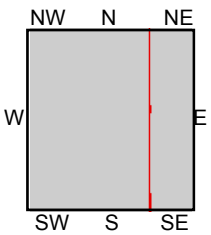
SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N



This report includes information from the following map sheet(s).

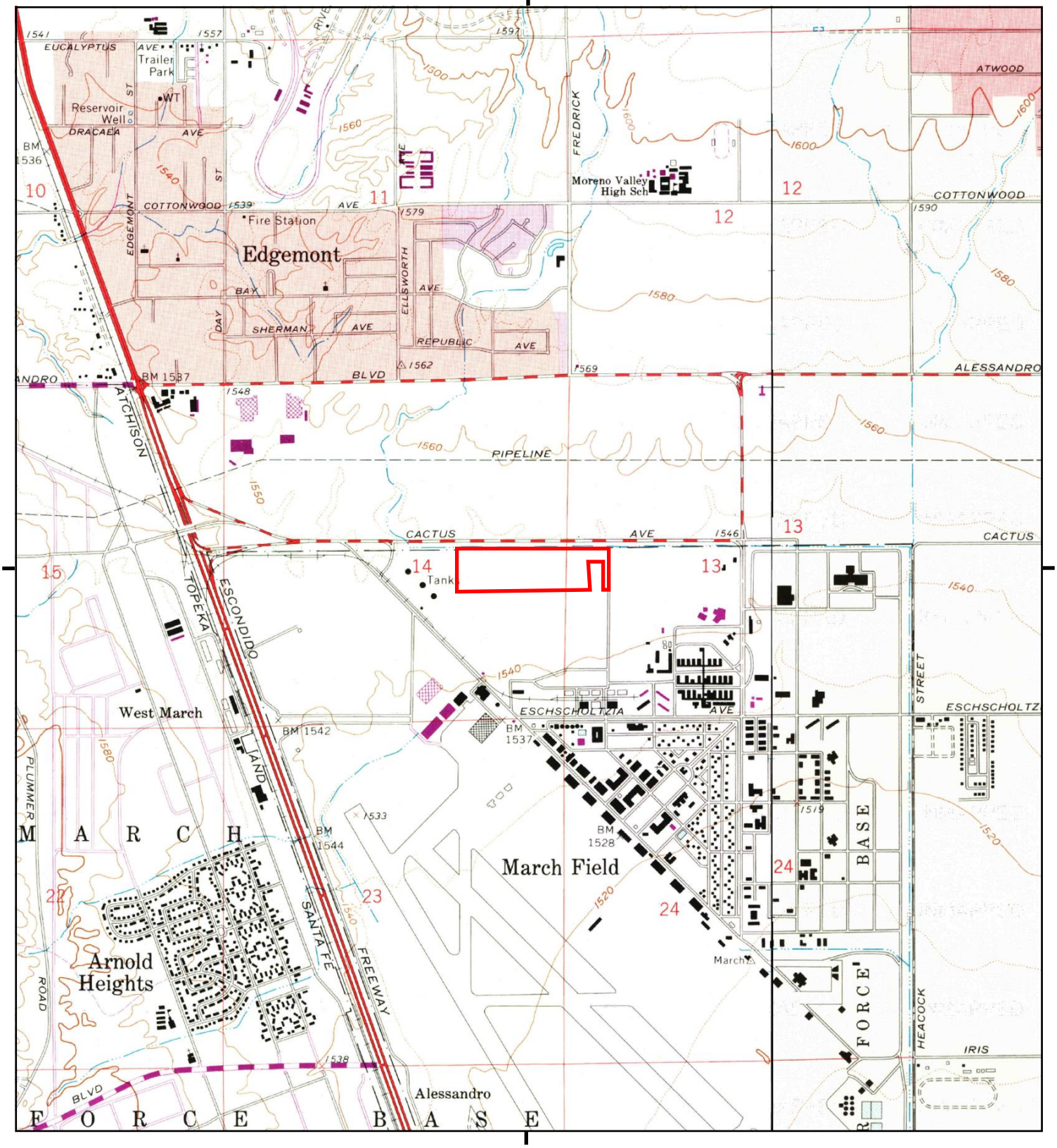
0 Miles 0.25 0.5 1 1.5



TP, Riverside East, 1980, 7.5-minute
NE, Sunnymead, 1980, 7.5-minute

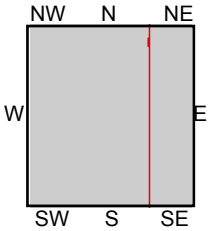
SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



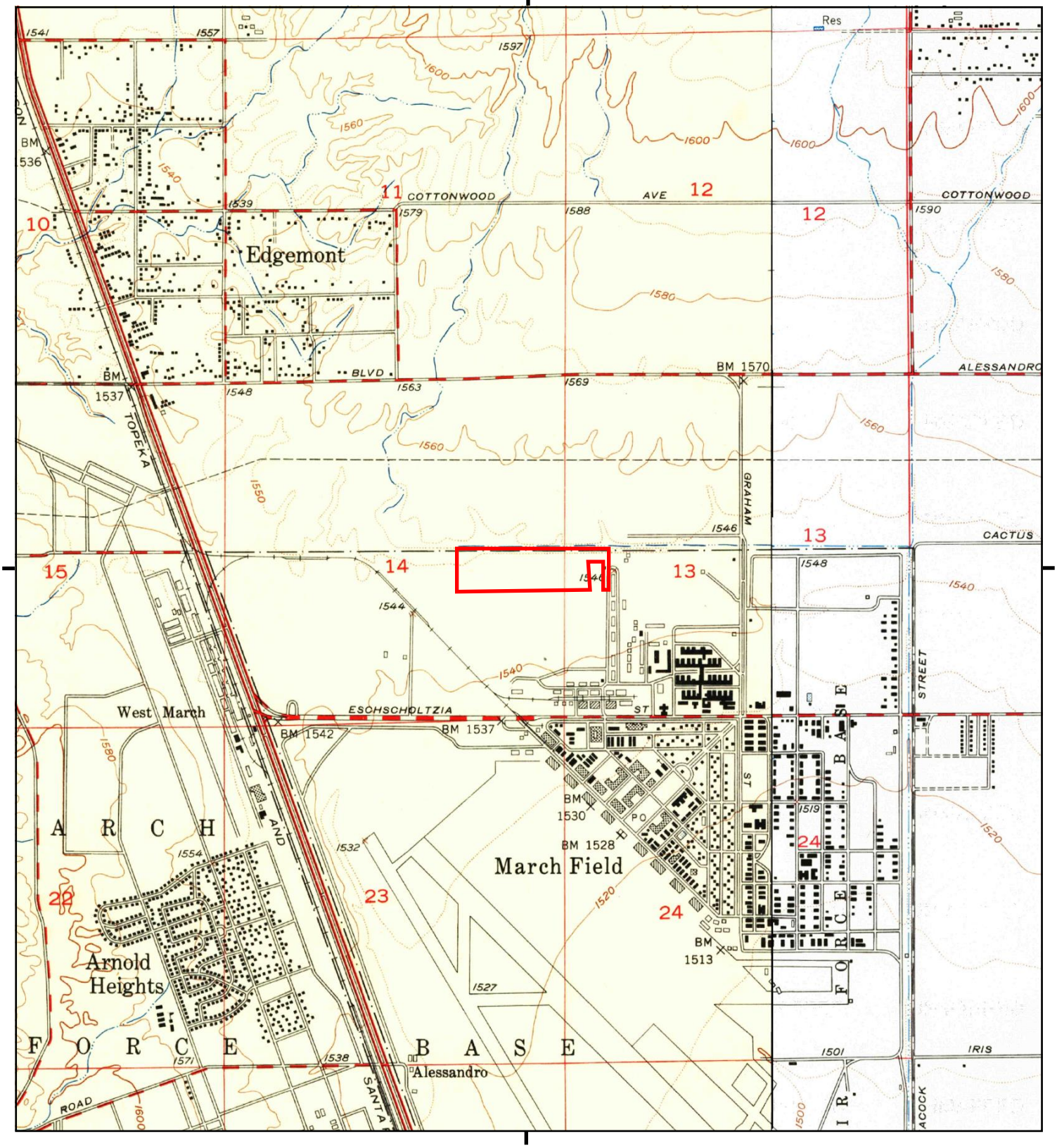
TP, Riverside East, 1967, 7.5-minute
NE, Sunnymead, 1967, 7.5-minute

SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N

Historical Topo Map

1953



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

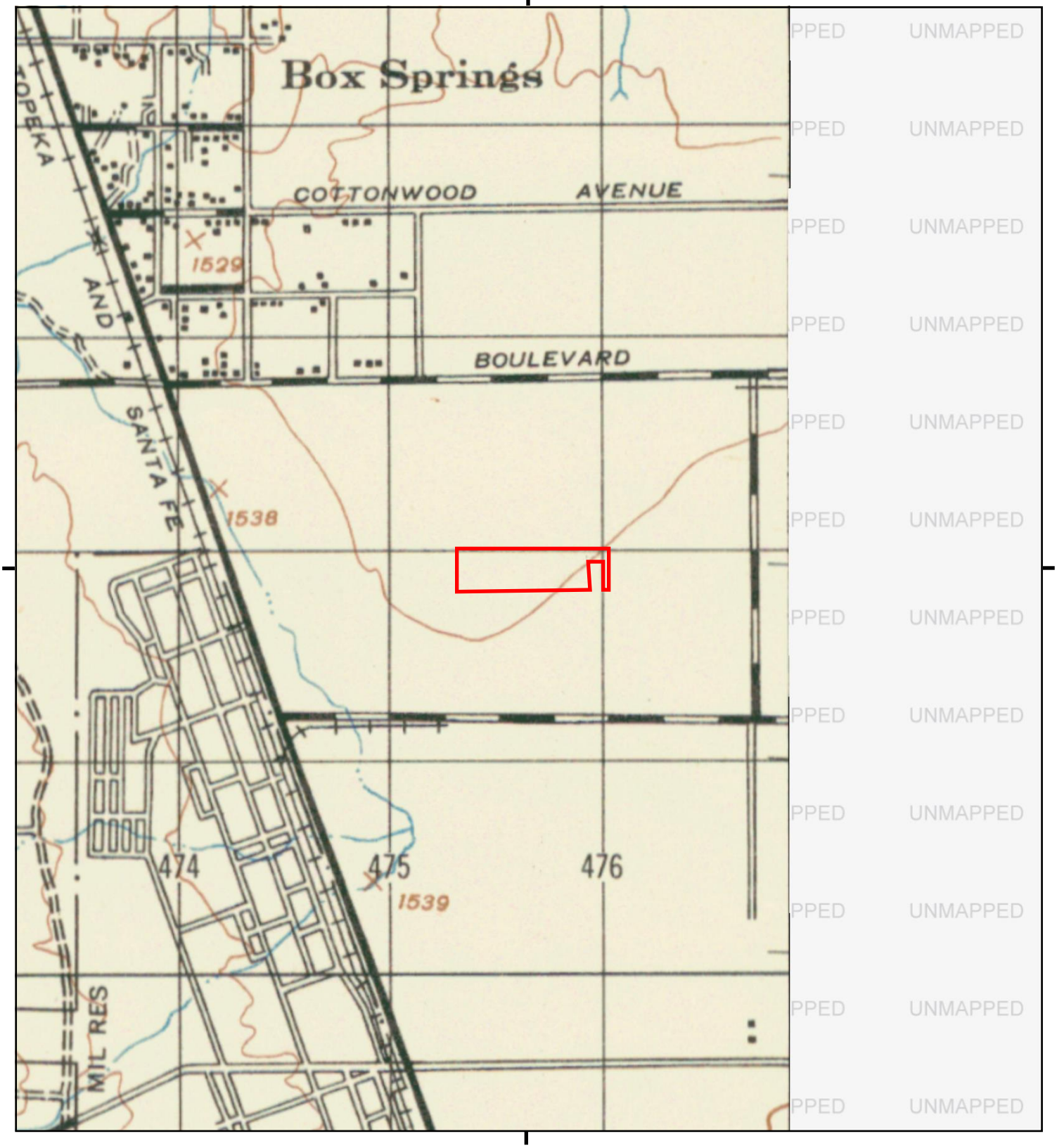
TP, Riverside East, 1953, 7.5-minute
NE, Sunnymead, 1953, 7.5-minute

SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N

Historical Topo Map

1947



This report includes information from the following map sheet(s).

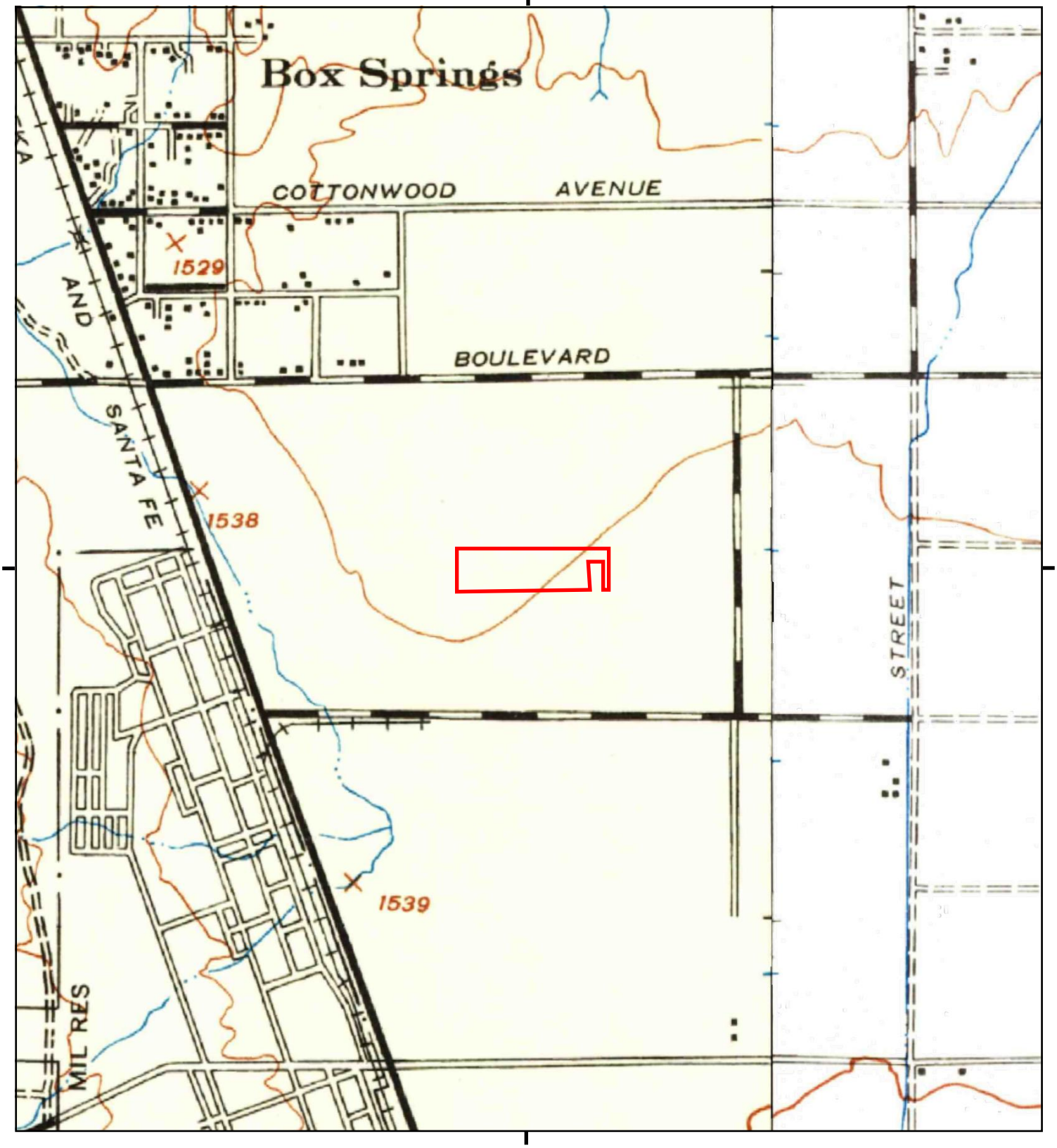
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, RIVERSIDE, 1947, 15-minute

SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N



This report includes information from the following map sheet(s).

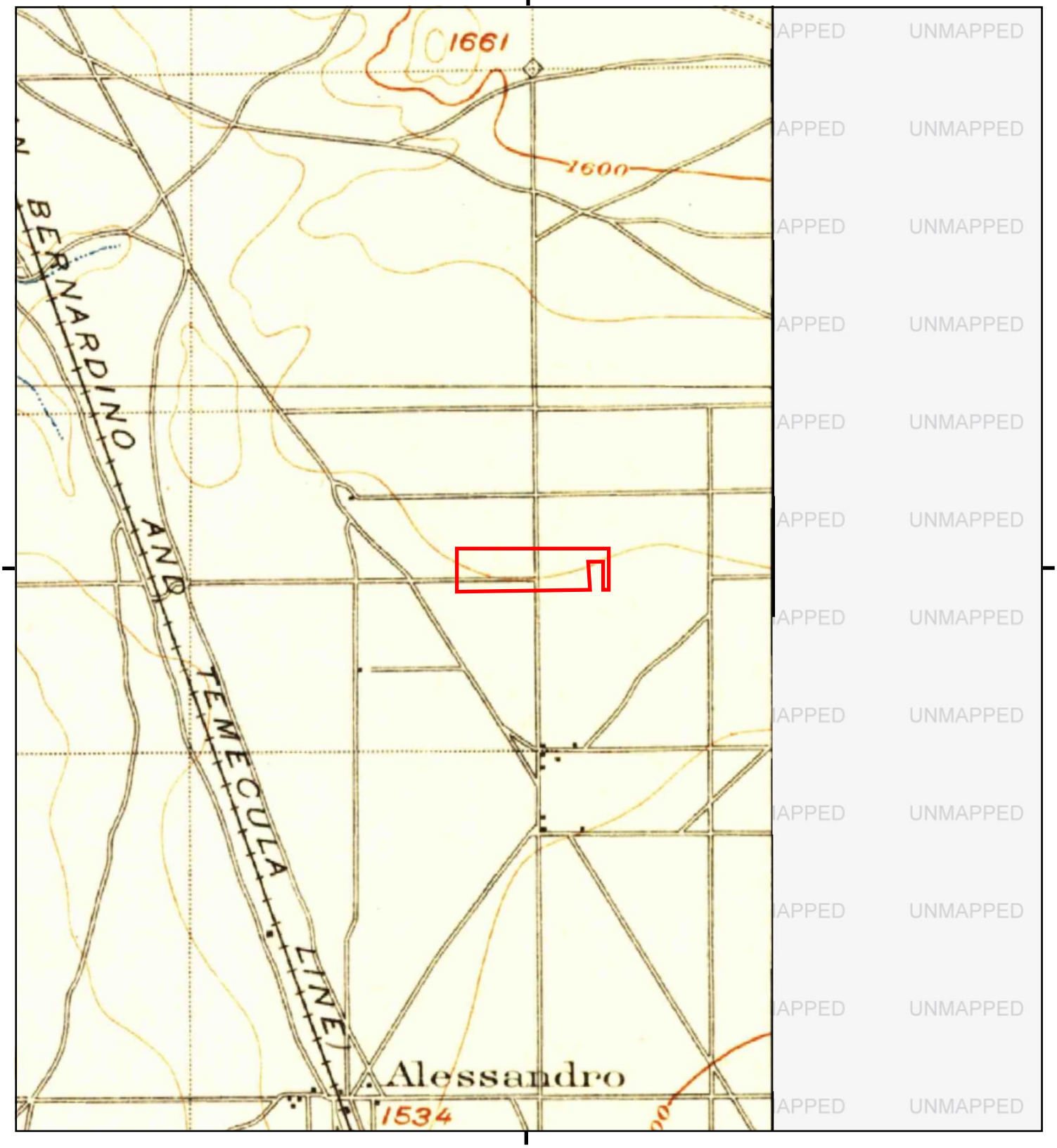
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside, 1942, 15-minute
E, Perris, 1942, 15-minute

SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside, 1901, 15-minute

SITE NAME: March Air Reserve Base
ADDRESS: Cactus Avenue Between Veterns Way an
March Air Reserve Ba, CA 92518
CLIENT: Leighton Consulting

N

March Air Reserve Base

Cactus Avenue Between Veterns Way and Frederick St

March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.3

April 05, 2018

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.23
April 06, 2018

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2011	☑	☐	Haines Criss-Cross Directory
2005	☑	☐	Haines Criss-Cross Directory
2000	☑	☐	Haines Criss-Cross Directory
1995	☑	☐	Haines Criss-Cross Directory
1990	☑	☐	Haines Criss-Cross Directory
1985	☑	☐	Haines Criss-Cross Directory
1980	☑	☐	Haines Criss-Cross Directory
1975	☑	☐	Haines Criss-Cross Directory

FINDINGS

TARGET PROPERTY STREET

Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Year	*CD Image*	*Source*	
CACTUS AVE			
2011	pg A1	Haines Criss-Cross Directory	
2005	pg A4	Haines Criss-Cross Directory	
2000	pg A7	Haines Criss-Cross Directory	
1995	pg A9	Haines Criss-Cross Directory	
1990	pg A11	Haines Criss-Cross Directory	
1985	pg A13	Haines Criss-Cross Directory	
1980	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source
1975	-	Haines Criss-Cross Directory	Target and Adjoining not listed in Source
FREDERICK ST			
2011	pg A2	Haines Criss-Cross Directory	
2005	pg A5	Haines Criss-Cross Directory	
2005	pg A6	Haines Criss-Cross Directory	
2000	pg A8	Haines Criss-Cross Directory	
1995	pg A10	Haines Criss-Cross Directory	
1990	pg A12	Haines Criss-Cross Directory	
1985	pg A14	Haines Criss-Cross Directory	
1985	pg A15	Haines Criss-Cross Directory	
1980	pg A16	Haines Criss-Cross Directory	
1975	pg A17	Haines Criss-Cross Directory	
VETERANS WAY			
2011	pg A3	Haines Criss-Cross Directory	
2005	-	Haines Criss-Cross Directory	Street not listed in Source
2000	-	Haines Criss-Cross Directory	Street not listed in Source
1995	-	Haines Criss-Cross Directory	Street not listed in Source
1990	-	Haines Criss-Cross Directory	Street not listed in Source
1985	-	Haines Criss-Cross Directory	Street not listed in Source

FINDINGS

Year	***CD Image***	***Source***	
1980	-	Haines Criss-Cross Directory	Street not listed in Source
1975	-	Haines Criss-Cross Directory	Street not listed in Source

FINDINGS

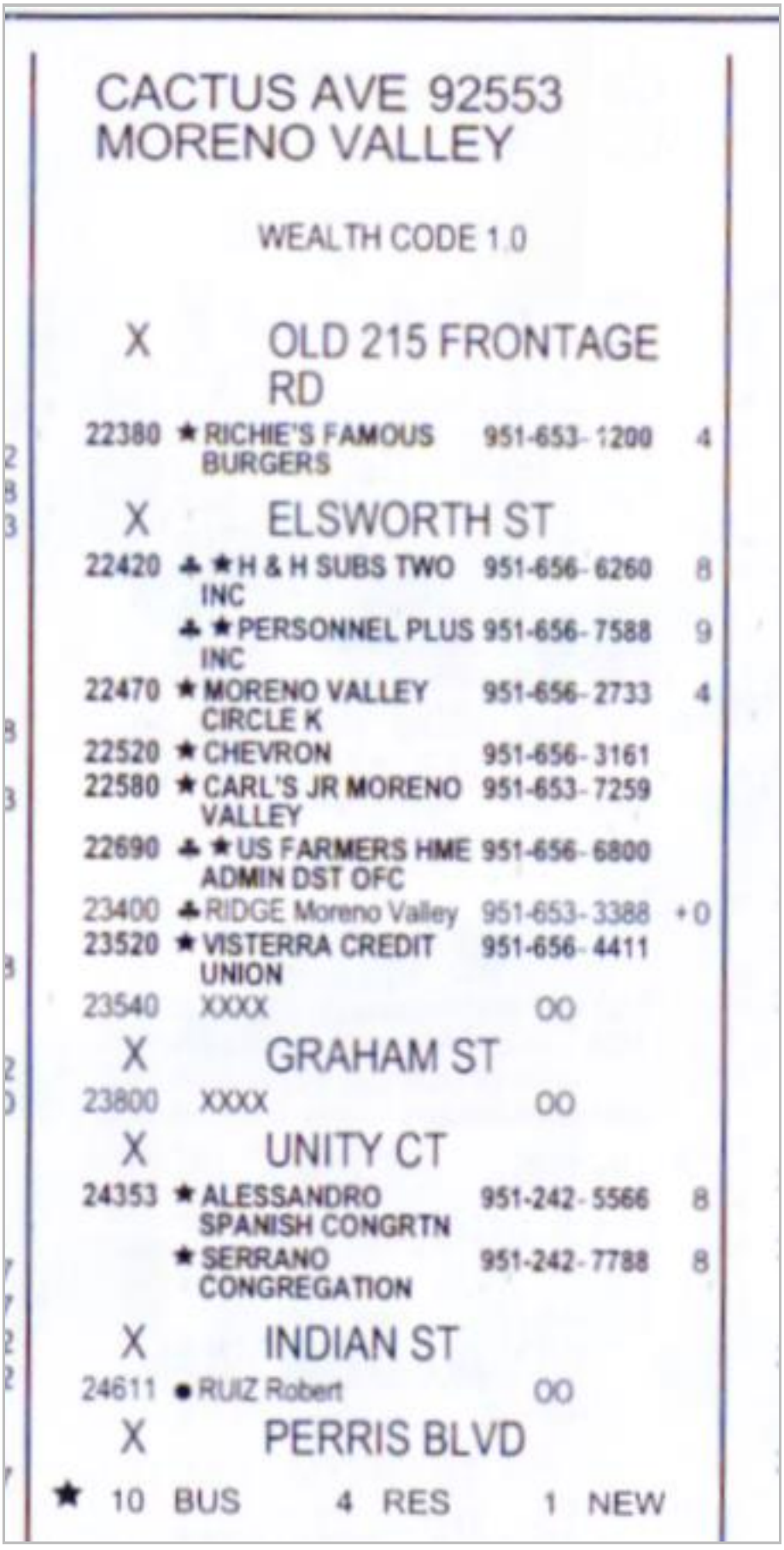
CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 2011



CACTUS AVE 92553
MORENO VALLEY

WEALTH CODE 1.0

X OLD 215 FRONTAGE RD

22380 ★ RICHIE'S FAMOUS BURGERS 951-653-1200 4

X ELSWORTH ST

22420 ★ H & H SUBS TWO INC 951-656-6260 8

★ PERSONNEL PLUS INC 951-656-7588 9

22470 ★ MORENO VALLEY CIRCLE K 951-656-2733 4

22520 ★ CHEVRON 951-656-3161

22580 ★ CARL'S JR MORENO VALLEY 951-653-7259

22690 ★ US FARMERS HME ADMIN DST OFC 951-656-6800

23400 RIDGE Moreno Valley 951-653-3388 +0

23520 ★ VISTERRA CREDIT UNION 951-656-4411

23540 XXXX OO

X GRAHAM ST

23800 XXXX OO

X UNITY CT

24353 ★ ALESSANDRO SPANISH CONGRTN 951-242-5566 8

★ SERRANO CONGREGATION 951-242-7788 8

X INDIAN ST

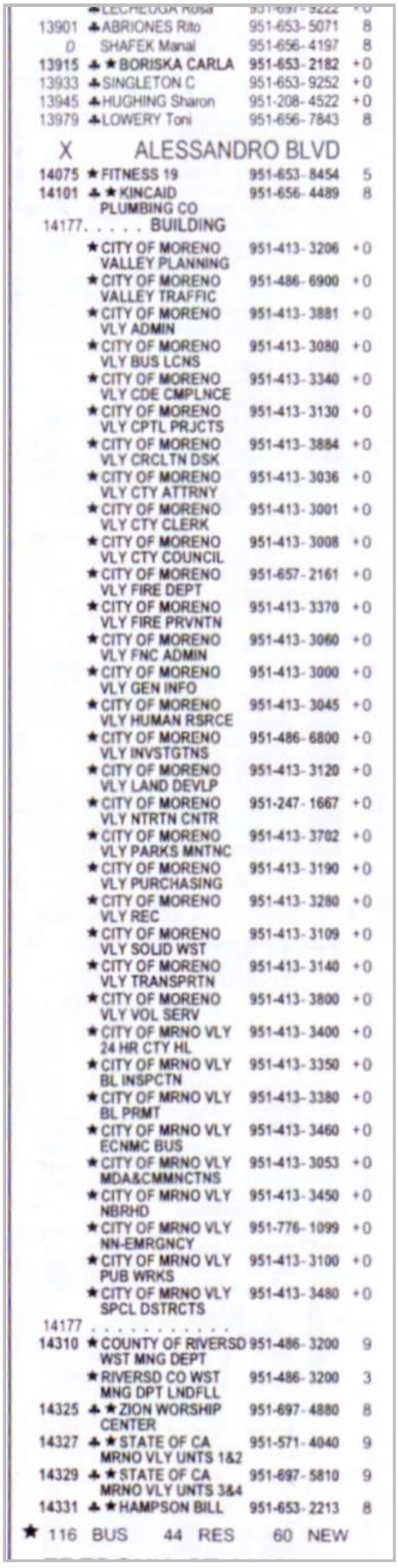
24611 ● RUIZ Robert OO

X PERRIS BLVD

★ 10 BUS 4 RES 1 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

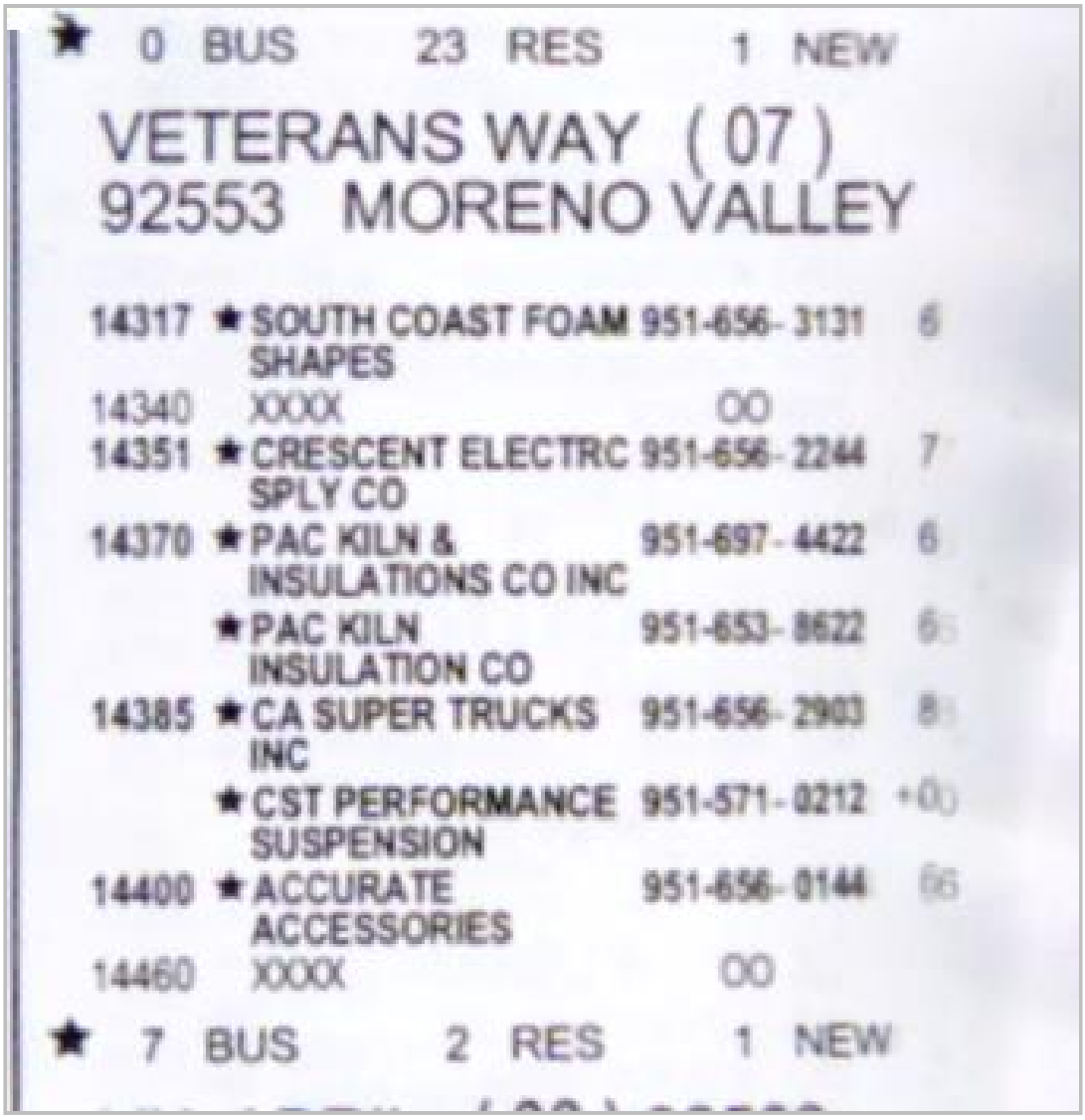
FREDERICK ST 2011



13901	♣ABRIONES Rito	951-653-5071	8
D	SHAFEK Manal	951-656-4197	8
13915	♣ ★BORISKA CARLA	951-653-2182	+0
13933	♣SINGLETON C	951-653-9252	+0
13945	♣HUGHING Sharon	951-208-4522	+0
13979	♣LOWERY Toni	951-656-7843	8
X	ALESSANDRO BLVD		
14075	★FITNESS 19	951-653-8454	5
14101	♣ ★KINCAID PLUMBING CO	951-656-4489	8
14177.	BUILDING		
	★CITY OF MORENO VALLEY PLANNING	951-413-3206	+0
	★CITY OF MORENO VALLEY TRAFFIC	951-486-6900	+0
	★CITY OF MORENO VLY ADMIN	951-413-3881	+0
	★CITY OF MORENO VLY BUS LCNS	951-413-3080	+0
	★CITY OF MORENO VLY CDE CMPLNCE	951-413-3340	+0
	★CITY OF MORENO VLY CPTL PRJCTS	951-413-3130	+0
	★CITY OF MORENO VLY CRCLTN DSK	951-413-3884	+0
	★CITY OF MORENO VLY CTY ATTRNY	951-413-3036	+0
	★CITY OF MORENO VLY CTY CLERK	951-413-3001	+0
	★CITY OF MORENO VLY CTY COUNCIL	951-413-3008	+0
	★CITY OF MORENO VLY FIRE DEPT	951-657-2161	+0
	★CITY OF MORENO VLY FIRE PRVNTN	951-413-3370	+0
	★CITY OF MORENO VLY FNC ADMIN	951-413-3060	+0
	★CITY OF MORENO VLY GEN INFO	951-413-3000	+0
	★CITY OF MORENO VLY HUMAN RSRCE	951-413-3045	+0
	★CITY OF MORENO VLY INVSTGTNS	951-486-6800	+0
	★CITY OF MORENO VLY LAND DEVLP	951-413-3120	+0
	★CITY OF MORENO VLY NTRTN CNTR	951-247-1667	+0
	★CITY OF MORENO VLY PARKS MNTNC	951-413-3702	+0
	★CITY OF MORENO VLY PURCHASING	951-413-3190	+0
	★CITY OF MORENO VLY REC	951-413-3280	+0
	★CITY OF MORENO VLY SOLID WST	951-413-3109	+0
	★CITY OF MORENO VLY TRANSPRTN	951-413-3140	+0
	★CITY OF MORENO VLY VOL SERV	951-413-3800	+0
	★CITY OF MRNO VLY 24 HR CTY HL	951-413-3400	+0
	★CITY OF MRNO VLY BL INSPCTN	951-413-3350	+0
	★CITY OF MRNO VLY BL PRMT	951-413-3380	+0
	★CITY OF MRNO VLY ECNMC BUS	951-413-3460	+0
	★CITY OF MRNO VLY MDA&CMMNCTNS	951-413-3053	+0
	★CITY OF MRNO VLY NBRHD	951-413-3450	+0
	★CITY OF MRNO VLY NN-EMRGNCY	951-776-1099	+0
	★CITY OF MRNO VLY PUB WRKS	951-413-3100	+0
	★CITY OF MRNO VLY SPCL DSTRCTS	951-413-3480	+0
14177			
14310	★COUNTY OF RIVERSD WST MNG DEPT	951-486-3200	9
	★RIVERSD CO WST MNG DPT LNDFLL	951-486-3200	3
14325	♣ ★ZION WORSHIP CENTER	951-697-4880	8
14327	♣ ★STATE OF CA MRNO VLY UNTS 1&2	951-571-4040	9
14329	♣ ★STATE OF CA MRNO VLY UNTS 3&4	951-697-5810	9
14331	♣ ★HAMPSON BILL	951-653-2213	8
★ 116	BUS 44 RES 60 NEW		

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

VETERANS WAY 2011



★ 0 BUS 23 RES 1 NEW

VETERANS WAY (07)
92553 MORENO VALLEY

14317	★	SOUTH COAST FOAM SHAPES	951-656-3131	6
14340		XXXX	OO	
14351	★	CRESCENT ELECTRC SPLY CO	951-656-2244	7
14370	★	PAC KILN & INSULATIONS CO INC	951-697-4422	6
	★	PAC KILN INSULATION CO	951-653-8622	6
14385	★	CA SUPER TRUCKS INC	951-656-2903	8
	★	CST PERFORMANCE SUSPENSION	951-571-0212	+0
14400	★	ACCURATE ACCESSORIES	951-656-0144	6
14460		XXXX	OO	

★ 7 BUS 2 RES 1 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 2005



CACTUS AVE 92553
MORENO VALLEY

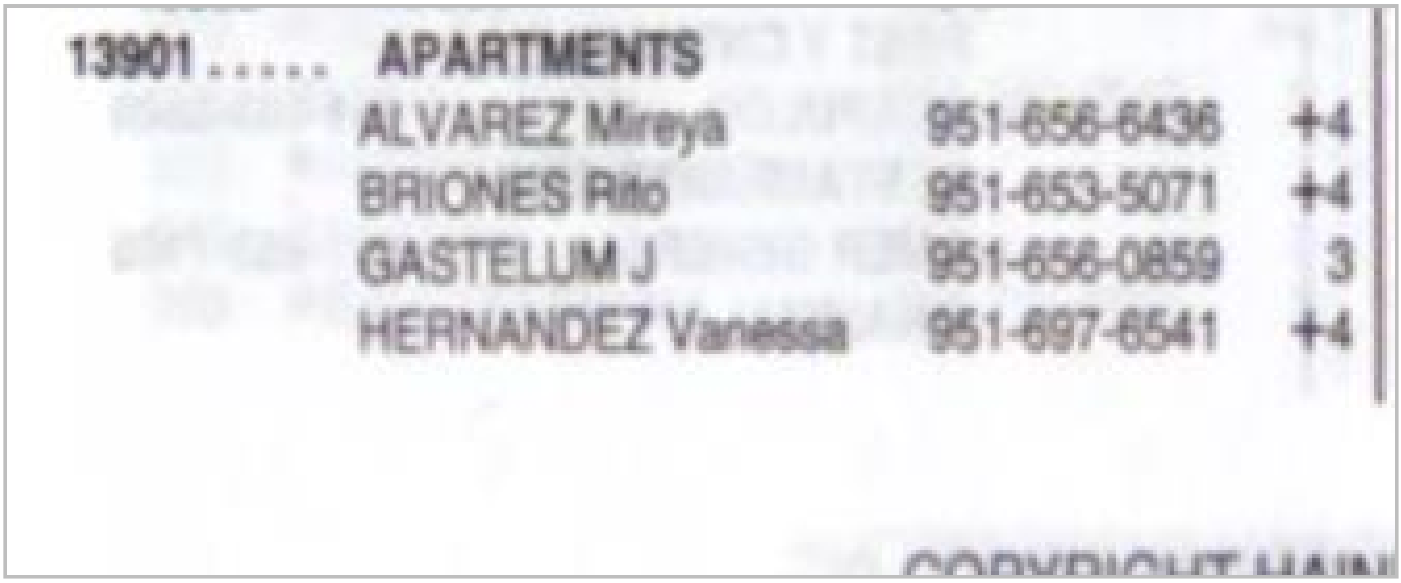
WEALTH CODE 2.7

22380	XXXX	OO	
22470	XXXX	OO	
22520	★ CHEVRON USA NO 1480	951-656-3161	
22580	★ CARL'S JR RESTAURANT	951-653-7259	
22690	★ KEITH COMPANIES THE	951-653-0118	+4
	★ KEITH COMPANIES THE	951-697-8300	
	★ THE KEITH COMPANIES	951-656-2497	+4
	★ US FARMERS HOME ADMIN DIST OFC	951-656-6800	7
	★ US RURAL DEVELOPMENT	951-656-6800	3
X	NEWHOPE ST		
X	GRAHAM ST		
23520	★ MARCH COMMUNITY CREDIT UNION	951-656-4412	+4
	★ MARCH COMMUNITY CREDIT UNION	951-656-4411	
X	PERHAM DR		
X	JOSHUA TREE AVE		
X	INDIAN ST		
24581	XXXX	OO	
X	SAYAN PL		
24611	●RUIZ Robert	OO ⊕	0
X	VICTOR DR		
X	PHILO ST		
24881	XXXX	OO	
24885	XXXX	OO	
24893	XXXX	OO	
24905	XXXX	OO	
24907	WASHINGTON Alice	951-243-0987	+4
24919	XXXX	OO	
24939	CAPERON C	951-486-9273	+4
24941	OROZCO Jose Luis	951-485-4874	1
X	N PERRIS BLVD		

★ 9 BUS 12 RES 5 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 2005

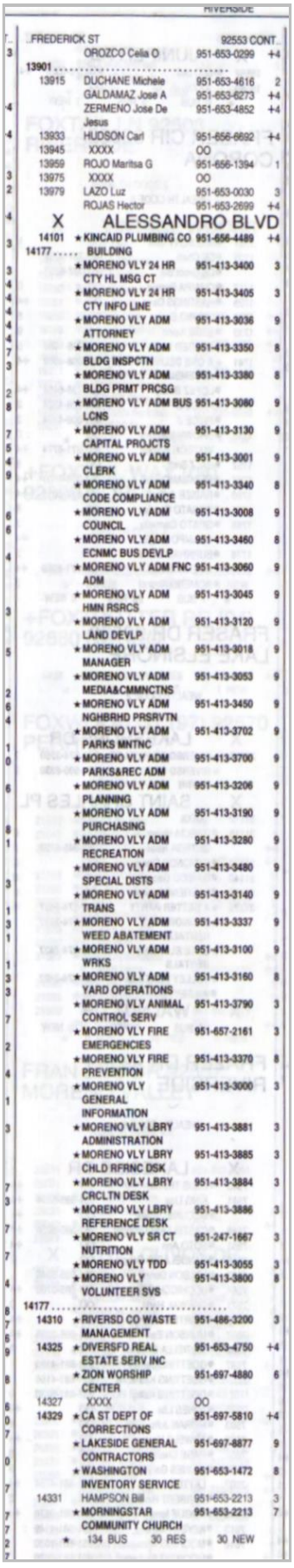


13901 ..... APARTMENTS

ALVAREZ Mireya	951-656-6436	+4
BRIONES Rito	951-653-5071	+4
GASTELUM J	951-656-0859	3
HERNANDEZ Vanessa	951-697-6541	+4

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 2005



RIVERSIDE

FREDERICK ST 92553 CONT

OROZCO Celia O 951-653-0299 +4

13901

13915 DUCHANE Michele 951-653-4616 2
GALDAMAZ Jose A 951-653-6273 +4
ZERMENO Jose De Jesus 951-653-4852 +4
13933 HUDSON Carl 951-656-6892 +4
13945 XXXX OO
13959 ROJO Maritsa G 951-656-1394 1
13975 XXXX OO
13979 LAZO Luz 951-653-0030 3
ROJAS Hector 951-653-2699 +4

X ALESSANDRO BLVD

14101 ★ KINCAID PLUMBING CO 951-656-4489 +4

14177 BUILDING

★ MORENO VLY 24 HR CTY HL MSG CT 951-413-3400 3
★ MORENO VLY 24 HR CTY INFO LINE 951-413-3405 3
★ MORENO VLY ADM ATTORNEY 951-413-3036 9
★ MORENO VLY ADM BLDG INSPCTN 951-413-3350 8
★ MORENO VLY ADM BLDG PRMT PRCSG 951-413-3380 8
★ MORENO VLY ADM BUS LCNS 951-413-3080 9
★ MORENO VLY ADM CAPITAL PROJCTS 951-413-3130 9
★ MORENO VLY ADM CLERK 951-413-3001 9
★ MORENO VLY ADM CODE COMPLIANCE 951-413-3340 8
★ MORENO VLY ADM COUNCIL 951-413-3008 9
★ MORENO VLY ADM ECNMC BUS DEVLP 951-413-3460 8
★ MORENO VLY ADM FNC ADM 951-413-3060 9
★ MORENO VLY ADM HMN RSRCS 951-413-3045 9
★ MORENO VLY ADM LAND DEVLP 951-413-3120 9
★ MORENO VLY ADM MANAGER 951-413-3018 9
★ MORENO VLY ADM MEDIA&CMMNCTNS 951-413-3053 9
★ MORENO VLY ADM NGHBRHD PRSRVTN 951-413-3450 9
★ MORENO VLY ADM PARKS MNTNC 951-413-3702 9
★ MORENO VLY ADM PARKS&REC ADM 951-413-3700 9
★ MORENO VLY ADM PLANNING 951-413-3206 9
★ MORENO VLY ADM PURCHASING 951-413-3190 9
★ MORENO VLY ADM RECREATION 951-413-3280 9
★ MORENO VLY ADM SPECIAL DISTS 951-413-3480 9
★ MORENO VLY ADM TRANS 951-413-3140 9
★ MORENO VLY ADM WEED ABATEMENT 951-413-3337 9
★ MORENO VLY ADM WRKS 951-413-3100 9
★ MORENO VLY ADM YARD OPERATIONS 951-413-3160 8
★ MORENO VLY ANIMAL CONTROL SERV 951-413-3790 3
★ MORENO VLY FIRE EMERGENCIES 951-657-2161 3
★ MORENO VLY FIRE PREVENTION 951-413-3370 8
★ MORENO VLY GENERAL INFORMATION 951-413-3000 3
★ MORENO VLY LBRY ADMINISTRATION 951-413-3881 3
★ MORENO VLY LBRY CHLD RFRNC DSK 951-413-3885 3
★ MORENO VLY LBRY CRCLTN DESK 951-413-3884 3
★ MORENO VLY LBRY REFERENCE DESK 951-413-3886 3
★ MORENO VLY SR CT NUTRITION 951-247-1667 3
★ MORENO VLY TDD 951-413-3055 3
★ MORENO VLY VOLUNTEER SVS 951-413-3800 8

14177

14310 ★ RIVERSD CO WASTE MANAGEMENT 951-486-3200 3
14325 ★ DIVERSFD REAL ESTATE SERV INC 951-653-4750 +4
★ ZION WORSHIP CENTER 951-697-4880 6
14327 XXXX OO
14329 ★ CA ST DEPT OF CORRECTIONS 951-697-5810 +4
★ LAKESIDE GENERAL CONTRACTORS 951-697-8877 9
★ WASHINGTON INVENTORY SERVICE 951-653-1472 8
14331 HAMPSON Bill 951-653-2213 3
★ MORNINGSTAR COMMUNITY CHURCH 951-653-2213 7

★ 134 BUS 30 RES 30 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 2000



CACTUS AV 92553
MORENO VALLEY

WEALTH CODE 3.6

22380	* BURGER KING	909-656-4225	7
22470	* TEXACO	909-656-1454	8
22520	* CHEVRON USA NO 1480	909-656-3161	3
22580	* CARLS JR RESTAURANT	909-653-7259	3
22690	* INTERVENTIONS	909-656-3806	6
	* KEITH COMPANIES THE	909-653-0234	3
	* TECHNICARE	909-697-7757	7
	* US FARMERS HOME ADMINISTRATION	909-656-6800	7
	* US TRANS MOTR CARRIER SFTY OFC	909-653-2299	3
23520	* MARCH COMMUNITY CREDIT UNION	909-656-4411	2

X INDIAN AV

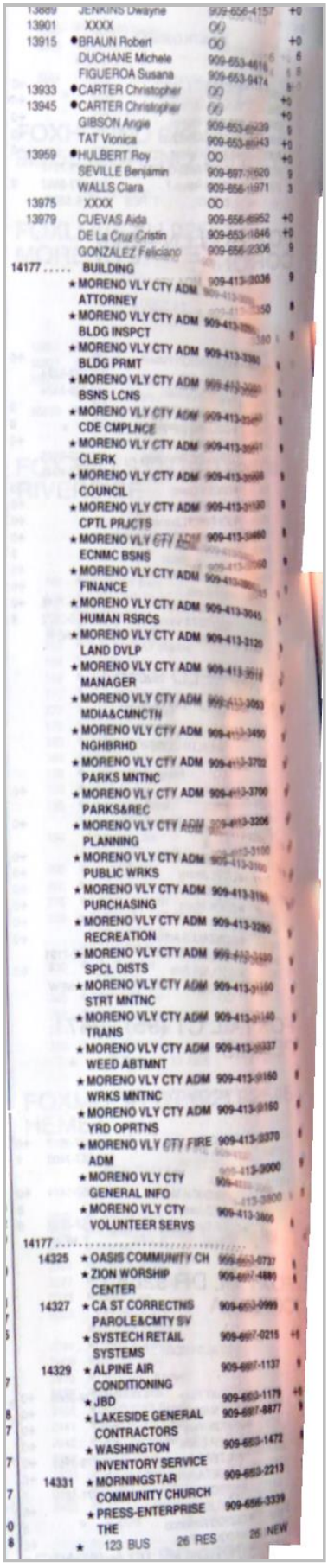
24581	XXXX	OO	

X SAYAN PL

24611	●RUIZ Robert	OO	+0
24881	●FULLER Ken	OO	+0
24885	XXXX	OO	
24893	XXXX	OO	
24905	●FULLER Ken	OO	+0
24919	MCKENVIE James	909-601-1186	+0
24939	●SHAMOLIAN Homayoon	OO	+0
24941	TORRES D	909-243-5397	+0

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 2000



13901 XXXX OO
13915 ●BRAUN Robert OO +0
DUCHANE Michele 909-653-4616 6
FIGUEROA Susana 909-653-9474 8
13933 ●CARTER Christopher OO
13945 ●CARTER Christopher OO +0
GIBSON Angie 909-653-6939 +0
TAT Vionica 909-653-8943 9
13959 ●HULBERT Roy OO +0
SEVILLE Benjamin 909-697-1520 +0
WALLS Clara 909-656-1971 9
13975 XXXX OO 3
13979 CUEVAS Aida 909-656-6952 +0
DE La Cruz Cristin 909-653-1846 +0
GONZALEZ Feliciano 909-656-2306 9

14177 ..... BUILDING
★ MORENO VLY CTY ADM ATTORNEY 909-413-3036 9
★ MORENO VLY CTY ADM BLDG INSPCT 909-413-3350 8
★ MORENO VLY CTY ADM BLDG PRMT 909-413-3380
★ MORENO VLY CTY ADM BSNS LCNS
★ MORENO VLY CTY ADM CDE CMPLNCE
★ MORENO VLY CTY ADM CLERK
★ MORENO VLY CTY ADM COUNCIL
★ MORENO VLY CTY ADM CPTL PRJCTS
★ MORENO VLY CTY ADM ECNMC BSNS 909-413-3460
★ MORENO VLY CTY ADM FINANCE
★ MORENO VLY CTY ADM HUMAN RSRCS 909-413-3045
★ MORENO VLY CTY ADM LAND DVLP 909-413-3120
★ MORENO VLY CTY ADM MANAGER
★ MORENO VLY CTY ADM MDIA&CMNCTN
★ MORENO VLY CTY ADM NGHBRHD 909-413-3450
★ MORENO VLY CTY ADM PARKS MNTNC 909-413-3702
★ MORENO VLY CTY ADM PARKS&REC 909-413-3700
★ MORENO VLY CTY ADM PLANNING 909-413-3206
★ MORENO VLY CTY ADM PUBLIC WRKS
★ MORENO VLY CTY ADM PURCHASING 909-413-3180
★ MORENO VLY CTY ADM RECREATION 909-413-3280
★ MORENO VLY CTY ADM SPCL DISTS
★ MORENO VLY CTY ADM STRT MNTNC 909-413-3160
★ MORENO VLY CTY ADM TRANS 909-413-3140
★ MORENO VLY CTY ADM WEED ABTMNT 909-413-3337
★ MORENO VLY CTY ADM WRKS MNTNC 909-413-3160
★ MORENO VLY CTY ADM YRD OPRTNS 909-413-3160
★ MORENO VLY CTY FIRE ADM 909-413-3370
★ MORENO VLY CTY GENERAL INFO 909-413-3000
★ MORENO VLY CTY VOLUNTEER SERVS 909-413-3800

14177 .....
14325 ★ OASIS COMMUNITY CH 909-653-0737
★ ZION WORSHIP CENTER 909-697-4880
14327 ★ CA ST CORRECTNS PAROLE&CMTY SV 909-653-0999
★ SYSTECH RETAIL SYSTEMS 909-697-0215 +6
14329 ★ ALPINE AIR CONDITIONING 909-697-1137 9
★ JBD 909-653-1179 +0
★ LAKESIDE GENERAL CONTRACTORS 909-697-8877 9
★ WASHINGTON INVENTORY SERVICE 909-653-1472
14331 ★ MORNINGSTAR COMMUNITY CHURCH 909-653-2213
★ PRESS-ENTERPRISE THE 909-656-3339
★ 123 BUS 26 RES 26 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 1995



CACTUS AV 92553
MORENO VALLEY

WEALTH CODE 4.0

22520	*CHEVRON USA NO 1480	656-3161	3
22580	*CARLS JR RESTAURANT	653-7259	3
22690	BUTLER Frank S	656-0299	+5
	*HASSANS	653-2897	+5
	*I D S FINANCIAL SRV	653-0175	3
	*I D S PRPRTY&CASLTY	653-8684	3
	*KEITH COMPANIES THE	653-0234	3
	MCCANDLESS Al	656-1444	+5
	PERKINS Scott	653-8227	+5
	*R W R PASCOE ENGRG	653-9295	3
	*TRANSAMERICA FNCL	656-5115	+5
	*US CONGRESS 44TH	656-1444	+5
	*US TRANS FED HWY	653-2299	3
	*WINCHESTER ASST MNG	653-6982	3
	ZACHARY David	656-3806	+5
23520	*AUTOLAND INC	653-4586	3
	*MARCH FDRL CRDT UN	656-4411	2
24581	XXXX	00	
24881	YOUNGQUIST Robt	485-0713	2
24885	JACKSON Wm	242-8935	2
24893	XXXX	00	
24905	WELLS Brian	247-9515	0
24907	LEMLEY Raymond	924-4726	3
24919	XXXX	00	
24939	COLLINS Cymone	485-8745	2

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

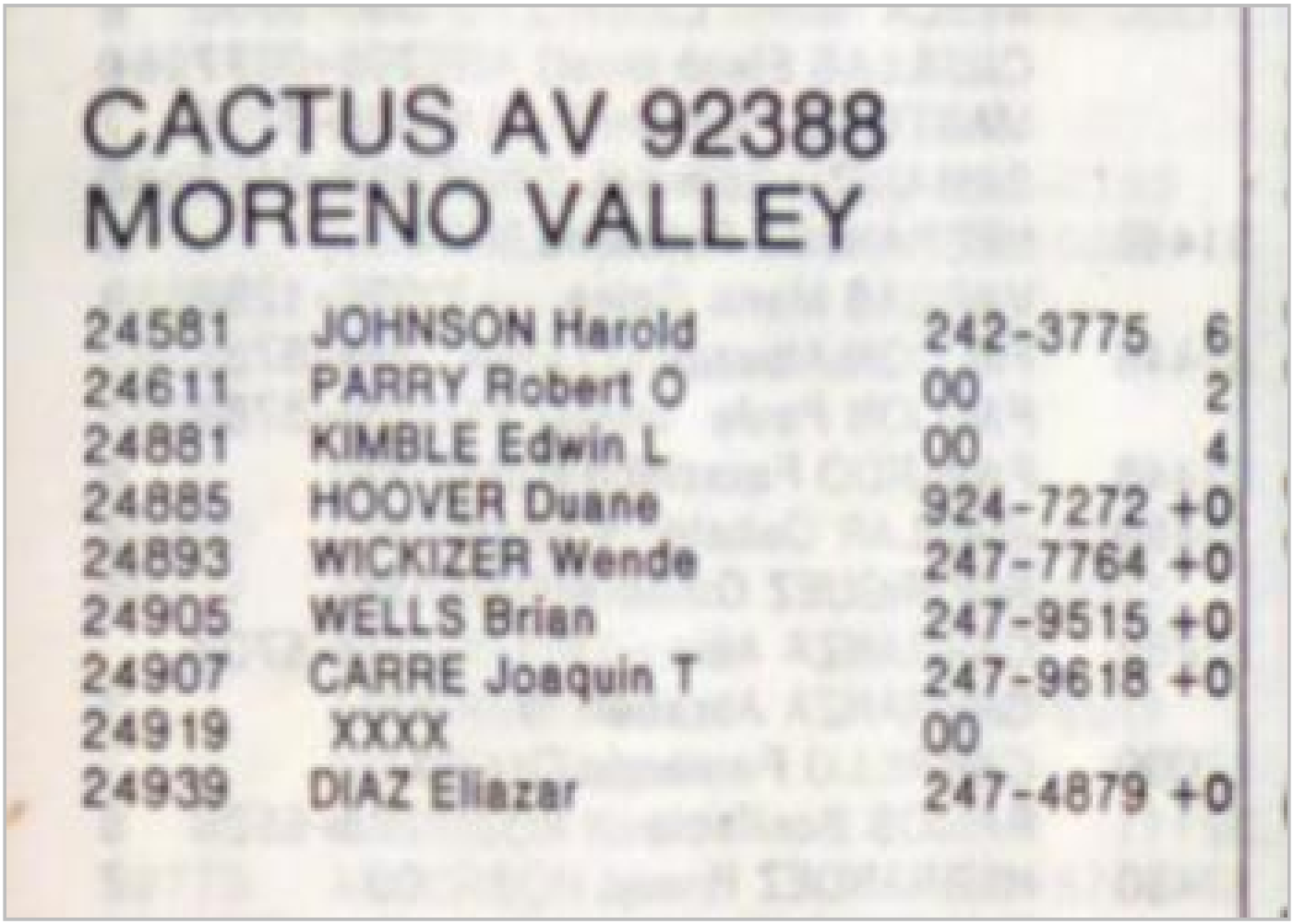
FREDERICK ST 1995



13901	DUCHANE Michele	653-4616	2
	HALL Weston	653-5848	+5
13915	XXXX	00	
13933	KHAMSING Jason	653-8150	+5
13945	MOTA B	653-6703	3
13959	WALLS Clara	656-1971	3
13975	XXXX	00	
13979	BAILEY Marcus	656-1150	+5
14325	*CA ST CORRECTIONS	653-0999	1
14327	*MORENO VLY BLUEPRNT	653-2174	1
	*TUBULAR MOTOR SPRTS	653-0148	+5
14329	*BLUE DIAMOND CONSTR	653-6633	+5
	*VALLEY OFC PRODUCTS	653-2203	1
14331	*FRIENDSHP CHRSTN CH	653-1696	3
	* 67 BUS 19 RES	19 NEW	

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 1990



CACTUS AV 92388
MORENO VALLEY

24581	JOHNSON Harold	242-3775	6
24611	PARRY Robert O	00	2
24881	KIMBLE Edwin L	00	4
24885	HOOVER Duane	924-7272	+0
24893	WICKIZER Wende	247-7764	+0
24905	WELLS Brian	247-9515	+0
24907	CARRE Joaquin T	247-9618	+0
24919	XXXX	00	
24939	DIAZ Eliazar	247-4879	+0

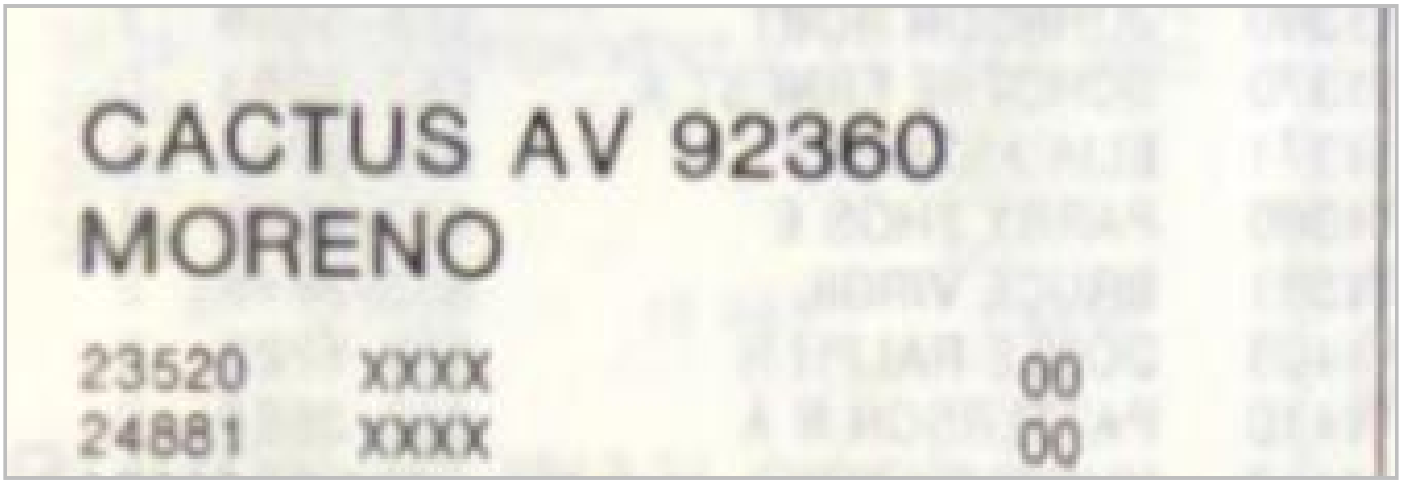
Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 1990

	TROJILLO Margaret	656-1901	+0
13901	ARMSTRONG William H	00	4
	DEJOHNETT Richard	653-8643	5
	JACKSON Clifton L	656-5051	5
	LIMPPO Michele	653-4616	9
	RAY Kelly	656-5318	+0
13915	HERNANDEZ Andy	00	4
	REYES Aracell	656-3047	9
	SCHWARTZ L	656-4932	6
	SNODGRASS Gilbert L	00	+0
13933	PAYNE Tom	653-8285	6
13945	GANBARA Jose	656-5008	9
	HARPER Kenneth	656-5605	7
	HOLLAND Anthony S	653-0691	7
	WHITED John	00	4
13959	XXXX	00	
13979	JONES Lila	653-7320	
	VILLALPANDO M S	00	4
14325	*CRAIG PRINTING CO	653-1001	+0
14327	*CENTENNIAL PROPERTY	653-0848	+0
14329	*ANTI POLLUTN ASBSTS	653-0480	+0
	*BLUE OCEAN CONSTR	653-0196	+0
	*CUSTOME DSGN PATIOS	653-0901	+0
	*JENSEN DENNIS CONTR	653-0284	+0
	*SCOTTS SCREENING SV	247-6003	+0
	*SCOTTS SCREENING SV	653-0766	+0
14331	*COUNTRY CRAFT WRHS	656-6115	+0
	*TRANSMISSION INC	653-0553	+0
	* 32 BUS 46 RES 36 NEW		

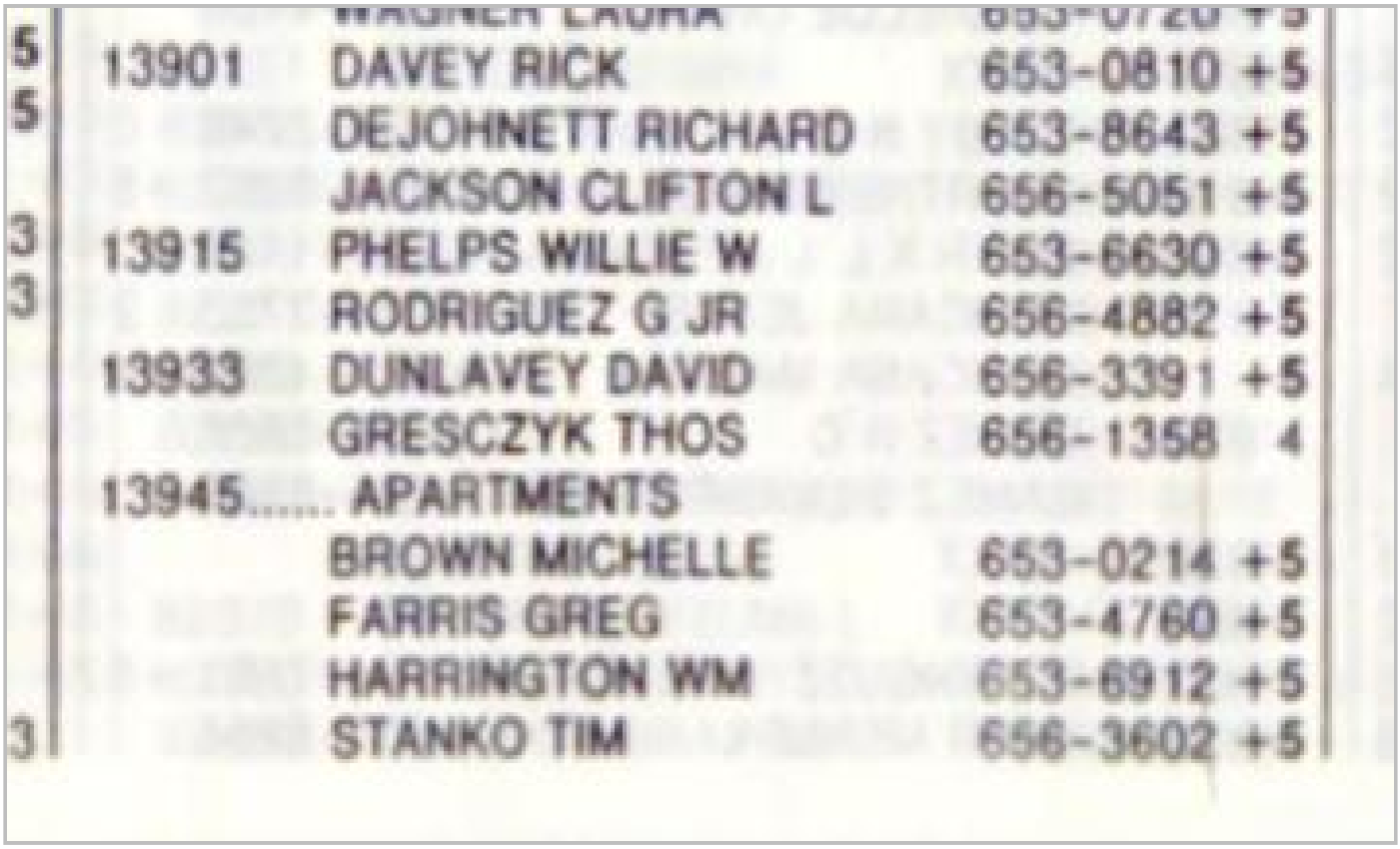
Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

CACTUS AVE 1985



Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

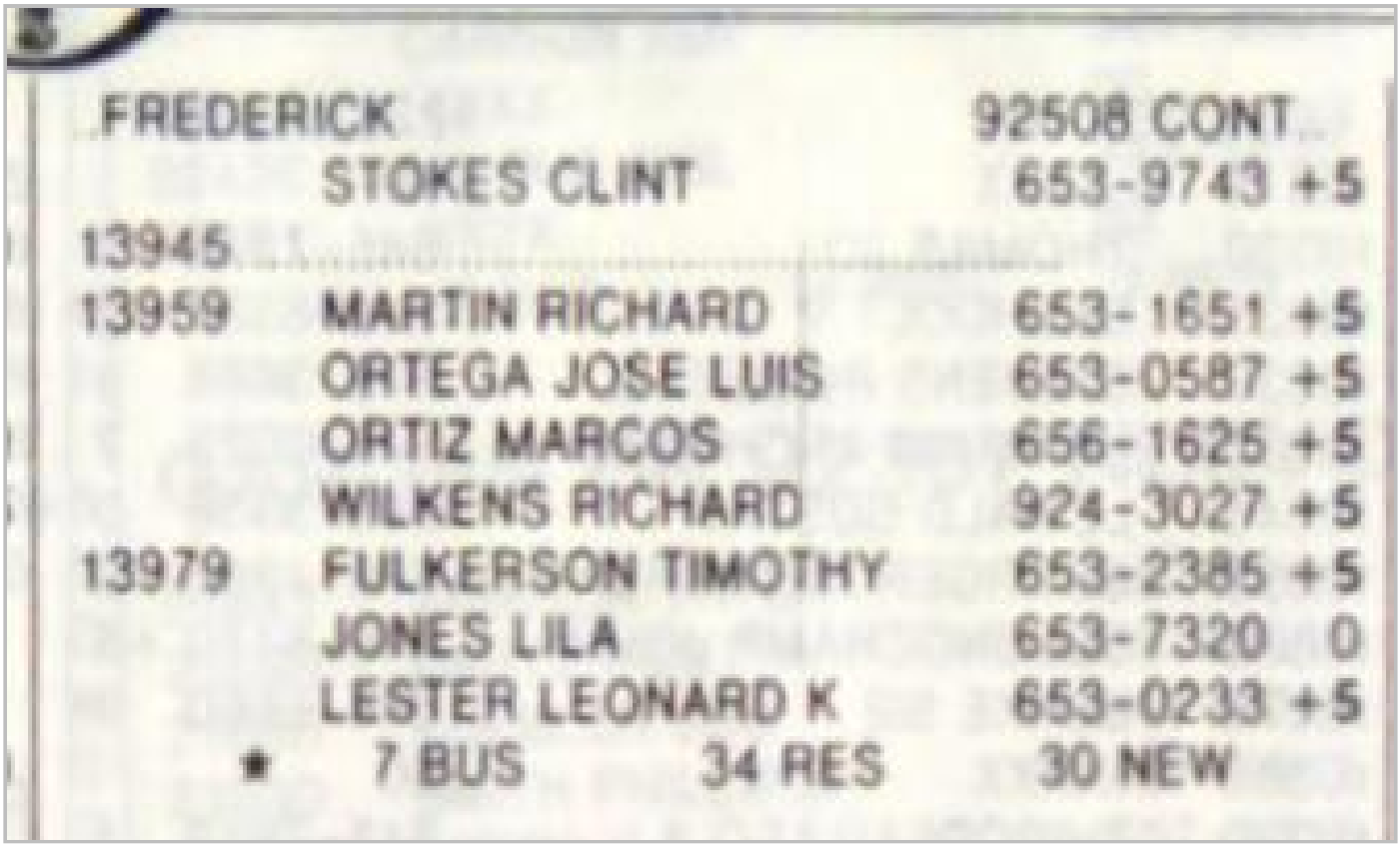
FREDERICK ST 1985



5	13901	DAVEY RICK	653-0810 +5
5		DEJOHNETT RICHARD	653-8643 +5
		JACKSON CLIFTON L	656-5051 +5
3	13915	PHELPS WILLIE W	653-6630 +5
3		RODRIGUEZ G JR	656-4882 +5
	13933	DUNLAVEY DAVID	656-3391 +5
		GRESCZYK THOS	656-1358 4
	13945	APARTMENTS	
		BROWN MICHELLE	653-0214 +5
		FARRIS GREG	653-4760 +5
		HARRINGTON WM	653-6912 +5
3		STANKO TIM	656-3602 +5

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 1985



FREDERICK 92508 CONT

	STOKES CLINT	653-9743 +5
13945		
13959	MARTIN RICHARD	653-1651 +5
	ORTEGA JOSE LUIS	653-0587 +5
	ORTIZ MARCOS	656-1625 +5
	WILKENS RICHARD	924-3027 +5
13979	FULKERSON TIMOTHY	653-2385 +5
	JONES LILA	653-7320 0
	LESTER LEONARD K	653-0233 +5

* 7 BUS 34 RES 30 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

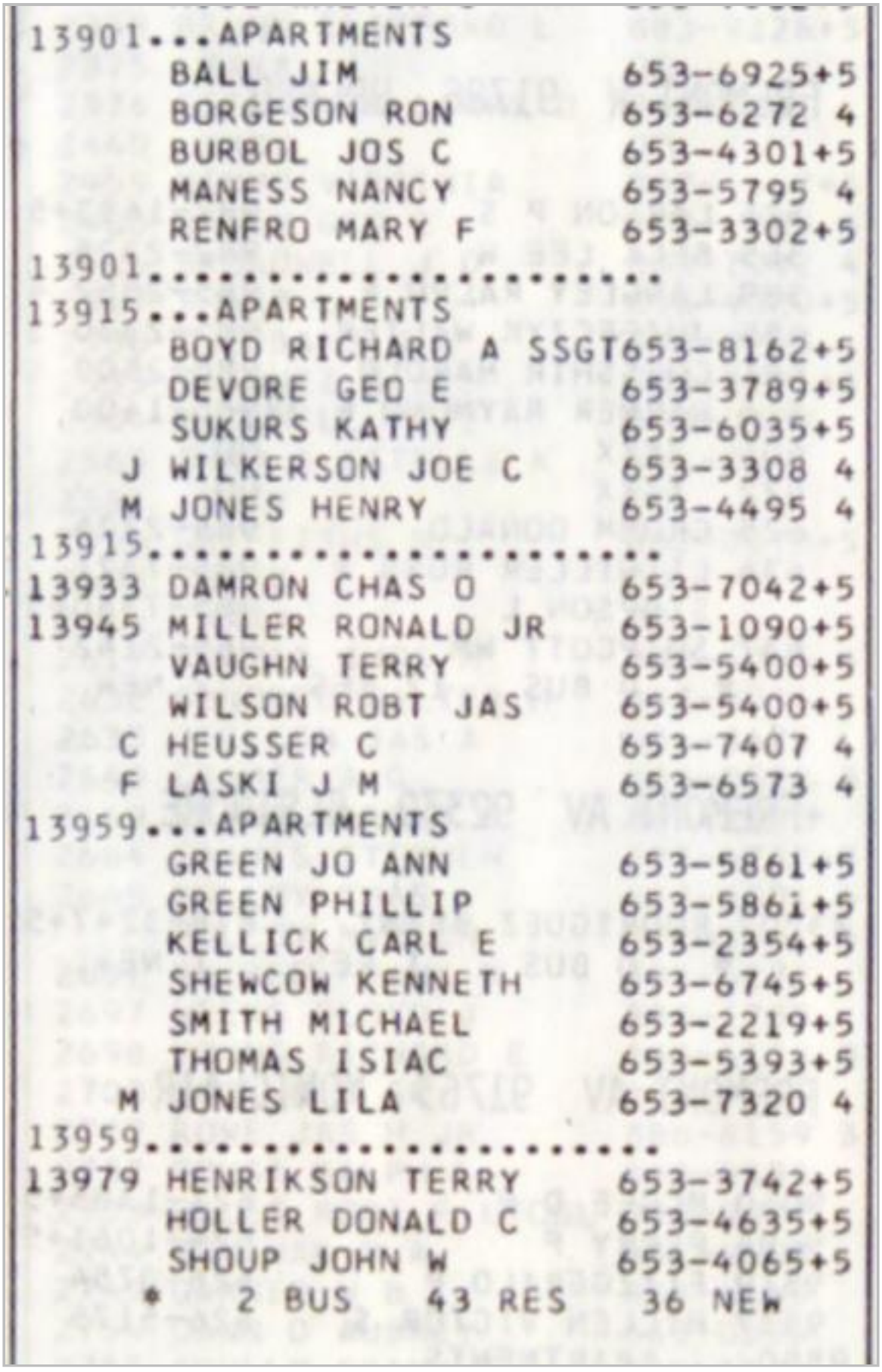
FREDERICK ST 1980

13901	BROWN DANL	653-1580	+0
	JACKSON MICHAEL	653-2415	+0
	MIILER MICHAEL W	653-4033	+0
	MILLER MICHAEL W	653-4033	+0
13915	COURTNEY BRAD	653-3570	9
	JONES HENRY	653-4495	4
	MCDUFFIE KURT I	653-1732	+0
13933	BERG CHARLES	653-9681	9
	GRIGGS B	653-0254	+0
	KITTSON BRYCE U	653-0812	+0
	RODRIGUEZ JERRY	653-1642	9
13945	APARTMENTS		
	BROWN GERALD	653-6135	9
	CLARK MIKE	653-1225	9
	HILL JERRY A	653-3234	9
	MILLER RONALD JR	653-1090	5
	NAKATA BRADFORD	653-6744	9
	WASHBURN ROGER	653-3979	9
13945			
13959	DUNNELL VERNON	656-1329	+0
	TIBBS J	653-2770	+0
	WILLIAMS LINDA	653-9239	+0
13979	APARTMENTS		
	GILSTRAP TERRY	653-5886	9
	JONES LILA	653-7320	+0
	LEWIS BRENDA	653-6721	+0
	TOROK PETER	653-1839	+0
	WOODEN FLETCHER	653-4712	+0
13979			

* 3 BUS 50 RES 27 NEW

Target Street	Cross Street	Source
✓	-	Haines Criss-Cross Directory

FREDERICK ST 1975



```
13901...APARTMENTS
       BALL JIM                  653-6925+5
       BORGESON RON              653-6272 4
       BURBOL JOS C              653-4301+5
       MANESS NANCY              653-5795 4
       RENFRO MARY F             653-3302+5
13901.........................
13915...APARTMENTS
       BOYD RICHARD A SSGT       653-8162+5
       DEVORE GEO E              653-3789+5
       SUKURS KATHY              653-6035+5
     J WILKERSON JOE C           653-3308 4
     M JONES HENRY               653-4495 4
13915.........................
13933 DAMRON CHAS O              653-7042+5
13945 MILLER RONALD JR           653-1090+5
       VAUGHN TERRY              653-5400+5
       WILSON ROBT JAS           653-5400+5
     C HEUSSER C                 653-7407 4
     F LASKI J M                 653-6573 4
13959...APARTMENTS
       GREEN JO ANN              653-5861+5
       GREEN PHILLIP             653-586i+5
       KELLICK CARL E            653-2354+5
       SHEWCOW KENNETH           653-6745+5
       SMITH MICHAEL             653-2219+5
       THOMAS ISIAC              653-5393+5
     M JONES LILA                653-7320 4
13959.........................
13979 HENRIKSON TERRY            653-3742+5
       HOLLER DONALD C           653-4635+5
       SHOUP JOHN W              653-4065+5
      *   2 BUS   43 RES   36 NEW
```

Certified Sanborn® Map Report

04/05/18

Site Name:	Client Name:
March Air Reserve Base	Leighton Consulting
Cactus Avenue Between Veter	17781 Cowan
March Air Reserve Ba, CA 925	Irvine, CA 92614
EDR Inquiry # 5249358.3	Contact: Michelle Manzano

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Leighton Consulting were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # E846-4E99-91AE

PO # 11979.001

Project Meridian Park Warehouse

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: E846-4E99-91AE

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.8
April 05, 2018

EDR Building Permit Report

Target Property and Adjoining Properties

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Building Permit Report: Search Documentation

4/05/18

Site Name:
March Air Reserve
Cactus Avenue
March Air Reserve Ba,

EDR Inquiry # 5249358.8

Client Name:
Leighton Consulting
17781 Cowan
Irvine, CA 92614

Contact: Michelle Manzano

Search Documentation

DATA GAP

The complete collection of Building Permit data available to EDR has been searched, and as of 4/05/18, EDR does not have access to building permits in the city where your target property is located (March Air Reserve Ba, CA).

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EDR BUILDING PERMIT REPORT

About This Report

The EDR Building Permit Report provides a practical and efficient method to search building department records for indications of environmental conditions. Generated via a search of municipal building permit records gathered from more than 1,600 cities nationwide, this report will assist you in meeting the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

Building permit data can be used to identify current and/or former operations and structures/features of environmental concern. The data can provide information on a target property and adjoining properties such as the presence of underground storage tanks, pump islands, sumps, drywells, etc., as well as information regarding water, sewer, natural gas, electrical connection dates, and current/former septic tanks.

ASTM and EPA Requirements

ASTM E 1527-13 lists building department records as a "standard historical source," as detailed in § 8.3.4.7: "Building Department Records - The term building department records means those records of the local government in which the property is located indicating permission of the local government to construct, alter, or demolish improvements on the property." ASTM also states that "Uses in the area surrounding the property shall be identified in the report, but this task is required only to the extent that this information is revealed in the course of researching the property itself."

EPA's Standards and Practices for All Appropriate Inquires (AAI) states: "§312.24: Reviews of historical sources of information. (a) Historical documents and records must be reviewed for the purposes of achieving the objectives and performance factors of §312.20(e) and (f). Historical documents and records may include, but are not limited to, aerial photographs, fire insurance maps, building department records, chain of title documents, and land use records."

Methodology

EDR has developed the EDR Building Permit Report through our partnership with BuildFax, the nation's largest repository of building department records. BuildFax collects, updates, and manages building department records from local municipal governments. The database now includes 30 million permits, on more than 10 million properties across 1,600 cities in the United States.

The EDR Building Permit Report comprises local municipal building permit records, gathered directly from local jurisdictions, including both target property and adjoining properties. Years of coverage vary by municipality. Data reported includes (where available): date of permit, permit type, permit number, status, valuation, contractor company, contractor name, and description.

Incoming permit data is checked at seven stages in a regimented quality control process, from initial data source interview, to data preparation, through final auditing. To ensure the building department is accurate, each of the seven quality control stages contains, on average, 15 additional quality checks, resulting in a process of approximately 105 quality control "touch points."

For more information about the EDR Building Permit Report, please contact your EDR Account Executive at (800) 352-0050.

EDR® Environmental Data Resources Inc

BUILDFAX® PROPERTY HISTORY

March Air Reserve Base
Cactus Avenue Between Veterns Way and Frederick St
March Air Reserve Ba, CA 92518

Inquiry Number: 5249358.6
April 05, 2018

The EDR Property Tax Map Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

EDR Property Tax Map Report

Environmental Data Resources, Inc.'s EDR Property Tax Map Report is designed to assist environmental professionals in evaluating potential environmental conditions on a target property by understanding property boundaries and other characteristics. The report includes a search of available property tax maps, which include information on boundaries for the target property and neighboring properties, addresses, parcel identification numbers, as well as other data typically used in property location and identification.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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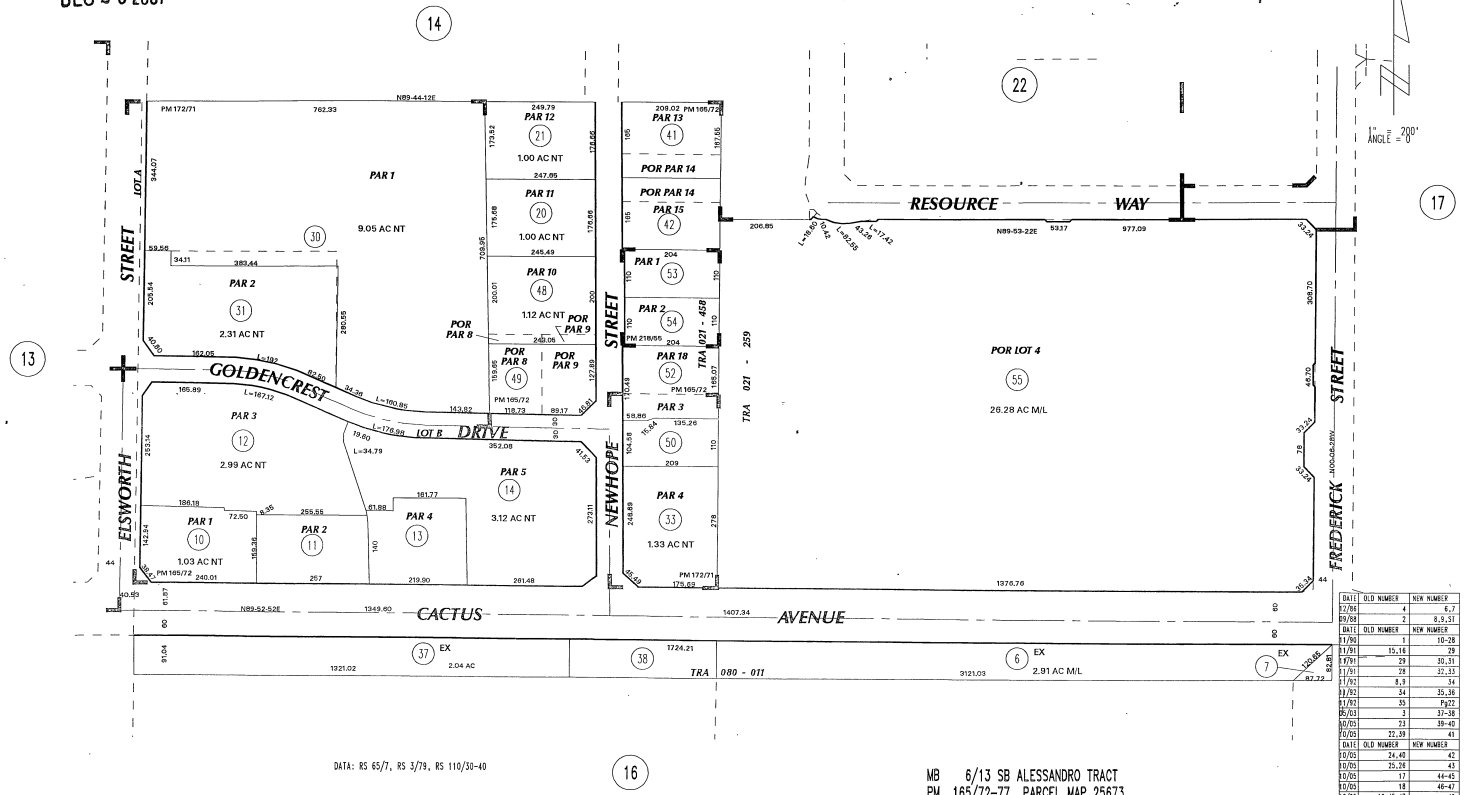
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DEC 2 6 2007

POR.SEC 14 T.3S.,R.4W
CITY OF MORENO VALLEY

297-15
293-24

1" = 200'
ANGLE = 0°



DATA: RS 65/7, RS 3/79, RS 110/30-40

MB 6/13 SB ALESSANDRO TRACT
PM 165/72-77 PARCEL MAP 25673
PM 172/71-72 PARCEL MAP 27147
PM 218/55-56 PARCEL MAP NO 34604

Dec 2007

DATE	OLD NUMBER	NEW NUMBER
12/86	4	6,7
09/88	2	8,9,51
DATE	OLD NUMBER	NEW NUMBER
11/90	1	10-26
11/91	15,16	28
11/91	29	30,31
11/91	28	32,33
11/92	8,9	34
11/92	34	35,36
01/92	35	Pg22
05/03	3	37-38
10/03	23	39-40
10/05	22,39	41
DATE	OLD NUMBER	NEW NUMBER
10/05	24,40	42
10/05	25,26	43
10/05	17	44-45
10/05	18	46-47
10/05	19,45,47	48
10/05	44,46	49
10/05	52	50-51
10/05	27,51	52
12/06	43	53,54
12/07	36	55,51

ASSESSOR'S MAP BK297 PG.15
Riverside County, Calif.

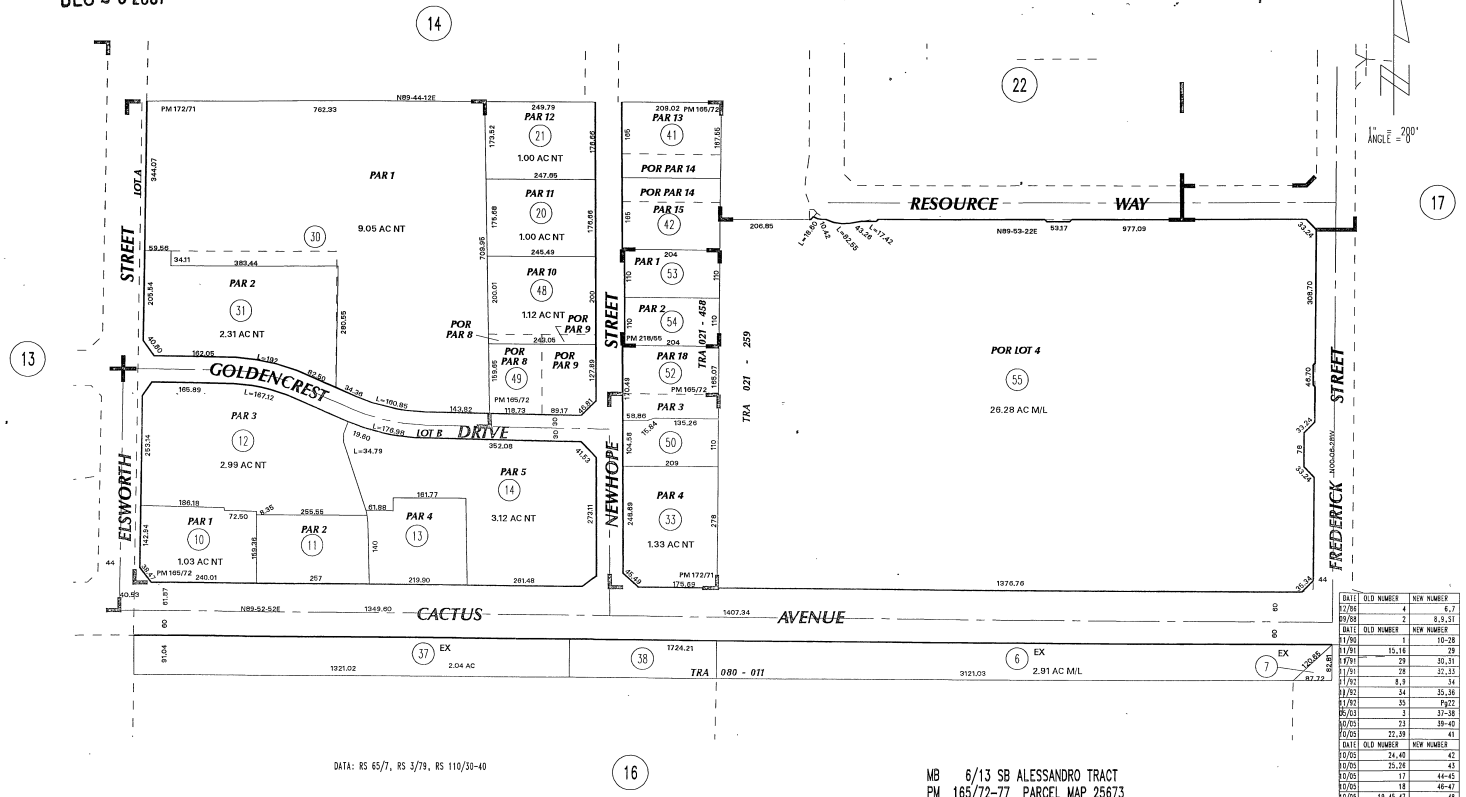
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297-15
293-24

1" = 200'
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DATA: RS 65/7, RS 3/79, RS 110/30-40

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PM 165/72-77 PARCEL MAP 25673
PM 172/71-72 PARCEL MAP 27147
PM 218/55-56 PARCEL MAP NO 34604

ASSESSOR'S MAP BK297 PG.15
Riverside County, Calif.

Dec 2007

DATE	OLD NUMBER	NEW NUMBER
12/86	4	6,7
09/88	2	8,9,51
DATE	OLD NUMBER	NEW NUMBER
11/90	1	10-26
11/91	15,16	28
11/91	29	30,31
11/91	28	32,33
11/92	8,9	34
11/92	54	35,36
01/92	55	Pg22
05/03	3	37-38
10/03	23	39-40
10/05	22,39	41
DATE	OLD NUMBER	NEW NUMBER
10/05	24,40	42
10/05	25,26	43
10/05	17	44-45
10/05	18	46-47
10/05	19,45,47	48
10/05	44,46	49
10/05	52	50-51
10/05	27,51	52
12/06	43	53,54
12/07	36	55,51

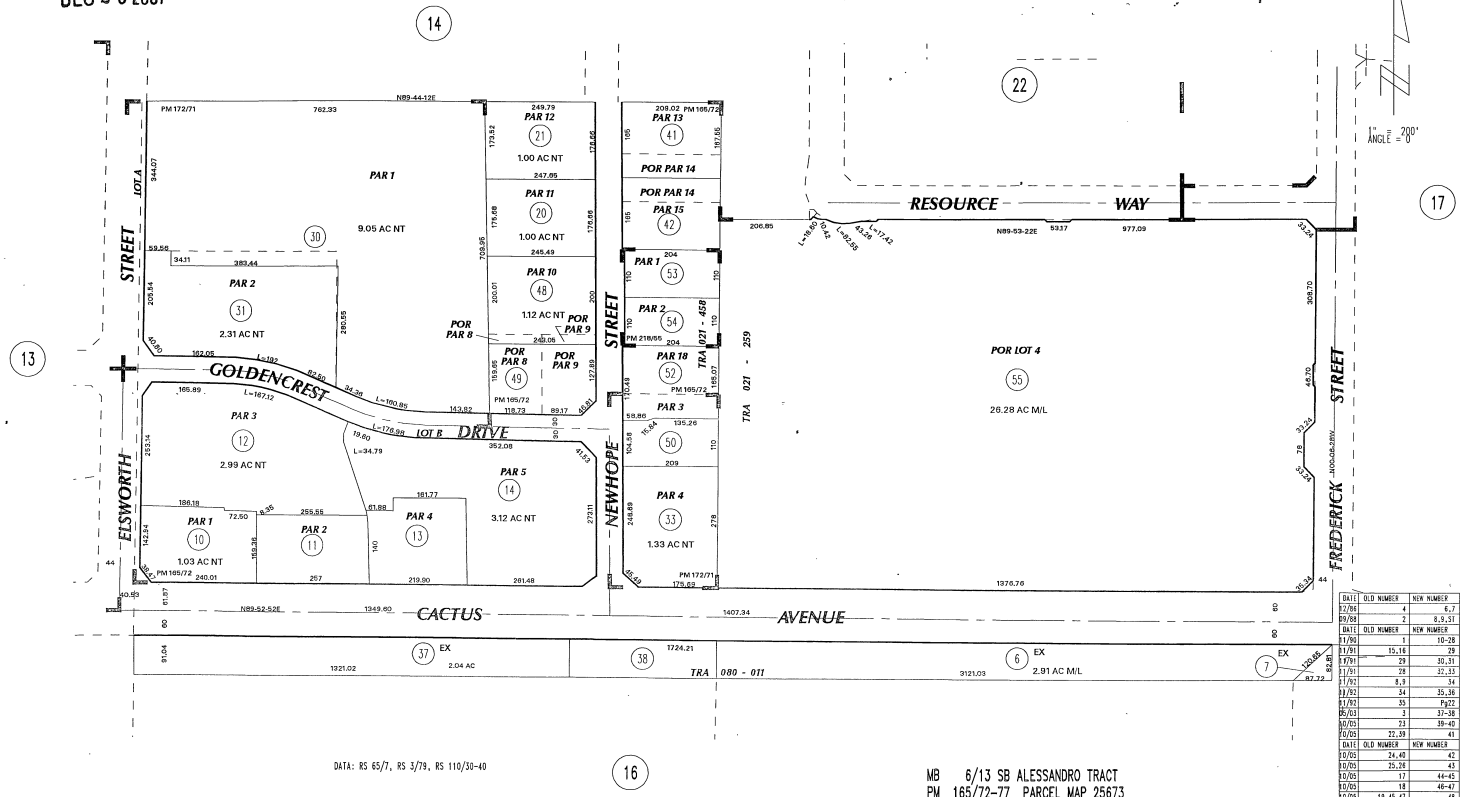
THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCEL MAY NOT COMPLY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.

DEC 2 6 2007

POR.SEC 14 T.3S.,R.4W
CITY OF MORENO VALLEY

297-15
293-24

1" = 200'
ANGLE = 0°



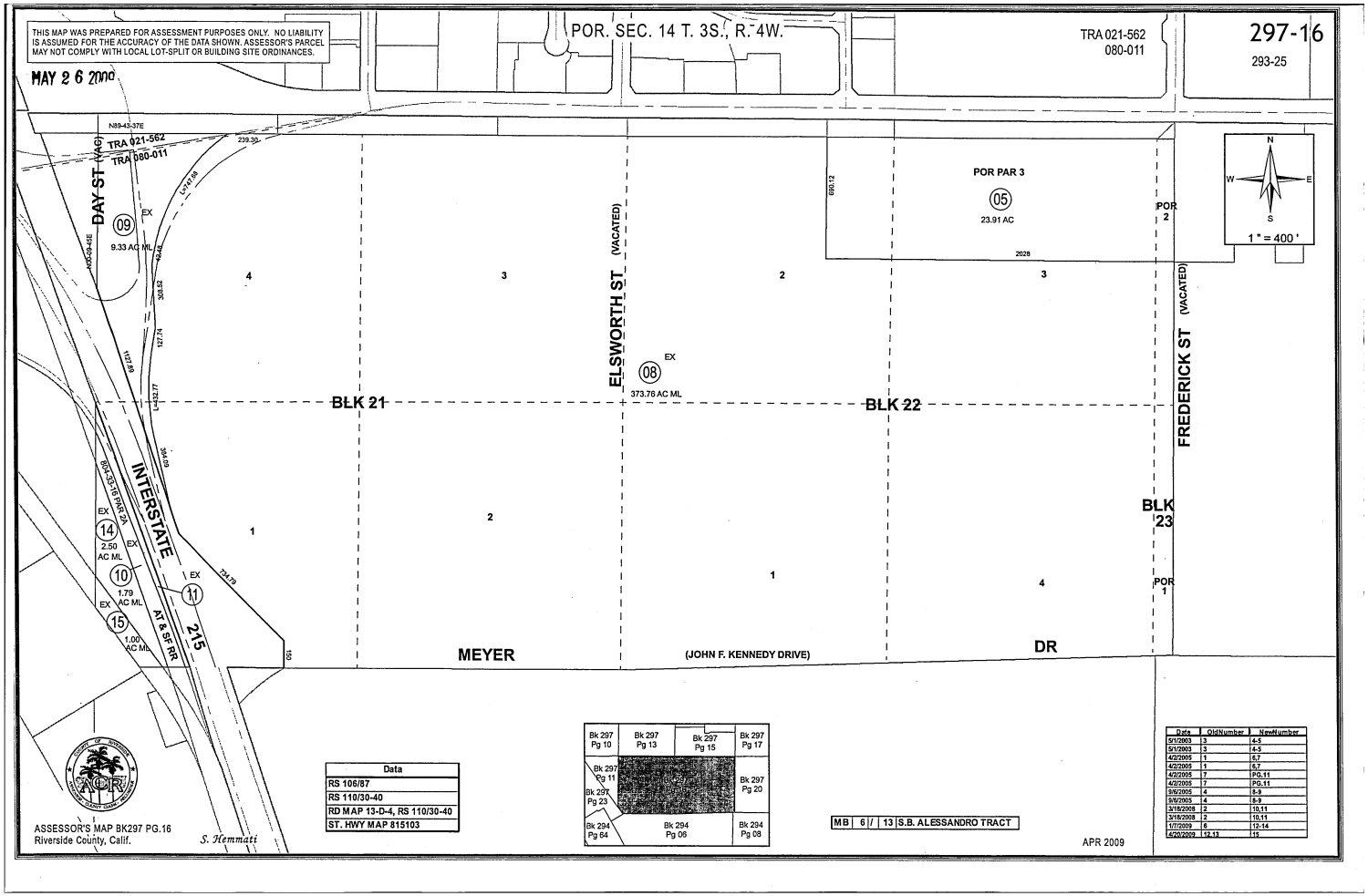
DATA: RS 65/7, RS 3/79, RS 110/30-40

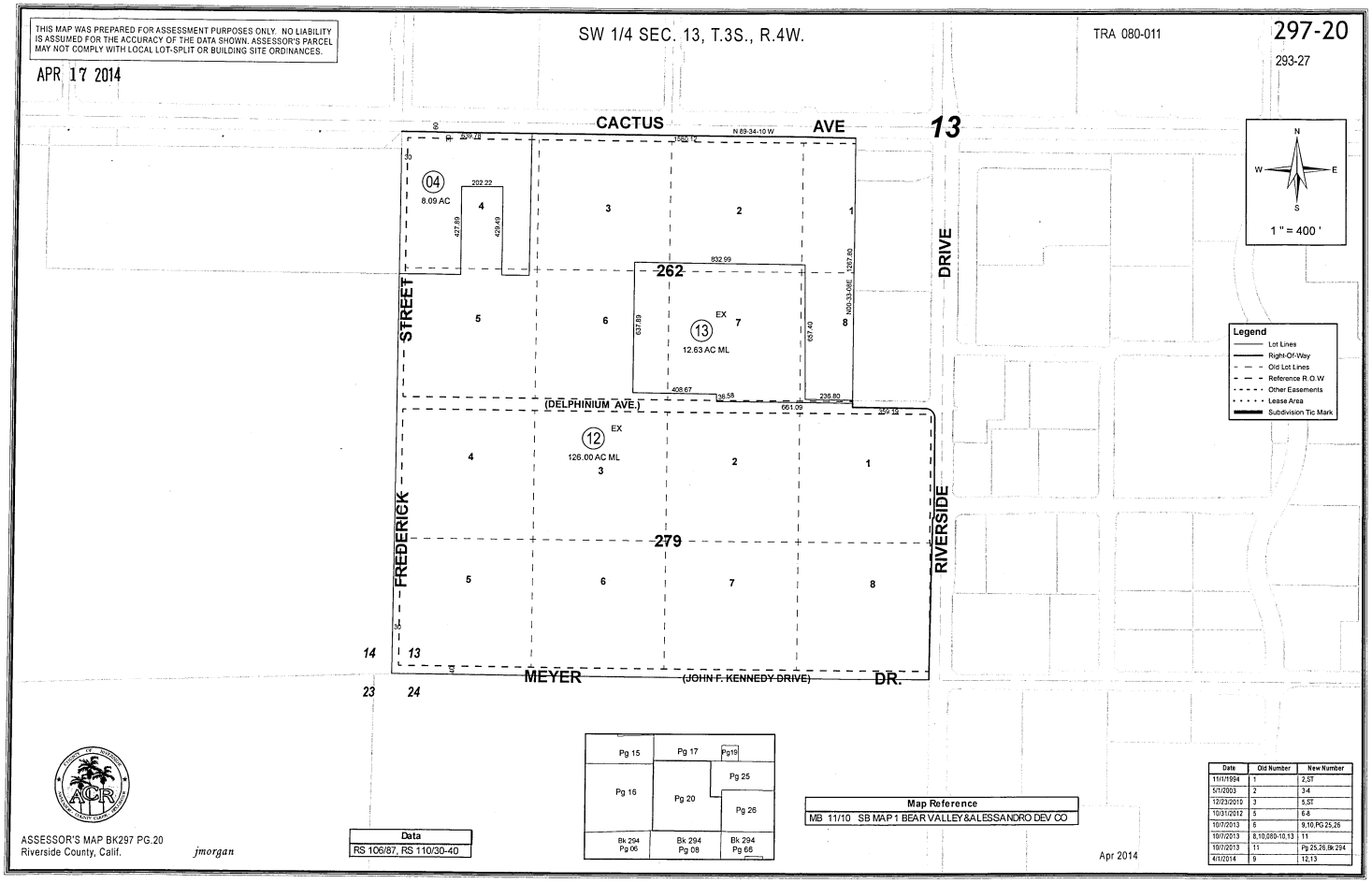
MB 6/13 SB ALESSANDRO TRACT
PM 165/72-77 PARCEL MAP 25673
PM 172/71-72 PARCEL MAP 27147
PM 218/55-56 PARCEL MAP NO 34604

Dec 2007

ASSESSOR'S MAP BK297 PG.15
Riverside County, Calif.

DATE	OLD NUMBER	NEW NUMBER
12/86	4	6,7
09/88	2	8,9,51
DATE	OLD NUMBER	NEW NUMBER
11/90	1	10-26
11/91	15,16	28
11/91	29	30,31
11/91	28	32,33
11/92	8,9	34
11/92	54	35,36
01/92	55	Pg22
05/03	3	37-38
10/03	23	39-40
10/05	22,39	41
DATE	OLD NUMBER	NEW NUMBER
10/05	24,40	42
10/05	25,26	43
10/05	17	44-45
10/05	18	46-47
10/05	19,45,47	48
10/05	44,46	49
10/05	52	50-51
10/05	27,51	52
12/06	43	53,54
12/07	36	55,51


THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCEL MAY NOT COMPLY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.
MAY 2 6 2009
POR. SEC. 14 T. 3S., R. 4W.
TRA 021-562
080-011
297-16
293-25
N89-43-37E
239.30
TRA 021-562
TRA 080-011
DAY ST (VAC)
EX
09
9.33 AC ML
N00-59-48E
1747.59
494.8
308.52
127.74
1197.89
L=427.77
904.09
S89-43-37E 1943.28
INTERSTATE
215
AT & SF RR
724.79
EX
14
2.50 AC ML
EX
10
1.79 AC ML
EX
15
1.00 AC ML
11
ELSWORTH ST (VACATED)
EX
08
373.76 AC ML
POR PAR 3
05
23.91 AC
699.12
2028
POR 2
FREDERICK ST (VACATED)
N
W
E
S
1 " = 400 '
BLK 21
BLK 22
BLK 23
POR 1
MEYER
(JOHN F. KENNEDY DRIVE)
DR
ASSESSOR'S MAP BK297 PG.16
Riverside County, Calif.
S. Hemmati
Data
RS 106/87
RS 110/30-40
RD MAP 13-D-4, RS 110/30-40
ST. HWY MAP 815103
Bk 297 Pg 10
Bk 297 Pg 13
Bk 297 Pg 15
Bk 297 Pg 17
Bk 297 Pg 11
Bk 297 Pg 20
Bk 297 Pg 23
Bk 294 Pg 64
Bk 294 Pg 06
Bk 294 Pg 08
MB 6 // 13 S.B. ALESSANDRO TRACT
APR 2009
Date | OldNumber | NewNumber
5/1/2003 | 3 | 4-5
5/1/2003 | 3 | 4-5
4/2/2005 | 1 | 6,7
4/2/2005 | 1 | 6,7
4/2/2005 | 7 | PG.11
4/2/2005 | 7 | PG.11
5/6/2005 | 4 | 8-9
5/6/2005 | 4 | 8-9
3/18/2008 | 2 | 10,11
3/18/2008 | 2 | 10,11
1/7/2009 | 6 | 12-14
4/20/2009 | 12,13 | 15


THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCEL MAY NOT COMPLY WITH LOCAL LOT-SPLIT OR BUILDING SITE ORDINANCES.
APR 17 2014
SW 1/4 SEC. 13, T.3S., R.4W.
TRA 080-011
297-20
293-27
CACTUS AVE
13
DRIVE
STREET
FREDERICK
RIVERSIDE
MEYER
(JOHN F. KENNEDY DRIVE)
DR.
(DELPHINIUM AVE.)
262
279
04
8.09 AC
13
12.63 AC ML
12
126.00 AC ML
EX
N 89-34-10 W
832.99
N00-33-04E
1207.60
637.89
637.40
408.67
38.58
236.80
661.09
202.22
427.89
429.49
1" = 400'
Legend
Lot Lines
Right-Of-Way
Old Lot Lines
Reference R.O.W
Other Easements
Lease Area
Subdivision Tic Mark
14
13
23
24
Pg 15
Pg 17
Pg19
Pg 16
Pg 20
Pg 25
Pg 26
Bk 294 Pg 06
Bk 294 Pg 08
Bk 294 Pg 66
Map Reference
MB 11/10 SB MAP 1 BEAR VALLEY&ALESSANDRO DEV CO
Data
RS 106/87, RS 110/30-40
Date
Old Number
New Number
11/1/1994 1 2,5T
5/1/2003 2 3,4
12/23/2010 3 5,5T
10/31/2012 5 6-8
10/7/2013 6 9,10,PG 25,26
10/7/2013 8,10,880-10,13 11
10/7/2013 11 Pg 25,26,Bk 294
4/1/2014 9 12,13
ASSESSOR'S MAP BK297 PG.20
Riverside County, Calif.
jmorgan
Apr 2014

APPENDIX H
LABORATORY DOCUMENTATION

Leighton

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

Date: May 4, 2018

Mr. Zach Freeman
Leighton Consulting
10532 Acacia, Suite B-6
Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: Rorr@Leightongroup.com

Project: **11979.001 / Meridian Park K-4**
Lab I.D.: **180427-24 through -43**

Dear Mr. Freeman:

The **analytical results** for the soil samples, received by our lab on April 27, 2018, are attached. The samples were received chilled, intact and with chain of custody record.

Trace concentrations between the MDL and the PQL have been reported with a "J" flag indicator.

Enviro-Chem appreciates the opportunity to provide you and your company this and other services. Please do not hesitate to call us if you have any questions.

Sincerely,

Curtis Desilets
Vice President/Program Manger

for

Andy Wang
Laboratory Manager

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: Leighton Consulting
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE ANALYZED: 04/30/18
DATE REPORTED: 05/04/18

EPA 6010B FOR TTLC-ARSENIC; PAGE 1 OF 2
UNITS: mg/Kg = MILLIGRAM PER KILOGRAM = PPM

SAMPLE I.D.	LAB I.D.	ARSENIC RESULT	DF
SP1	180427-24	1.65	1
SP2	180427-25	2.02	1
SP3	180427-26	2.74	1
SP4	180427-27	1.39	1
SP5	180427-28	1.78	1
SP6	180427-29	1.82	1
SP7	180427-30	1.47	1
Method Blank	---	ND	1
	MDL	0.248	
	PQL	0.30	

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
J = Trace Concentration between MDL and PQL
Actual Detection Limit = PQL X DF
ND = Below the Actual Detection Limit or non-detected
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
STLC Limit for Arsenic = 5 PPM
* = STLC analysis is recommended (if marked)
*** = The concentration exceeds the TTLC Limit @ 500 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --TTLC--SOLID/SOIL MATRIX

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 4/30/2018

Unit : mg/Kg(ppm)

Analysis	Spk.Sample ID	CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Atsenic(As)	180426-144	50.0	106	PASS	0	50.0	49.7	99%	50.1	100%	1%
Lead(Pb)	180426-144	50.0	110	PASS	0.517	50.0	51.5	102%	52.1	103%	1%
Nickel(Ni)	180426-144	50.0	110	PASS	0	50.0	49.1	98%	49.8	100%	1%

ANALYSIS DATE. : 4/30/2018

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)	180430-3	0.125	96	PASS	0	0.125	0.107	85%	0.103	83%	3%

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Atsenic(As)	PASS	PASS	PASS	PASS
Lead(Pb)	PASS	PASS	PASS	PASS
Nickel(Ni)	PASS	PASS	PASS	PASS
Mercury (Hg)	PASS	PASS	PASS	PASS
Accepted Range	**75 ~ 125**	**75 ~ 125**	**85 ~ 115**	**0 ~ 20**

ANALYST: _____

FINAL REVIEWER: _____

*=Fail due to matrix interference

Note:LCS is in control therefore results are in control

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: Leighton Consulting
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE ANALYZED: 05/01/18
DATE REPORTED: 05/04/18

EPA 6010B FOR TTLC-ARSENIC; PAGE 2 OF 2
UNITS: mg/Kg = MILLIGRAM PER KILOGRAM = PPM

SAMPLE I.D.	LAB I.D.	ARSENIC RESULT	DF
SP8	180427-31	1.26	1
SP9	180427-32	1.25	1
SP10	180427-33	1.60	1
SP11	180427-34	1.76	1
SP12	180427-35	1.76	1
SP13	180427-36	2.03	1
SP14	180427-37	1.97	1
SP15	180427-38	1.72	1
SP16	180427-39	2.14	1
SP17	180427-40	1.73	1
SP18	180427-41	2.68	1
SP19	180427-42	1.84	1
SP20	180427-43	1.66	1
Method Blank	---	ND	1
	MDL	0.248	
	PQL	0.30	

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
J = Trace Concentration between MDL and PQL
Actual Detection Limit = PQL X DF
ND = Below the Actual Detection Limit or non-detected
TTLC = Total Threshold Limit Concentration
STLC = Soluble Threshold Limit Concentration
STLC Limit for Arsenic = 5 PPM
* = STLC analysis is recommended (if marked)
*** = The concentration exceeds the TTLC Limit @ 500 PPM, therefore the sample is defined as hazardous waste as per CCR-TITLE 22 (if marked)

Data Reviewed and Approved by: _____
CAL-DHS ELAP CERTIFICATE No.: 1555

QA/QC for Metals Analysis --TTLC--SOLID/SOIL MATRIX

Matrix Spike/ Matrix Spike Duplicate/ LCS :

ANALYSIS DATE: 5/1/2018

Unit : mg/Kg(ppm)

Analysis	Spk.Sample ID	CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Atsenic(As)	180427-31	50.0	105	PASS	1.26	50.0	49.7	97%	50.5	98%	2%
Lead(Pb)	180427-31	50.0	111	PASS	1.66	50.0	44.8	86%	45.4	87%	1%
Nickel(Ni)	180427-31	50.0	101	PASS	2.13	50.0	47.7	91%	48.8	93%	2%

ANALYSIS DATE. : 5/1/2018

Analysis	Spk.Sample ID	LCS CONC.	LCS %Rec.	LCS STATUS	Sample Result	Spike Conc.	MS	% Rec MS	MSD	% Rec MSD	% RPD
Mercury (Hg)	180430-2	0.125	96	PASS	0	0.125	0.111	89%	0.107	85%	4%

MS/MSD Status:

Analysis	%MS	%MSD	%LCS	%RPD
Atsenic(As)	PASS	PASS	PASS	PASS
Lead(Pb)	PASS	PASS	PASS	PASS
Nickel(Ni)	PASS	PASS	PASS	PASS
Mercury (Hg)	PASS	PASS	PASS	PASS
Accepted Range	**75 ~ 125**	**75 ~ 125**	**85 ~ 115**	**0 ~ 20**

ANALYST: _____

FINAL REVIEWER: _____

*=Fail due to matrix interference

Note:LCS is in control therefore results are in control

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Leighton Consulting**
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/01/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP1**
LAB I.D.: 180427-24

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Leighton Consulting**
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/01/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP2**

LAB I.D.: 180427-25

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Leighton Consulting**
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel (909) 743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP3**

LAB I.D.: 180427-26

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	0.003	0.001	0.0001	1
4,4'-DDT	0.0007J	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: **Leighton Consulting**
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel (909) 743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP4**

LAB I.D.: 180427-27

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: Leighton Consulting
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: SP5

LAB I.D.: 180427-28

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
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PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

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SAMPLE I.D.: **SP6**

LAB I.D.: 180427-29

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

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SAMPLE I.D.: **SP7**
LAB I.D.: 180427-30

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	0.003	0.001	0.0001	1
4,4'-DDT	0.001	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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SAMPLE I.D.: **SP8**
LAB I.D.: 180427-31

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	0.001	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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SAMPLE I.D.: **SP9**

LAB I.D.: 180427-32

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	2
alpha-BHC	ND	0.001	0.0001	2
beta-BHC	ND	0.001	0.0001	2
gamma-BHC (Lindane)	ND	0.001	0.0001	2
delta-BHC	ND	0.001	0.0001	2
alpha-Chlordane	ND	0.001	0.0001	2
gamma-Chlordane	ND	0.001	0.0001	2
Total Chlordane	ND	0.005	0.0005	2
4,4'-DDD	ND	0.001	0.0002	2
4,4'-DDE	0.009	0.001	0.0001	2
4,4'-DDT	ND	0.001	0.0001	2
Dieldrin	ND	0.001	0.0002	2
Endosulfan I	ND	0.001	0.0002	2
Endosulfan II	ND	0.001	0.0002	2
Endosulfan Sulfate	ND	0.001	0.0001	2
Endrin	ND	0.001	0.0001	2
Endrin Aldehyde	ND	0.001	0.0001	2
Endrin Ketone	ND	0.001	0.0001	2
Heptachlor Epoxide	ND	0.001	0.0001	2
Heptachlor	ND	0.001	0.0001	2
Methoxyclor	ND	0.001	0.0001	2
Toxaphene	ND	0.020	0.0100	2

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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SAMPLE I.D.: **SP10**

LAB I.D.: 180427-33

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	2
alpha-BHC	ND	0.001	0.0001	2
beta-BHC	ND	0.001	0.0001	2
gamma-BHC (Lindane)	ND	0.001	0.0001	2
delta-BHC	ND	0.001	0.0001	2
alpha-Chlordane	ND	0.001	0.0001	2
gamma-Chlordane	ND	0.001	0.0001	2
Total Chlordane	ND	0.005	0.0005	2
4,4'-DDD	ND	0.001	0.0002	2
4,4'-DDE	0.008	0.001	0.0001	2
4,4'-DDT	0.002J	0.001	0.0001	2
Dieldrin	ND	0.001	0.0002	2
Endosulfan I	ND	0.001	0.0002	2
Endosulfan II	ND	0.001	0.0002	2
Endosulfan Sulfate	ND	0.001	0.0001	2
Endrin	ND	0.001	0.0001	2
Endrin Aldehyde	ND	0.001	0.0001	2
Endrin Ketone	ND	0.001	0.0001	2
Heptachlor Epoxide	ND	0.001	0.0001	2
Heptachlor	ND	0.001	0.0001	2
Methoxyclor	ND	0.001	0.0001	2
Toxaphene	ND	0.020	0.0100	2

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
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REPORT TO: MR. ZACH FREEMAN

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SAMPLE I.D.: SP11

LAB I.D.: 180427-34

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

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SAMPLE I.D.: **SP12**

LAB I.D.: 180427-35

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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MATRIX: SOIL
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SAMPLE I.D.: **SP13**
LAB I.D.: 180427-36

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

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REPORT TO: MR. ZACH FREEMAN

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SAMPLE I.D.: **SP14**

LAB I.D.: 180427-37

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	20*
alpha-BHC	ND	0.001	0.0001	20*
beta-BHC	ND	0.001	0.0001	20*
gamma-BHC (Lindane)	ND	0.001	0.0001	20*
delta-BHC	ND	0.001	0.0001	20*
alpha-Chlordane	ND	0.001	0.0001	20*
gamma-Chlordane	ND	0.001	0.0001	20*
Total Chlordane	ND	0.005	0.0005	20*
4,4'-DDD	ND	0.001	0.0002	20*
4,4'-DDE	ND	0.001	0.0001	20*
4,4'-DDT	ND	0.001	0.0001	20*
Dieldrin	ND	0.001	0.0002	20*
Endosulfan I	ND	0.001	0.0002	20*
Endosulfan II	ND	0.001	0.0002	20*
Endosulfan Sulfate	ND	0.001	0.0001	20*
Endrin	ND	0.001	0.0001	20*
Endrin Aldehyde	ND	0.001	0.0001	20*
Endrin Ketone	ND	0.001	0.0001	20*
Heptachlor Epoxide	ND	0.001	0.0001	20*
Heptachlor	ND	0.001	0.0001	20*
Methoxyclor	ND	0.001	0.0001	20*
Toxaphene	ND	0.020	0.0100	20*

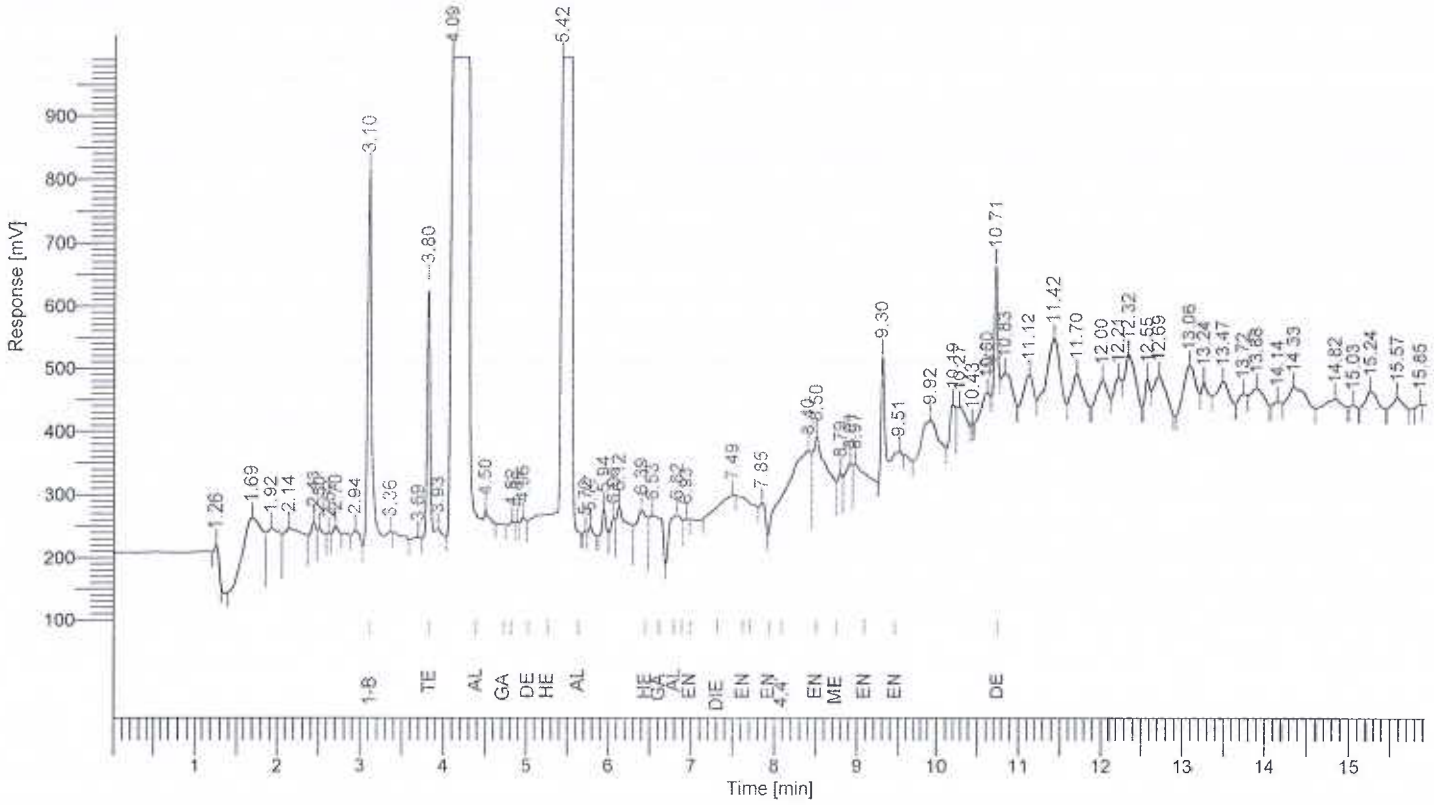
COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected
* = Actual Detection Limit raised due to Matrix Interference

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Software Version : 6.3.2.0646
Sample Name : 180427-37 20/40 RE
Instrument Name : GC-E
Rack/Vial : 0/13
Sample Amount : 1.000000
Cycle : 34

Date : 5/3/2018 3:37:54 PM
Data Acquisition Time : 5/3/2018 12:00:39 AM
Channel : A
Operator : tcprocess
Dilution Factor : 1.000000

Result File : E:\GC DATA\GC-E\E02018\E1804\E180430\A170.rst
Sequence File : E:\GC DATA\GC-E\E02018\E1804\E180430\E180430.seq



Results

Component Name	Time [min]	Area [uV*sec]	Height [uV]	Adjusted Amount
1-Bromo-2-Nitrobenze	3.10	1814609	576479	----------
Tetra chloro-meta-xy	3.80	1010193	387127	80.0009
Alpha-BHC	4.50	95391	19618	0.0021
Beta-BHC	4.82	22503	6715	0.0011
Delta-BHC	4.96	65743	14876	0.0013
Aldrin	5.72	8923	4082	0.0002
Heptachlor Epoxide	6.39	648553	69057	0.0176
Alpha Chlordane	6.82	479509	45006	0.0132
4,4' DDE	6.93	50128	11515	0.0014
Endosulfan II	7.85	115956	25433	0.0042
Endrin Aldhyde	8.50	1302850	118710	0.0590
Methoxychlor	8.79	193384	42939	0.0144
Endrin Ketone	9.51	129882	13267	0.0051
Decachlorobiphenyl	10.71	517733	194175	50.1432
		6455356	1528999	130.2636

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

LABORATORY REPORT

CUSTOMER: Leighton Consulting
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: SP15

LAB I.D.: 180427-38

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

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CUSTOMER: Leighton Consulting
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Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: SP16

LAB I.D.: 180427-39

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

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Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: SP17

LAB I.D.: 180427-40

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

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LABORATORY REPORT

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Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP18**

LAB I.D.: 180427-41

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	2
alpha-BHC	ND	0.001	0.0001	2
beta-BHC	ND	0.001	0.0001	2
gamma-BHC (Lindane)	ND	0.001	0.0001	2
delta-BHC	ND	0.001	0.0001	2
alpha-Chlordane	ND	0.001	0.0001	2
gamma-Chlordane	ND	0.001	0.0001	2
Total Chlordane	ND	0.005	0.0005	2
4,4'-DDD	ND	0.001	0.0002	2
4,4'-DDE	0.007	0.001	0.0001	2
4,4'-DDT	0.004	0.001	0.0001	2
Dieldrin	ND	0.001	0.0002	2
Endosulfan I	ND	0.001	0.0002	2
Endosulfan II	ND	0.001	0.0002	2
Endosulfan Sulfate	ND	0.001	0.0001	2
Endrin	ND	0.001	0.0001	2
Endrin Aldehyde	ND	0.001	0.0001	2
Endrin Ketone	ND	0.001	0.0001	2
Heptachlor Epoxide	ND	0.001	0.0001	2
Heptachlor	ND	0.001	0.0001	2
Methoxyclor	ND	0.001	0.0001	2
Toxaphene	ND	0.020	0.0100	2

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
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LABORATORY REPORT

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PROJECT: **11979.001 / Meridian Park K-4**

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: **SP19**

LAB I.D.: 180427-42

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	0.0006J	0.001	0.0001	1
4,4'-DDT	0.0006J	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

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LABORATORY REPORT

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Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/02/18
DATE REPORTED: 05/04/18

SAMPLE I.D.: SP20

LAB I.D.: 180427-43

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	0.002	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro – Chem, Inc.
1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909) 590-5905 Fax (909) 590-5907

METHOD BLANK REPORT

CUSTOMER: Leighton Consulting
10532 Acacia, Suite B-6, Rancho Cucamonga, CA 91730
Tel(909)743-2642 E-Mail: ZFreeman@Leightongroup.com

PROJECT: 11979.001 / Meridian Park K-4

MATRIX: SOIL
SAMPLING DATE: 04/27/18
REPORT TO: MR. ZACH FREEMAN

DATE RECEIVED: 04/27/18
DATE EXTRACTED: 04/30/18
DATE ANALYZED: 05/01/18
DATE REPORTED: 05/04/18

METHOD BLANK REPORT FOR LAB I.D.: 180427-24 THROUGH -43

Organochlorine Pesticides Analysis
method: EPA 8081A
Unit: mg/Kg = Milligram Per Kilogram = PPM

PARAMETER	SAMPLE RESULT	PQL	MDL	DF
Aldrin	ND	0.001	0.0002	1
alpha-BHC	ND	0.001	0.0001	1
beta-BHC	ND	0.001	0.0001	1
gamma-BHC (Lindane)	ND	0.001	0.0001	1
delta-BHC	ND	0.001	0.0001	1
alpha-Chlordane	ND	0.001	0.0001	1
gamma-Chlordane	ND	0.001	0.0001	1
Total Chlordane	ND	0.005	0.0005	1
4,4'-DDD	ND	0.001	0.0002	1
4,4'-DDE	ND	0.001	0.0001	1
4,4'-DDT	ND	0.001	0.0001	1
Dieldrin	ND	0.001	0.0002	1
Endosulfan I	ND	0.001	0.0002	1
Endosulfan II	ND	0.001	0.0002	1
Endosulfan Sulfate	ND	0.001	0.0001	1
Endrin	ND	0.001	0.0001	1
Endrin Aldehyde	ND	0.001	0.0001	1
Endrin Ketone	ND	0.001	0.0001	1
Heptachlor Epoxide	ND	0.001	0.0001	1
Heptachlor	ND	0.001	0.0001	1
Methoxyclor	ND	0.001	0.0001	1
Toxaphene	ND	0.020	0.0100	1

COMMENTS:
DF = Dilution Factor
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
Actual Detection Limit = PQL X DF
J = Trace Concentration between MDL and PQL
ND = Below the Actual Detection Limit or non-detected

Data Reviewed and Approved by:
CAL-DHS CERTIFICATE # 1555

Enviro-Chem, Inc.

1214 E. Lexington Avenue, Pomona, CA 91766 Tel (909)590-5905 Fax (909)590-5907

EPA 8081 QA/QC Report

Matrix: **Soil/Solid/Liquid(Oil)** Date Analyzed: **5/1-2/2018**

Unit: **mg/Kg (ppm)**

Matrix Spike (MS)/Matrix Spike Duplicate (MSD)

Spiked Sample Lab I.D.: 180427-36 MS/MSD

Analyte	S.R.	spk conc	MS	%REC	MSD	%REC	%RPD	ACP %RPD	ACP %REC
Gamma-BHC	0.000	0.00500	0.00472	**94%**	0.00484	**97%**	**3%**	**0-20%**	**70-130**
Aldrin	0.000	0.00500	0.00495	**99%**	0.00509	**102%**	**3%**	**0-20%**	**70-130**
4,4-DDE	0.000	0.00500	0.00466	**93%**	0.00481	**96%**	**3%**	**0-20%**	**70-130**

Lab Control Spike (LCS) Recovery:

Analyte	spk conc	LCS	% REC	ACP %REC
Gamma-BHC	0.00500	0.00506	**101%**	**75-125**
Aldrin	0.00500	0.00499	**100%**	**75-125**
4,4-DDE	0.00500	0.00479	**96%**	**75-125**
Dieldrin	0.00500	0.00486	**97%**	**75-125**

Surrogate Recovery	ACP%	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.		MB	180427-24	180427-25	180427-26	180427-27	180427-28	180427-29
Tetra-chloro-meta-xylene	50-150	98%	109%	97%	99%	90%	99%	100%
Decachlorobiphenyl	50-150	100%	95%	97%	74%	75%	95%	82%

Surrogate Recovery	ACP%	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.		180427-30	180427-31	180427-32	180427-33	180427-34	180427-35	180427-36
Tetra-chloro-meta-xylene	50-150	96%	83%	94%	95%	100%	105%	102%
Decachlorobiphenyl	50-150	90%	58%	89%	91%	83%	85%	86%

Surrogate Recovery	ACP%	%REC	%REC	%REC	%REC	%REC	%REC	%REC
Sample I.D.		180427-37	180427-38	180427-39	180427-40	180427-41	180427-42	180427-43
Tetra-chloro-meta-xylene	50-150	80%	98%	100%	96%	96%	101%	100%
Decachlorobiphenyl	50-150	50%	81%	96%	78%	90%	95%	81%

S.R. = Sample Result

spk conc = Spike Concentration

%REC = Percent Recovery

ACP %RPD = Acceptable Percent RPD Range

ACP %REC = Acceptable Percent Recovery Range

** = Surrogate fail due to matrix interference (If Marked)*

Note: ***LCS, MS, MSD are in control therefore results are in control.***

Analyzed and Reviewed By: _____

Final Reviewer: _____

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE #1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
X 1 Week (Standard)
Other:

Misc./PO#

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	Arsenic OCPs	COMMENTS
SP1	180427-24	04/27/18	9:11	Soil	1		Ice	X X	
SP2	-25	04/27/18	9:15	"	"		"	X X	
SP3	-26	"	9:20	"	"		"	X X	
SP4	-27	"	9:24	"	"		"	X X	
SP5	-28	"	9:36	"	"		"	X X	
SP6	-29	"	0940	"	"		"	X X	
SP7	-30	"	0946	"	"		"	X X	
SP8	-31	"	0949	"	"		"	X X	
SP9	-32	"	0954	"	"		"	X X	
SP10	-33	"	0959	"	"		"	X X	
SP11	-34	"	1002	"	"		"	X X	
SP12	-35	"	1005	"	"		"	X X	
SP13	-36	"	1008	"	"		"	X X	
SP14	-37	"	1022	"	"		"	X X	
SP15	-38	"	1025	"	"		"	X X	

Analysis Required

Company Name: Leighton Consulting
Address: 10532 Acacia St, Suite B6
City/State/Zip: Rancho Cucamonga CA 91730

Project Contact: Zach Freeman
Tel: 951-713-2642
Fax/Email: zfreeman@leightongroup.com

Sampler's Signature: Breanna Cabral
Project Name/ID: 11979-001 Meridian Park K-4

Relinquished by: Smriti Dhital	Received by: Breanna Cabral	Date & Time: 4/27/18 1244	Instructions for Sample Storage After Analysis:
Relinquished by: Breanna Cabral	Received by:	Date & Time: 4/29/18 1245	O Dispose of O Return to Client O Store (30 Days)
Relinquished by:	Received by:	Date & Time:	O Other:

CHAIN OF CUSTODY RECORD

Date: 4-27-2018

WHITE WITH SAMPLE • YELLOW TO CLIENT

Enviro-Chem, Inc. Laboratories
1214 E. Lexington Avenue,
Pomona, CA 91766
Tel: (909) 590-5905 Fax: (909) 590-5907
CA-DHS ELAP CERTIFICATE #1555

Turnaround Time
0 Same Day
0 24 Hours
0 48 Hours
0 72 Hours
X 1 Week (Standard)
Other:

SAMPLE ID	LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	No. OF CONTAINERS	TEMPERATURE	PRESERVATION	Asbestic ACBs	Misc./PO#
SP16	18042[7-39	~~04~~/27/18	~~1023~~ 1013	Soil	1		ice		
SP17	-40	04/27/18	1030	"	"		"		
SP18	-41	"	1035	"	"		"		
SP19	-42	"	1039	"	"		"		
SP20	-43	"	1043	"	"		"		

Analysis Required

COMMENTS

Company Name: Leighton Consulting
Address: 10532 Acacia St Suite B6
City/State/Zip: Rancho Cucamonga CA 91730

Project Contact: Zach Freeman
Tel:
Fax/Email: ZFreeman@leightongroup.com

Sampler's Signature: Breanna Copeland
Project Name/ID: 11979.001 Meridian Park K-4

Relinquished by: Smith Dhital	Received by: Breanna Copeland	Date & Time: 4-27-18 1241
Relinquished by: Breanna Copeland	Received by:	Date & Time: 4/27/18 1745
Relinquished by:	Received by:	Date & Time:

Instructions for Sample Storage After Analysis:
O Dispose of O Return to Client O Store (30 Days)
O Other:

CHAIN OF CUSTODY RECORD

Date: 4-27-2018

WHITE WITH SAMPLE • YELLOW TO CLIENT

APPENDIX I

GBA GEOENVIRONMENTAL REPORT

Leighton

Important Information about This

Geoenvironmental Report

Geoenvironmental studies are commissioned to gain information about environmental conditions on and beneath the surface of a site. The more comprehensive the study, the more reliable the assessment is likely to be. But remember: Any such assessment is to a greater or lesser extent based on professional opinions about conditions that cannot be seen or tested. Accordingly, no matter how many data are developed, risks created by unanticipated conditions will always remain. *Have realistic expectations.* Work with your geoenvironmental consultant to manage known and unknown risks. Part of that process should already have been accomplished, through the risk allocation provisions you and your geoenvironmental professional discussed and included in your contract's general terms and conditions. This document is intended to explain some of the concepts that may be included in your agreement, and to pass along information and suggestions to help you manage your risk.

Beware of Change; Keep Your Geoenvironmental Professional Advised

The design of a geoenvironmental study considers a variety of factors that are subject to change. Changes can undermine the applicability of a report's findings, conclusions, and recommendations. *Advise your geoenvironmental professional about any changes you become aware of.* Geoenvironmental professionals cannot accept responsibility or liability for problems that occur because a report fails to consider conditions that did not exist when the study was designed. Ask your geoenvironmental professional about the types of changes you should be particularly alert to. Some of the most common include:

- modification of the proposed development or ownership group,
- sale or other property transfer,
- replacement of or additions to the financing entity,
- amendment of existing regulations or introduction of new ones, or
- changes in the use or condition of adjacent property.

Should you become aware of any change, *do not rely on a geoenvironmental report.* Advise your geoenvironmental professional immediately; follow the professional's advice.

Recognize the Impact of Time

A geoenvironmental professional's findings, recommendations, and conclusions cannot remain valid indefinitely. The more time that passes, the more likely it is that important latent changes will occur. *Do not rely on a geoenvironmental report if too much time has elapsed since it was completed.* Ask your environmental professional to define "too much time." In the case of Phase I Environmental Site Assessments (ESAs), for example, more than 180 days after submission is generally considered "too much."

Prepare To Deal with Unanticipated Conditions

The findings, recommendations, and conclusions of a Phase I ESA report typically are based on a review of historical information, interviews, a site "walkover," and other forms of noninvasive research. When site subsurface conditions are not sampled in any way, the risk of unanticipated conditions is higher than it would otherwise be.

While borings, installation of monitoring wells, and similar invasive test methods can help reduce the risk of unanticipated conditions, *do not overvalue the effectiveness of testing.* Testing provides information about actual conditions only at the precise locations where samples are taken, and only when they are taken. Your geoenvironmental

professional has applied that specific information to develop a general opinion about environmental conditions. *Actual conditions in areas not sampled may differ (sometimes sharply) from those predicted in a report.* For example, a site may contain an unregistered underground storage tank that shows no surface trace of its existence. *Even conditions in areas that were tested can change*, sometimes suddenly, due to any number of events, not the least of which include occurrences at adjacent sites. Recognize, too, that *even some conditions in tested areas may go undiscovered,* because the tests or analytical methods used were designed to detect only those conditions assumed to exist.

Manage your risks by retaining your geoenvironmental professional to work with you as the project proceeds. Establish a contingency fund or other means to enable your geoenvironmental professional to respond rapidly, in order to limit the impact of unforeseen conditions. And to help prevent any misunderstanding, identify those empowered to authorize changes and the administrative procedures that should be followed.

Do Not Permit Any Other Party To Rely on the Report

Geoenvironmental professionals design their studies and prepare their reports to meet the specific needs of the clients who retain them, in light of the risk management methods that the client and geoenvironmental professional agree to, and the statutory, regulatory, or other requirements that apply. The study designed for a developer may differ sharply from one designed for a lender, insurer, public agency...or even another developer. *Unless the report specifically states otherwise, it was developed for you and only you.* Do not unilaterally permit any other party to rely on it. The report and the study underlying it may not be adequate for another party's needs, and you could be held liable for shortcomings your geoenvironmental professional was powerless to prevent or anticipate. Inform your geoenvironmental professional when you know or expect that someone else—a third-party—will want to use or rely on the report. *Do not permit third-party use or reliance until you first confer with the geoenvironmental professional who prepared the report.* Additional testing, analysis, or study may be required and, in any event, appropriate terms and conditions should be agreed to so both you and your geoenvironmental professional are protected from third-party risks. *Any party who relies on a geoenvironmental report without the express written permission of the professional who prepared it and the client for whom it was prepared may be solely liable for any problems that arise.*

Avoid Misinterpretation of the Report

Design professionals and other parties may want to rely on the report in developing plans and specifications. They need to be advised, in writing, that their needs may not have been considered when the study's scope was developed, and, even if their needs were considered, they might misinterpret geoenvironmental findings, conclusions, and recommendations. *Commission your geoenvironmental professional to explain pertinent elements of the report to others who are permitted to rely on it, and to review any plans, specifications or other instruments of professional service that incorporate any of the report's findings, conclusions, or recommendations.* Your geoenvironmental professional has the best understanding of the issues involved, including the fundamental assumptions that underpinned the study's scope.

Give Contractors Access to the Report

Reduce the risk of delays, claims, and disputes by giving contractors access to the full report, *providing that it is accompanied by a letter of transmittal that can protect you* by making it unquestionably clear that: 1) the study was not conducted and the report was not prepared for purposes of bid development, and 2) the findings, conclusions, and recommendations included in the report are based on a variety of opinions, inferences, and assumptions and are subject to interpretation. Use the letter to also advise contractors to consult with your geoenvironmental professional to obtain clarifications, interpretations, and guidance (a fee may be required for this service), and that—in any event—they should conduct additional studies to obtain the specific type and extent of information each prefers for preparing a bid or cost estimate. Providing access to the full report, with the appropriate caveats, helps prevent formation of adversarial attitudes and claims of concealed or differing conditions. If a contractor elects to ignore the warnings and advice in the letter of transmittal, it would do so at its own risk. Your geoenvironmental professional should be able to help you prepare an effective letter.

Do Not Separate Documentation from the Report

Geoenvironmental reports often include supplemental documentation, such as maps and copies of regulatory files, permits, registrations, citations, and correspondence with regulatory agencies. If subsurface explorations were performed, the report may contain final boring logs and copies of laboratory data. If remediation activities occurred on site, the report may include: copies of daily field reports; waste manifests; and information about the disturbance of subsurface materials, the type and thickness of any fill placed on site, and fill placement practices, among other types of documentation. *Do not separate supplemental documentation from the report. Do not, and do not permit any other party to redraw or modify any of the supplemental documentation for incorporation into other professionals' instruments of service.*

Understand the Role of Standards

Unless they are incorporated into statutes or regulations, standard practices and standard guides developed by the American Society for Testing and Materials (ASTM) and other recognized standards-developing organizations (SDOs) are little more than aspirational methods agreed to by a consensus of a committee. The committees that develop standards may not comprise those best-qualified to establish methods and, no matter what, no standard method can possibly consider the infinite client- and project-specific variables that fly in the face of the theoretical "standard conditions" to which standard practices and standard guides apply. In fact, these variables can be so pronounced that geoenvironmental professionals who comply with every directive of an ASTM or other standard procedure could run afoul of local custom and practice, thus violating the standard of care. Accordingly, when geoenvironmental professionals indicate in their reports that they have performed a service "in general compliance" with one standard or another, it means they have applied professional judgement in creating and implementing a scope of service designed for the specific client and project involved, and which follows some of the general precepts laid out in the referenced standard. To the extent that a report indicates "general compliance" with a standard, you may wish to speak with your geoenvironmental professional to learn more about what was and was not done. *Do not assume a given standard was followed to the letter.* Research indicates that that seldom is the case.

Realize That Recommendations May Not Be Final

The technical recommendations included in a geoenvironmental report are based on assumptions about actual conditions, and so are preliminary or tentative. Final recommendations can be prepared only by observing actual conditions as they are exposed. For that reason, you should retain the geoenvironmental professional of record to observe construction and/or remediation activities on site, to permit rapid response to unanticipated conditions. *The geoenvironmental professional who prepared the report cannot assume responsibility or liability for the report's recommendations if that professional is not retained to observe relevant site operations.*

Understand That Geotechnical Issues Have Not Been Addressed

Unless geotechnical engineering was specifically included in the scope of professional service, a report is not likely to relate any findings, conclusions, or recommendations about the suitability of subsurface materials for construction purposes, especially when site remediation has been accomplished through the removal, replacement, encapsulation, or chemical treatment of on-site soils. The equipment, techniques, and testing used by geotechnical engineers differ markedly from those used by geoenvironmental professionals; their education, training, and experience are also significantly different. If you plan to build on the subject site, but have not yet had a geotechnical engineering study conducted, your geoenvironmental professional should be able to provide guidance about the next steps you should take. The same firm may provide the services you need.

Read Responsibility Provisions Closely

Geoenvironmental studies cannot be exact; they are based on professional judgement and opinion. Nonetheless, some clients, contractors, and others assume geoenvironmental reports are or certainly should be unerringly precise. Such assumptions have created unrealistic expectations that have led to wholly unwarranted claims and disputes. To help prevent such problems, geoenvironmental professionals have developed a number of report provisions and contract terms that explain who is responsible for what, and how risks are to be allocated. Some people mistake these for "exculpatory clauses," that is, provisions whose purpose is to transfer one party's rightful responsibilities and liabilities to someone else. Read the responsibility provisions included in a report and in the contract you and your geoenvironmental professional agreed to. *Responsibility provisions are not "boilerplate."* They are important.

Rely on Your Geoenvironmental Professional for Additional Assistance

Membership in the Geoprofessional Business Association exposes geoenvironmental professionals to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a geoenvironmental project. Confer with your GBA-member geoenvironmental professional for more information.

GEOPROFESSIONAL BUSINESS ASSOCIATION

8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@geoprofessional.org www.geoprofessional.org

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
FORMER MARCH AIR FORCE BASE
K-4 PARCEL AND CACTUS CHANNEL
46± ACRES OF VACANT LAND
MARCH AIR RESERVE BASE
(MORENO VALLEY AREA)
RIVERSIDE COUNTY, CALIFORNIA

DRAFT

PROJECT NO. 23466.2
AUGUST 15, 2018

Prepared For:

Meridian Park, LLC
1156 North Mountain Avenue
P.O. Box 670
Upland, California 91785-0670

Attention: Mr. Timothy Reeves

August 15, 2018

Meridian Park, LLC
1156 North Mountain Avenue
P.O. Box 670
Upland, California 91785-0670

Project No. 23466.2

Attention: Mr. Timothy Reeves

Subject: Phase I Environmental Site Assessment, Former March Air Force Base, K-4 Parcel and Cactus Channel, 46± Acres of Vacant Land, March Air Reserve Base (Moreno Valley Area), Riverside County, California

Attached herewith is the Phase I Environmental Site Assessment (ESA) for the K-4 Parcel and Cactus Channel, located at March Air Reserve Base in the Moreno Valley area of Riverside County, California.

This Phase I ESA was planned and executed based upon a scope of services generally outlined in our Work Authorization Agreement dated July 17, 2018, and written and verbal communication with your office.

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We appreciate the opportunity to provide this environmental assessment for the subject site. If you have any questions or comments regarding this evaluation, please do not hesitate to contact this firm at your convenience.

LOR Geotechnical Group, Inc.

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EXECUTIVE SUMMARY

A Phase I Environmental Site Assessment (ESA) was conducted by this firm for the K-4 Parcel and Cactus Channel, approximately 46 acres of vacant land, located along/near the south side of Cactus Avenue, at March Air Reserve Base in the Moreno Valley area of Riverside County, California. The Phase I ESA was conducted in conformance with American Society for Testing and Materials (ASTM) E1527-13, and All Appropriate Inquiries (AAI) set forth in 40 CFR (Code of Federal Regulations) Part 312.

In the 1930s, the subject site was vacant land, including dry farm land. Some time during World War II, by 1943, the site was part of United States (US) Army Air Force March Field. US Army Corps of Engineers maps from 1943 and 1944 indicate no buildings or structures were located onsite, except for patrol road(s) and levee(s) along the north side of the base, suggesting the presence of a storm drain channel along the present day Cactus Channel. Immediately adjacent structures to the east were temporary truck shelters, with nearby offices for utilities and US (Army) Engineering Department. Other nearby features included a bomb storage facility over 100 feet west and southwest of the west end of the Cactus Channel at the subject site. Skeet ranges and a “High Tower Shot Gun Range” is also shown with a turret or control house and nearby storage building. A map suggested a portion of the area with these shooting range features was located within the east portion of the K-4 Parcel; however, the other two maps reviewed and historical aerial photograph from 1949 indicate these shooting range features are located north of the subject site, just beyond the Cactus Channel, and are estimated to fall within the present day Cactus Avenue and property beyond. Per historical aerial photographs, during and following World War II, as late as the early 1960s, activity was present onsite within the K-4 Parcel of the subject site, with numerous objects, structures, and/or buildings were present, none of which appeared permanent, and may have been a storage or staging area. The Cactus Channel was first evident in historical aerials photographs from the late 1940s. The K-4 Parcel of the subject site has remained largely vacant since the 1960s, and the Cactus Channel remains an earthen storm drain channel to the present day. Following the end of World War II, the United States Air Force (USAF) assumed operation of March Field, eventually becoming March Air Force Base (MAFB). The skeet and shotgun ranges were removed by the 1960s, and the bomb storage facility was moved west of the 215 Freeway to the former US Army Camp Haan, which came under ownership and usage by the USAF, often referred to as “West March”. By the early 1950s, the location immediately east/northeast of the former bomb storage facility was constructed as a bulk fuels storage facility, with three large ASTs within an earthen bermed area, including two 2.31 million-gallon jet fuel tanks (USAF Facility Nos. 2203 and 2204) and one 1.26 million-gallon

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aviation gas tank (USAF Facility No. 2205), apparently discontinued as such in the 1970s, and more recently used for jet fuel. Jet fuel JP-4 and/or JP-8 has been reportedly stored in these tanks. The closest approach to the fenced area that includes these ASTs is approximately 55 feet west-southwest of the southwest corner of the K-4 Parcel and over 100 feet south of the west end of the Cactus Channel, with the ASTs themselves over 300 feet from the subject site. From the 1950s to the 1990s, commercial buildings, electrical substations, and a base hospital and dental clinic were added within a couple hundred of the subject site. In 1993, MAFB was chosen for realignment under the Base Realignment and Closure (BRAC) process, closing in 1996, and became March Air Reserve Base (MARB). Some time later, ownership of the K-4 Parcel of the subject site was transferred from the United State of America (USA), acting by and through the USAF, to the March Joint Powers Authority (MJPA), and was conveyed to Meridian Park, LLC in 2015.

Recent onsite observations indicate the area to the west of the north-south trending power poles and the offsite electrical substations at the K-4 Parcel contains approximately 3 to 5 feet of loose, smoothed out, fill material stockpiles, estimated at roughly 20,000 cubic yards. Some construction debris, mainly concrete, was noted within areas of these fill materials. These fill materials reportedly came from an Eastern Municipal Water District (EMWD) pipeline project within a public roadway in relative proximity to the subject site.

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A few empty 1-quart motor oil containers are present along the north side of the Cactus Channel and south side of Cactus Avenue, with no other containers of hazardous materials or wastes observed onsite. No chemical odor or soil staining were noted onsite.

During future grading subsurface utility lines will be encountered, including water, electric, and telecommunications. If water lines are encountered, asbestos-containing materials may be present. Appropriate precautions and handling of such materials should be undertaken. If any of these materials are to be disposed, they should be lawfully transported offsite to an appropriate disposal facility.

Numerous environmental reports for sites within the former MAFB and current MARB, not specifically for the subject site, have been prepared, and information gathered as part of the BRAC process. Sites with releases of hazardous materials or wastes in relative close proximity to the subject site, within a few hundred feet, include Installation Restoration Program (IRP) Site No. 11, the bulk fuels storage area, and the former base hospital and dental clinic area. Soil gas survey and soil sampling at IRP Site No. 11 suggest no significant impact to the subject site is likely, with PAHs remaining in surficial soils greater than the United States Environmental Protection Agency (USEPA) Region IX Preliminary

Remediation Goal (PRG) for residential soils, but less than the PRG for industrial soils. As documented in a 2005 Record of Decision (ROD), the USAF selected land use controls as the remedial alternative, which consisted of a prohibition of residential type uses to prevent exposure to contamination by PAHs in surface soils and limiting access to the site to authorized personnel. The land use controls specifically prohibited the construction or use of the site for residences, public or private schools, day care centers, or hospitals for human care. This selected remedy was subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 5-Year Review requirement. The latest 5-Year Review from 2014 indicated no significant change to the condition of IRP Site No. 11 since the 2005 ROD. The former base hospital and dental clinic area had reported releases of mercury to the sanitary sewer system. However, indoor air and subsurface soil sampling indicated no mercury concentrations above residential USEPA PRGs. In a 2005 ROD, the USAF selected No Further Action (NFA) as the remedial alternative, which would allow for the unrestricted use of the site. Groundwater plumes at the former MAFB have not been identified within 500 feet of the subject site.

There are around a dozen sites and the former MAFB and/or associated sites, not including the subject site, listed in environmental regulatory databases within 1 mile of the subject site. Based on the results of our Vapor Encroachment Screen (VES), Tier 1 and 2 screening, a vapor encroachment condition (VEC) at the subject site can be ruled out because a VEC does not or is not likely to exist. Based on our review of environmental regulatory databases, review of previously prepared environmental reports, and VES, no environmentally impaired properties, listed within these databases, have current or former releases of hazardous substances and/or petroleum products that have migrated to and/or significantly impacted the subject site.

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Based on the findings of the Phase I ESA and with consideration given to the recommendations contained in this report, the subject site exhibits no evidence of recognized environmental conditions (RECs), historical recognized environmental conditions (HRECs), and/or controlled recognized environmental conditions (CRECs) indicative of releases or threatened releases of hazardous substances on, at, in, or to the subject site, except for the following:

- The subject site has historical use under three former military bases, including US Army Air Force March Field during World War II, USAF MAFB following World War II, and MARB from 1996 until some time later, being transferred to the MJPA, constituting a REC.

Based on the research conducted during this Phase I ESA, including the review of numerous environmental reports prepared under the BRAC process, the above REC does not appear to have significantly impacted the subject site. However, the specific nature of the objects, buildings, and/or structures onsite within the K-4 Parcel during World War II and years following into the early 1960s are undetermined. Any impacts to the subject site from this time period are likely localized and not anticipated to have a significant impact to the planned industrial development of the subject site. Similarly, no significant impact to the planned onsite development from the imported fill materials from a local EMWD pipeline project is anticipated. To confirm these conclusions regarding the environmental condition of the subject site, soil sampling should be conducted. Such sampling would be from random, gridded locations across the site and/or fill materials, and would include analysis for heavy metals, hydrocarbons, pesticides, herbicides, polychlorinated biphenyls, volatile organic compounds, and/or semi-volatile organic compounds. If desired, a work plan to conduct this sampling can be prepared.

Based on the past use of the subject site as part of military bases for over 50 years, both the US Army Air Force and USAF, future development of the subject site, including grading activities, have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, unexploded ordnance (UXO), and contaminated media, including soil, soil vapor/gas, and/or groundwater. If any of these are encountered during site development, further environmental assessment, evaluation, and/or remediation may be necessary.

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The former base hospital and dental clinic area, within a couple hundred feet to the south of the east end of the subject site, is an HREC, and IRP Site No. 11, the past and current bulk fuels storage area within 100 feet of the west end of the K-4 Parcel, is a CREC. Based on past environmental assessment in these areas, neither of these sites appear to have had a significant environmental impact to the subject site.

INTRODUCTION

During July and August 2018, a Phase I ESA was conducted by this firm for the K-4 Parcel and Cactus Channel, approximately 46 acres of vacant land, located along/near the south side of Cactus Avenue, at March Air Reserve Base in the Moreno Valley area of Riverside County, California. The subject site is currently vacant land, including a storm drain channel (Cactus Channel). The subject site was formerly part of US Army Air Force March Field during World War II, followed by USAF March Air Force Base (now March Air Reserve Base). The planned use of the K-4 Parcel is an industrial development, including a building (718,000 square feet) with office area and over 100 loading docks, truck trailer parking, vehicle parking, and drive areas.

The Cactus Channel and associated property, roughly 10.6 acres, are situated along the south side of Cactus Avenue, between Elsworth Street and Heacock Street. The "K-4 Parcel" was designated such under the BRAC process, and is approximately 35.4 acres situated along the south side of Cactus Avenue, roughly coincident with Veterans Way and Frederick Street which are north-south streets located north of Cactus Avenue. An approximate 2,360-foot section of the Cactus Channel cuts through the K-4 parcel.

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This Phase I ESA was conducted in conformance with the Standard Practice for Environmental Site Assessments: Phase I ESA Process, ASTM E1527-13, and AAI set forth in 40 CFR Part 312. The purpose was to identify RECs, HRECs, and/or CRECs that may be associated with the subject site. A REC is defined as the presence or likely presence of any hazardous substance or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. A HREC is defined as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meets the unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (i.e., property use restrictions, activity and use limitations, institutional controls, or engineering controls, which would fall under a controlled recognized environmental condition or CREC). This does not include de minimis conditions, that generally, do not present a threat to human health or the environment and generally would not be the subject of an enforcement action if brought to the attention of the appropriate government agency. Conditions determined to be de minimis are not recognized environmental conditions or controlled recognized environmental conditions.

The approximate location of the site within its regional setting is presented on an Index Map (Figure 1). The Preliminary Site Plan, showing the proposed development of the K-4 Parcel, is shown on Figure 2.

The findings of our Phase I ESA, as well as our conclusions and recommendations, are presented in the following sections of this report.

NON-SCOPE CONSIDERATIONS

The following environmental issues are outside the scope of ASTM E1527-13 and 40 CFR Part 312, and may not have been addressed in this report:

- Lead in Drinking Water
- Lead-Based Paint
- Wetlands
- Methane
- Radon
- Cultural Land Historical Resources
- Industrial Hygiene
- Health and Safety
- Ecological Resources
- Endangered Species
- Indoor Air Quality
- Mold and Mildew
- Asbestos-Containing Materials
- Mineral Resources
- Regulatory Compliance
- Natural Hazards
- High Voltage Power Lines

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METHODOLOGY AND PROCEDURES

Per ASTM E1527-13 and AAI, User provided information was evaluated with respect to site history, usage, and environmental concerns.

A general review of the physical setting of the subject site, including geology and hydrogeology, was performed. This review, in part, provides information regarding the potential for groundwater to be contaminated and the potential pathways for contaminant

transport.

Historical maps, aerial photographs, and other records and information were researched and examined, as available, to investigate the use of the subject site and surrounding area.

As available, person(s) knowledgeable about the subject site were interviewed to obtain any known information regarding site usage and potential environmental concerns.

Concurrent with our public and governmental agency interviews and literature research, a site reconnaissance of the property was conducted. The site reconnaissance was conducted in order to determine current uses of the site and the potential for soil and/or possible groundwater contamination based on aboveground visual observation.

During this Phase I ESA, public regulatory agencies, potentially including environmental, building, etc. were contacted directly or online research was conducted, as warranted, for information regarding permits, underground storage tanks (USTs), hazardous materials incidents, and general information about the subject site and surrounding area to ascertain the past uses with respect to environmental concerns. Based on the subject site being part of former military bases, the USAF Administrative Record website was researched, and was the primary source for reports and other information regarding the subject site and adjacent properties.

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Federal, state, local, tribal, and proprietary lists and databases were reviewed to ascertain the presence of known environmentally impaired sites on the subject site or within the immediate area, and to determine their impact, if any, to the site.

As part of this Phase I ESA, a Vapor Encroachment Screen was conducted to determine if a vapor encroachment condition exists, based on the information obtained during the Phase I ESA.

USER PROVIDED INFORMATION

ASTM E1527-13 defines a User as the party seeking to use Practice E1527 to complete an environmental site assessment of the property. A User may include, without limitation, a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager.

Under ASTM E1527-13 and AAI, specific tasks are assigned to the User that will help identify the possibility of RECs in connection with the property. These tasks do not require the technical expertise of an environmental professional and are generally not performed by environmental professionals performing a Phase I ESA. The User may provide the information gathered from these tasks, including the following:

- Any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state or local law;

- Any activity and land use limitations (AULs), such as engineering controls, land use restrictions, or institutional controls that are in place at the subject site and/or have been filed or recorded in a registry under federal, tribal, state, or local law;

- Specialized knowledge or experience (that is material to RECs in connection with the property) of the User related to the property or nearby properties (for example, is the User involved in the same line of business as the current or former occupants of the property or an adjoining property so that the User would have specialized knowledge of the chemicals and processes used by this type of business);
- Relationship of the purchase price to the fair market value of the property if it were not contaminated (reason for significantly lower purchase price, such as contamination is known or believed to be present at the property);

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- Commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases (such as the past uses of the property, specific chemicals that are present or once were present at the property, spills or other chemical releases that have taken place at the property, and any environmental cleanups that have taken place at the property);

- Any obvious indicators that point to the presence or likely presence of contamination at the property, based on the knowledge and experience of the User related to the property; and

- Other information, including the reason why the Phase I ESA is required and/or is being performed, the type of property and type of property transaction (sale, purchase, exchange, etc.), the complete and correct address for the property, the scope of services desired for the Phase I ESA, identification of all parties who will rely on the Phase I ESA report, identification of the subject site contact and how the

contact can be reached, any special terms and conditions which must be agreed upon by the environmental professional, and any other knowledge or experience with the property that may be pertinent to the environmental professional (for example, copies of any available prior environmental site assessment reports, documents, correspondence, etc., concerning the property and its environmental condition).

A User Questionnaire was completed by a representative of a User (client) of this report. The purchase price of the site is indicated to reflect fair market value with no discount for environmental concerns. The information provided in the completed questionnaire indicates the subject site was formerly USAF property, the client is unaware of any spills, etc., and if there had been any spills when the site was USAF property, they would have been cleared prior to conveyance. The purpose for conducting this assessment is future development of the subject site. The subject site is indicated to have been owned for several years, and ownership is beginning entitlements, an Environmental Impact Report, etc. No previous environmental studies are known by the client to have been performed onsite. Meridian Park, LLC, the client, local jurisdiction, lenders, and future tenants or buyers were stated to be the parties who will rely on this Phase I ESA report.

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A copy of the completed User Questionnaire is provided in Appendix A.

The User also provided maps and figures for the K-4 Parcel and Cactus Channel, and a geotechnical report prepared by Leighton Consulting, Inc. (LCI) for the K-4 Parcel. A map and figure provided by the User are presented within this report (Figures 2 and 3) and the LCI geotechnical report is discussed under the **REVIEW OF EXISTING REPORTS** section of this report.

Environmental Cleanup Liens and Activity and Use Limitations

Under AAI and ASTM, a search for environmental cleanup liens and AULs must be conducted, typically by the User. The subject site, whose researched historical use has been vacant land, dry farm land, and part of three former military bases (US Army March Field, MAFB, and MARB) did not appear in any state and/or federal liens or deed databases in The Environmental Data Resources, Inc. (EDR) Radius Map™ Report with GeoCheck® (Appendix G). However, MAFB, of which the subject site was a part, is listed in the US Engineering Controls and US Institutional Controls databases for issues related to soil, soil vapor, and/or groundwater contamination, with respect to remediation, monitoring, and/or use restrictions. Based on research by this firm, none of these

contamination or use restrictions appear to be associated with the subject site.

REVIEW OF EXISTING REPORTS

Geotechnical

The following geotechnical report was provided for our review during this Phase I ESA.

Leighton Consulting, Inc., 2018, Geotechnical Exploration, Proposed Industrial Warehouse Site K-4, Cactus Avenue, Unincorporated Riverside County, near Moreno Valley, California, Project No. 11979.002, May 15, 2018.

The above-referenced geotechnical report was provided by the client, and was prepared by LCI for the K-4 Parcel of the subject site. This investigation included the placement of nine exploratory soil borings, sampled to maximum depths ranging from approximately 11.5 to 51 feet below the ground surface (bgs) across the subject site. Bedrock was not encountered, and no fill materials were noted. Groundwater was encountered in two of the nine borings at depths of approximately 19 and 23 feet bgs. Although done specifically to address the engineering properties of the onsite soils, no subsurface structures, unusual odors, or stained soils were noted.

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Environmental

There were numerous environmental reports and maps that were prepared for properties surrounding and/or including the subject site that were briefly reviewed, and some of the information obtained from our review of these reports is incorporated into this Phase I ESA. Of the numerous reports we reviewed, the following were the most pertinent to the subject site. Most of the reports and maps reviewed were obtained from the online USAF Civil Engineer Center Air Force Administrative Record search under BRAC sites for MAFB.

War Department (US Army Corps of Engineers), 1944, March Field, General Plan (with Building Schedule), June 1944.

War Department (US Army Corps of Engineers), 1944, March Field, Landing Field: Parking Apron & Landing Field Expansion Schedule for Paving Operations, December 1944.

US Army Corps of Engineers, 1994, Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste Chemical Warfare Materials, Archives Search Report Findings, March Air Force Base and Associated Sites, Riverside, California, Site Nos. J09CA001100, J09CA047600, and J09CAT82600, September 1994, USAF Administrative Record File Number 423.

A few maps were reviewed which show March Field during World War II, which included the subject site. These maps are of poorer quality due to age and reduction, scanning, and/or copying. However, the maps are of sufficient quality to discern the locations of onsite and offsite features. One of the three maps reviewed is included within the above-referenced Archives Search Report, presented as “Map M-3" and shown to be from November 1943, and is highlighted with a bomb storage facility and skeet range. The bomb storage facility is immediately west/southwest of the present day bulk fuel storage area that includes three jet fuel ASTs within a fenced area approximately 55 feet west-southwest of the southwest corner of the subject site K-4 Parcel. The bomb storage facility was over 100 feet west and southwest of the west end of the Cactus Channel at the subject site. Skeet ranges and a “High Tower Shot Gun Range” is also shown with a turret and nearby storage building. The map suggests a portion of the area with these shooting range features (one map shows a control house instead of turret) are located within the east portion of the K-4 Parcel. However, the other two maps referenced indicate these shooting range features are located north of the subject site, just beyond the Cactus Channel, and are estimated to fall within the present day Cactus Avenue and property beyond. Patrol road and levees are indicated, likely along the present day Cactus Channel. No buildings or other features are shown for the subject site, except for a north-south road along the present day Chanute Avenue. A long, narrow, rectangular structure is shown immediately adjacent to the east of the southeast corner of the K-4 Parcel. This structure, according to the building schedule provided with the June 1944 map, is a temporary truck shelter, situated at the north end of a north-south alignment of smaller, narrow, rectangular structures which are mostly indicated to also be temporary truck shelters. A 5-car wash rack is indicated along this north-south alignment of truck shelters, located over 500 feet south-southeast of the K-4 Parcel. An east-west oriented, smaller, rectangular structure, near and northeast of the long, narrow, rectangular truck shelter, is indicated to be offices for utilities and “U.S.E.D.”, which likely stands for United States (Army) Engineering Department. South-southeasterly from this office and along the east side of a looping road, are seven small, rectangular structures, which may be associated with these offices. East/southeast of these small, rectangular structures is a utility yard, over 200 feet from the K-4 Parcel. In the general area, farther away, are a motor pool, salvage yard, oil & paint building, and utility shop yard.

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CH2M Hill, 1984, Installation Restoration Program Records Search, March Air Force Base, California, April 1984, USAF Administrative Record File Number 02.

The Records Search Report was conducted to try and identify known and potential sites of contamination across MAFB. Sites identified near the subject site were Site No. 21 - Bulk Fuels Storage Area and Site No. 27 - Civil Engineering Storage Yard. The maps shown identifying these areas does not include some present day improvements, which makes it somewhat difficult to tell exactly where the identified sites are situated in relation to the subject site. However, it appears Site No. 21 - Bulk Fuels Storage Area is defined by the present day concrete bermed area which includes three ASTs (USAF Facility Nos. 2203, 2204, and 2205), two 2.31 million gallons and one 1.26 million gallons, situated within a fenced area approximately 55 feet west-southwest of the K-4 Parcel of the subject site. The northwest corner of Site No. 27 - Civil Engineering Storage Yard appears to be located immediately adjacent to the east of the southeast corner of the K-4 Parcel.

The referenced report includes a discussion of fuels storage and usage. Jet fuel (JP-4) was stated to be piped from off-base to two ASTs (USAF Facility Nos. 2203 and 2204). A third AST (USAF Facility No. 2205) was used for aviation gasoline storage until the use of such fuel was discontinued in 1975. This AST was reported to be inactive. Fuel was indicated to be piped to two pump stations with 41 jet fuel USTs, 50,000 gallons each, except for one 25,000-gallon tank. The pumping stations supplied flightline hydrant refueling systems. IN 1976, a transfer valve malfunction resulted in a discharge of 10,000 gallons of jet fuel from the second bulk storage AST (USAF Facility No. 2204). Approximately 4,000 gallons of fuel were recovered, with the remaining 6,000 gallons either evaporating or percolating into the ground southwest of the bulk fuels storage area. Routine maintenance also resulted in the loss of 5 gallons per week from the two active ASTs for at least the previous 4 years, and a loss of 10 to 15 gallons per week from each tank was reported prior to installation of the product recovery system. Base personnel interviewed indicated this lost fuel was usually disposed of on the ground adjacent to the tanks, and that during rainstorms, fuel floated to the surface in the bulk fuels storage area.

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Site No. 21 - Bulk Fuels Storage Area was rated using the USAF Hazard Assessment Rating Methodology (HARM), receiving a HARM rating score of 58, primarily due to: 1) the confirmed disposal of a large quantity of hazardous wastes; 2) the proximity to a well (approximately 2,500 feet); 3) the proximity to the base boundary (approximately 800 feet); 4) the presence of a population greater than 1,000 people served by groundwater supply within 3 miles; 5) the proximity to the base drainage ditch system (approximately 400 feet); and 6) permeable soils with clay contents between 0% and 15%.

Site No. 27 - Civil Engineering Storage Yard had various hazardous materials stored onsite. Multiple spills of possibly contaminated oils, disposal of refrigeration shop waste fluids and solvents, and discharges of other wastes had reportedly occurred. Numerous drums, tanks, and transformers were being stored at the yard. Two recent spills of transformer oils, possibly containing PCBs (polychlorinated biphenyls), had also occurred.

Site No. 27 - Civil Engineering Storage Yard was rated using the USAF Hazard Assessment Rating Methodology (HARM), receiving a HARM rating score of 58, primarily due to: 1) the confirmed presence of a moderate quantity of hazardous wastes; 2) the proximity to a well (approximately 1,000 feet); 3) the proximity to the base boundary (approximately 800 feet); 4) the presence of a population greater than 1,000 people served by groundwater supply within 3 miles; 5) the proximity to the base drainage ditch system (approximately 300 feet); and 6) permeable soils with clay contents between 0% and 15%.

The Earth Technology Corporation, 1993, Installation Restoration Program, Expanded Source Investigation/RCRA Facility Investigation, March Air Force Base, California, May 1993, USAF Administrative Record File Number 230.

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This report, which covered all of MAFB, included the base hospital building (USAF Building No. 2990) and electrical substation (USAF Building No. 2991) for the base hospital complex, located within a few hundred feet south of the east end of the Cactus Channel at the subject site.

USAF Building No. 2990 was constructed in 1965, and included office space, patient rooms, a cafeteria, various laboratories, and X-ray facilities. Mercury and radioactive materials had been disposed in the drain in the past. Numerous mercury releases had occurred from thermometers and other medical products. Tests of the hospital plumbing indicated mercury levels above acceptable limits. Tests of sewer lines indicated no levels above acceptable limits. P-traps in the plumbing system were replaced, and 3 pounds of mercury were recovered. Approximately 30 gallons a year of various reagents were disposed in the sanitary sewer system until 1992, when such reagents were stored in 55-gallon drums for disposal.

A 15,000-gallon diesel UST was located east of USAF Building No. 2990, connected to a backup generator.

An X-ray developer was located inside USAF Building No. 2990, and prior to February 1992, the silver and cadmium wastes produced by the developer were disposed in the

drain. Waste formaldehyde was stored in a sealed 55-gallon plastic drum in the morgue.

USAF Building No. 2991 was constructed in 1965. One 5,000-gallon diesel UST was located north of the building, connected to a backup generator. There were no hazardous wastes associated with this building.

US Army Corps of Engineers, 1994, Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste Chemical Warfare Materials, Archives Search Report Findings, March Air Force Base and Associated Sites, Riverside, California, Site Nos. J09CA001100, J09CA047600, and J09CAT82600, September 1994, USAF Administrative Record File Number 423.

The above-referenced report indicates conventional ordnance was present and used in training at the former MAFB. In 1947, the bomb storage facility at March Field near the subject site was relocated to storage facilities at West March (former US Army Camp Haan), west of the 215 Freeway.

This report includes a map ("M-3") from November 1943 previously referenced, which highlighted a bomb storage facility and skeet range that were located near the subject site. The referenced report indicates that in April 1994, a US Army Corps of Engineers inspection team visited property just north of the former MAFB which was used as a safety fan for a skeet range. This area was reported to be an open field, a portion of which had been plowed and had a crop. No ordnance was found.

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It was concluded that it was not likely any ordnance and explosive waste (OEW) contamination remained in the buffer zone for the skeet range.

USAF, 1994, Basewide Environmental Baseline Survey, March Air Force Base, California, November 1994, USAF Administrative Record File Number 860.

The referenced Basewide Environmental Baseline Survey (EBS) report was prepared to document the environmental condition of the real property at the former MAFB, resulting from the storage, release, and disposal of hazardous substances and petroleum products and their derivatives over the installation's history. Study areas were defined, and included the K-4 Parcel of the subject site within Areas A and I. It is unclear if the Cactus Channel was included in these study areas, but if so, would have fallen within Areas A, E, G, and I. All of the property within the former base was categorized into seven different categories. Most of the subject site was deemed to be Category 1 (uncontaminated property).

However, the far southeast portion of the K-4 Parcel appears to have been deemed Category 7 (areas unevaluated or requiring additional evaluation), apparently due to the benzene, tetrachloroethylene (PCE), and/or trichloroethylene (TCE) groundwater plumes. The bulk fuels storage area near the west end of the subject site and hospital complex near and south of the east end of the subject site were apparently deemed Category 7 as well. An area south of the K-4 Parcel was deemed either Category 2 (hazardous substance stored, no release) or Category 6 (hazardous substance release, no actions taken). The reproduced copy of the provided map makes it difficult to discern the shading used to designate some of the categories.

Land use maps for the years circa 1934 and 1944, the subject site is largely shown as vacant land adjoined by vacant land, but the far southeast portion of the K-4 Parcel likely encroaches into an industrial area in 1944. The land use map for the year circa 1968 indicates the far east portion of the K-4 Parcel encroaches into an industrial area. The hospital area (institutional, medical) is indicated south of the east end of the subject site (Cactus Channel). The present day bulk fuels storage area is shown as industrial. The land use map for the year circa 1993 indicates again the far east portion of the K-4 Parcel encroaches into an industrial area. West of the hospital area are two commercial areas, straddling the present day Riverside Drive. The northern tip of an industrial area, previously mentioned to be either Category 2 or 6, is shown near or immediately south of the central portion of the K-4 Parcel. These land use maps do not appear to specifically include the onsite Cactus Channel.

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No RCRA Facility Assessment (RFA) sites were identified at or in close proximity to the subject site. A map with IRP sites includes IRP Site No. 11 for the bulk fuels storage area, previously designated Site No. 21, and IRP Site No. 12 for the civil engineering storage yard, previously designated Site No. 27. The location of the IRP Site No. 12 area is now shown farther away, over 500 feet from the subject site K-4 Parcel. Both IRP Site Nos. 11 and 12 were assigned to Operable Unit 2. Both IRP Sites were considered to be Category 7 (areas unevaluated or requiring additional evaluation).

Maps with locations of identified USTs and ASTs include the three large ASTs in the bulk fuels storage area (IRP Site No. 11), two USTs and one AST in the hospital area located over 200 feet south of the subject site, and a UST southeast of the intersection at North Avenue and 2nd Street, east of Riverside Drive, over 400 feet south of the subject site. The three large ASTs in the bulk fuels storage area, USAF Facility Nos. 2203 and 2204 (2,310,000 gallons each) and USAF Facility No. 2205 (1,260,000 gallons) were indicated to be used for storage of jet fuel (JP-8), which was piped to the former MAFB via a pipeline

from a fuel terminal in Colton, California.

Five silver recovery units were in use at the former MAFB, including the hospital building (USAF Building No. 2990). Because no reported releases were associated with these units, which appeared in good condition, they were deemed to be Category 2 (hazardous substance stored, no release).

The base hospital (USAF Building No. 2990) utilized numerous radioactive sources, including radiopharmaceuticals for diagnostic and treatment purposes, calibration of medical equipment, and check source. No records of radioactive mixed waste generation or waste storage were identified, and no radioactive material or mixed waste spill or contaminated sites were identified during a records search, visual site inspections, or through interviews with base personnel; therefore, all facilities associated with the use and/or storage of radioactive materials were considered to be Category 2.

In 1991, several mercury spills were identified in the sewer system of the base hospital (USAF Building No. 2990), probably from the accidental breakage of mercury-containing thermometers and manometers. In May 1992, a detailed sampling program was implemented to characterize the level and extent of mercury contamination. Of the fifty-nine (59) samples taken from the interior piping, fifty-four (54) had detectable mercury concentrations, of which thirty-nine (39) exceeded or had the potential to exceed California hazardous waste criteria for mercury. Approximately 500 linear feet of mercury-contaminated piping was identified within the hospital. Although none of the samples taken from the exterior sewer line were above the California hazardous waste limits, it was recommended additional testing be conducted. The exterior sewer lines were noted to be generally structurally sound and free of significant corrosion. The hospital was considered to be Category 6 (hazardous substance release, no actions taken) because of the known mercury contamination.

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The referenced Basewide EBS report addresses surface/storm water, and discusses flightline discharge which is conveyed to the Heacock Channel and ultimately to the Perris Valley Storm Drain Lateral A. Other surface or storm water features are discussed, but there is no mention of the onsite Cactus Channel.

EG&G, Inc., 1991, Draft Soil Gas Survey, March Air Force Base Site 11, April 1991, USAF Administrative Record File Number 85.

The referenced soil gas survey was part of a characterization and soil cleanup in the bulk fuels storage area (IRP Site No. 11). Construction activities were planned in December 1991 to replace the floating lid on one of the ASTs (USAF Facility No. 2205), paved the bermed areas with concrete, and replace the earthen containment dikes surrounding all three ASTs (USAF Facility Nos. 2203 through 2205) with concrete dikes.

The soil gas survey included eighty-five soil vapor probe locations, placed at approximate 50- to 100-foot intervals, and advanced to approximately 4 to 9 feet bgs. Hard soils were encountered in some locations, resulting in a lack of deeper sampling or no sampling at all. The analytical results shown include reporting limits around 5 to 10 times higher than is typical at present day for total petroleum hydrocarbons (TPH), and benzene, toluene, ethylbenzene, and total xylenes (BTEX). However, of the ninety-eight (98) samples analyzed, only ten (10) samples had reportable concentrations of TPH, ethylbenzene, and/or o- and p-xylenes up to 53 micrograms per liter (µg/L), 15 µg/L, and 22 µg/L, respectively. No samples had reportable concentrations of benzene, toluene, and o-xylene. The reported soil vapor concentrations of ethylbenzene are greater than the present California Regional Water Quality Control Board, San Francisco Bay (CRWQCB-SFR) Environmental Screening Levels for residential and commercial/industrial scenarios, with the reported soil vapor concentrations of TPH and xylenes less than these scenarios. The closest soil vapor sample with reportable concentrations was over 400 feet from the subject site. The closest soil vapor samples were collected approximately 200 feet or more from the subject site.

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Air Force Base Conversion Agency, 1997, Final Finding of Suitability to Transfer (FOST) in Support of an Easement to the City of Moreno Valley, Culvert at the Intersection of Cactus Avenue and Heacock Street, March Air Force Base, California, March 13, 1997.

The FOST was prepared to document environmentally-related findings and the suitability to transfer in support of a 25-year easement to be granted to the City of Moreno Valley for expanding an existing box culvert. The FOST was a thorough analysis of information contained in the following documents:

1) The Final Environmental Impact Statement (FEIS) for the Disposal and Reuse of MAFB, dated February 1996;

2) The Basewide EBS for MAFB, dated November 1994;

3) Supplemental EBS (SEBS) for an Easement to the City of Moreno Valley, dated September 3, 1996; and

4) Visual Site Inspection (VSI) report, dated June 4, 1996, and the follow-on VSI dated March 4, 1997.

Based on the Attachment 1, Map 2 within the FOST, the project area for the easement is at the east end of the subject site, where the Cactus Channel transitions to the Heacock Channel.

Based on the Basewide EBS, the proposed easement was indicated to be located within a large parcel considered to be DOD Environmental Condition Category 7 (areas unevaluated or requiring additional evaluation). Based on the VSIs and SEBS, the Category 7 rating was the result of environmental concerns primarily located at USAF Building No. 2990 and 2991 (base hospital and dental clinic area). These buildings were approximately 900 feet away, and did not appear to affect the proposed easement. It was concluded that based on an analysis of the data, and upon completion of the closure actions related to two USTs and resolution of the Category 6 (hazardous substance release, no actions taken) rating based upon mercury found in the sewer system of USAF Building No. 2990, regulatory concurrence of "No Further Action" (NFA) along with reclassification to Category 4 (hazardous substance release, all actions have been taken) was to be formally documented in the update to the Basewide EBS.

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The USAF determined the property required neither deed restrictions nor notifications to the City of Moreno Valley. No evidence of release of any hazardous substances to the environment was identified during the VSI.

The FOST concluded that the easement proposal had been adequately assessed and evaluated for environmental hazards, environmental impacts anticipated from future use of the property, and adequate notice of disclosure resources. The future use of the property was concluded to not present current or future risk to human health or to the environment, subject to inclusion and compliance with the appropriate easement covenants regarding flood plains and wetlands. The property was deemed to be suitable for an easement.

Earth Tech, Inc., 2004, Final Focused Remedial Investigation, OU4, Former March AFB, California, July 2004, USAF Administrative Record File Number 1995.

The above-referenced report includes documentation of assessment and evaluation of health risk. Past investigation was report in 1992, similar to that discussed in this Phase I ESA report for the Basewide EBS. A total of 146 samples were collected, including 57 samples from internal waste collection lines, 73 real-time air monitoring samples from sewer ventilation exhaust pipe outlets, 10 samples from the “floor drain” clean-outs of the internal lines, and 6 samples from the exterior sewer lines. Approximately 86 percent of the interior waste collection line samples had mercury concentrations above the analytical detection limit, with more than one-third of these samples with mercury concentrations ranging from 25.8 to 71,200 milligrams per kilogram (mg/kg). Fourteen percent had no detectable mercury or were visually clean. Of the 12 exterior sewer line sample locations in manholes, 6 were visually clean, and no samples taken. Of the 6 exterior sewer line samples, 3 had concentrations of mercury above analytical detection limits, but below the residential USEPA PRG of 23 mg/kg.

Additional sampling was conducted in 1997, with 4 internal line samples collected with mercury reported at 85 and 110 mg/kg in 2 samples, above the residential USEPA PRG. One sample collected from an external sewer line had a concentration of mercury of 2,100 mg/kg. Neither this, nor the previous sampling in 1992 collected soil samples from outside of the hospital and dental clinic facilities or from around the sewer line.

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The OU4 field investigation was performed between November 2002 and March 2003. Sludge and sediment samples were collected from the sewer main, the sewer main was video surveyed, subsurface soil samples were collected where the video survey showed potential breaks or separations in the sewer pipe, and indoor air samples were collected within the hospital and dental clinic. The sludge samples collected from within the sewer main were reported with mercury concentrations up to 999 mg/kg. Three soil samples were collected, with mercury concentrations reported up to 0.21 mg/kg, well below the USEPA residential PRG at 23 mg/kg. The fourteen indoor air samples, including two duplicate samples, had mercury concentrations less than the USEPA residential PRG at 0.31 micrograms per cubic meter ($\mu g/m^3$).

The maps provided indicate the sewer lines associated with the base hospital (USAF Building No. 2990) and dental clinic (USAF Building No. 2991) generally lead easterly and southerly, away from the subject site, which is located over 100 feet from the former hospital and dental clinic buildings and over 200 feet from the sewer lines shown.

Based on the reported mercury concentrations in soil and indoor air samples, it was concluded that no unacceptable risk was associated with the base hospital or dental clinic,

and no apparent release of mercury above residential USEPA residential PRGs was identified. The base hospital and dental clinic were recommended for NFA.

Earth Tech, 2005, Installation Restoration Program, Operable Unit 4, Final Record of Decision, Former March Air Force Base and March Air Reserve Base, California, September 2005, USAF Administrative Record File Number 2238.

The Record of Decision (ROD) by the USAF indicated that the OU4 Focused Remedial Investigation concluded that the base hospital and dental clinic did not pose an unacceptable risk to human health. The USAF determined that the mercury found did not pose a potential risk for human health or the environment. The USAF selected NFA as the remedial alternative, which would allow for the unrestricted use of the site.

USAF Reserve Command, 2005, Final Record of Decision, March Air Force Base/Air Reserve Base, Operable Unit 2, Air Force Reserve Command Sites 1, 11, 37, and 39, September 2005, USAF Administrative Record File Number 2289.

The ROD by the USAF indicated that IRP Site No. 11 had soil sampling that found elevated concentrations of PAHs in the surface soil, but no significant amount of fuel contamination (it was stated that evaporation removes a fraction of fuel spilled on the surface), and no significant groundwater contamination was found. Concentrations of PAHs were within acceptable risk values for industrial land, but exceeded residential levels. The baseline risk assessment indicated the carcinogenic risk for future residents was 2×10^{-4} verus 6×10^{-5} for industrial and construction workers. The risk to industrial and construction workers fell within the acceptable risk management range of 1×10^{-4} to 1×10^{-6}, whereas the risk to future residents was unacceptable, falling outside this range. Benzo(a)pyrene was the only chemical found at concentrations exceeding the USEPA residential PRG.

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The reasonable anticipated future land use at IRP Site No. 11 was industrial. In order to remain protective of human health and the environment, the remedial action objectives included: preventing unacceptable exposure to soil; prohibit future residential-type land uses; and limit access to authorized personnel.

The USAF selected land use controls as the remedial alternative, which consisted of a prohibition of residential type uses to prevent exposure to contamination by PAHs in surface soils and limiting access to the site to authorized personnel. The land use controls specifically prohibited the construction or use of the site for residences, public or private

schools, day care centers, or hospitals for human care. This selected remedy was subject to the CERCLA 5-Year Review requirement.

AECOM Technical Services, Inc., 2014, Final Third Five-Year Review Report, Performance-Based Remediation at March Air Reserve Base and Former March Air Force Base, California, September 29, 2014, USAF Administrative Record File Number 421538.

No significant changes to the condition of IRP Site No. 11 were noted since the 2005 ROD.

Tetra Tech, Inc., 1995, Final Installation Restoration Program (IRP) Stage 5, Basewide Groundwater Monitoring Program, Fall Quarter 1993, Analytical Data, Informal Technical Information Report, Volume 5, March Air Force Base, California, December 1995, USAF Administrative Record File Number 570.

Montgomery Watson, 2001, Fourth Quarter 2000, Long-Term Groundwater Monitoring, Informal Technical Information Report (ITIR), March Air Reserve Base, California, April 2001, USAF Administrative Record File Number 1285.

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AECOM Technical Services, Inc., 2018, Final Fourth Quarter 2017 Groundwater Monitoring, Informal Technical Information Report, CG049 Basewide Groundwater Monitoring Program, Operable Unit 5, March Air Reserve Base and Former March Air Force Base, California, March 5, 2018, USAF Administrative Record File Number 570681.

The above three groundwater monitoring reports, spanning from the early 1990s to 2000 to recently this year, were reviewed to evaluate the groundwater plumes at the former MAFB that may have impacted the subject site. Based on this reviewed, it appears no groundwater plumes, including those for benzene, 1,2-dichloroethane, PCE, and TCE. The closest well to the subject site with reported concentrations of PCE and TCE was well 5M12MW3, over 600 feet south-southeast of the K-4 Parcel of the subject site. Plumes for benzene and 1,2-DCA were located farther away. In the early years of groundwater monitoring, wells on or near the subject site were non-detect, including wells 2MW3, 2MW11, 5M11MW1, 5M11MW2, 28MW6, OW1, and OW6. The latest maps included in the Fourth Quarter 2017 Groundwater Monitoring report only include well 5M11MW1, suggesting the rest have been abandoned/destroyed and/or not actively used, suggesting there are no plumes currently near the subject site. Groundwater flow direction over various

monitoring periods is generally shown to the southeast, though occasionally a northerly/northwesterly flow is shown in the northwest portion of the former main base.

Aerostar SES, LLC, 2018, Final Site Inspection Report for Aqueous Film Forming Foam Areas, Former March Air Force Base, July 2018, USAF Administrative Record File Number 574458.

This report documents a Preliminary Assessment in 2015 that identified five potential areas and two fire training areas that may be impacted by the emergent chemical compounds perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid (PFBS) in the environment related to historical USAF use of aqueous film forming foam (AFFF). These compounds are a class of synthetic fluorinated chemicals used in industrial and consumer products, including defense-related applications. None of these fire training or potential areas were located at or near the subject site, and based on the known history of the subject site and nearby areas, no significant impact to the subject site from PFOS, PFOA, or PFBS compounds are anticipated.

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PHYSICAL SETTING

The geologic and hydrogeology for the region, former MAFB/MARB, and subject site, were referenced from documents reviewed during this Phase I ESA. The main document referenced is the Final Focused Remedial Investigation, Operable Unit 4, July 2004, USAF Administrative Record File No. 1995, prepared by Earth Tech.

Geology

The regional geology surrounding the former MAFB/MARB is characterized by igneous and metamorphic crystalline rock overlain, or outcropping through, alluvial sediments. The former MAFB/MARB lies within the northern part of the Peninsular Ranges Geomorphic Province. The Peninsular Ranges are a northwest- to southeast-oriented complex of blocks separated by similarly trending faults. Within the Peninsular Range, the former MAFB/MARB lies on an eroded mass of Cretaceous and older crystalline rock that is known as the Perris Block.

The Perris Block is bounded on the west by the Elsinore-Chino fault zone and on the east by the San Jacinto fault zone. The Elsinore-Chino fault zone is approximately 14 miles southwest of the base and the San Jacinto fault zone is approximately 7 miles northeast

of the base. The Casa Loma Fault, a sub-parallel splay of the San Jacinto Fault Zone, is located approximately 5 miles northeast of the base, and trends southeast from Reche Canyon to approximately 5 miles east of the Perris Reservoir Dam.

The bedrock at and around the former MAFB/MARB is granitic in composition, ranging from granodiorite to tonalite. The subsurface bedrock is characterized by a highly weathered zone near the bedrock-alluvium interface. Drilling records indicate that the weathered bedrock material can be up to 150 feet thick over the bedrock highs, and as thin as 10 feet or less over areas of buried bedrock channels. Additionally, drilling data show that the upper portion of the weathered bedrock is saturated, transmits water, and has characteristics similar to tighter, finer-grained sediments.

In the subsurface, three prominent buried bedrock highs can be observed beneath the former MAFB/MARB, exclusive of the former West MAFB/MARB. Based on geophysical data, one bedrock high is situated at the northern end of the base just north of the intersection of Meyer Drive and Graeber Street. A second bedrock high is near the central part of the main cantonment area beginning just north of the intersection of Graeber Street and Riverside Drive (Graeber Bedrock Ridge) and extending southeast to the former base boundary near Iris and Heacock Streets, just east of the former base boundary. The third and largest of the bedrock highs is south of Taxiway 2, and trends southeast, parallel to the active runway to the south end of the former base boundary (Runway Bedrock Ridge). Scoured bedrock channels between these bedrock highs appear to coalesce with the deeper bedrock tributary channel that runs parallel to the 215 Freeway to the west.

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The Perris Valley consists of deeply eroded bedrock subsurface that was subsequently filled with alluvium. The alluvial material consists of interbedded layers of gravel, sand, silt, and clay of varying thickness. The thickness of the alluvial deposits range from a few feet thick, in areas of bedrock highs, to over 900 feet thick southeast of the base. Based on the recent geotechnical investigation by LCI, the subject site and surrounding area are anticipated to be underlain by older alluvial soils, comprised of sandy and silty clays, silty and clayey sands, and sands to a depth of approximately 51 feet bgs.

Hydrogeology

Groundwater beneath the main former MAFB/MARB, which includes the subject site, generally occurs in alluvial deposits. The bedrock is considered non-water bearing, with the exception of groundwater that occurs in joints or fracture zones, or in the weathered zones that exist in some areas of the bedrock-alluvium contact. The water-bearing zones vary in

thickness and composition throughout the base. There is no single water-bearing zone that can be traced continuously across the base. The strata are discontinuous and may interfinger with adjacent alluvial units. In general, the water-bearing zones consist of varying amounts of sandy zones (with occasional gravel lenses) separated by leaky confining beds of finer-grained silts and clays. These deposits are moderately to highly permeable and capable of yielding large amounts of water under unconfined conditions. Based on previous studies, the permeability of the alluvium varies both laterally and vertically.

The groundwater system in the Perris and Moreno Valleys (San Jacinto Groundwater Basin) is almost completely surrounded by non-water-bearing rocks, such that water flowing into or out of the basin should be negligible. Natural recharge to the aquifer results primarily from infiltration of precipitation. Artificial recharge on base occurs from infiltration of irrigation water near the central portion of the base shop and housing areas and from the Perris Valley Storm Drain located along the east side of the main base. Infiltration of irrigation water and seepage from unlined canals and septic systems also contributes to the artificial recharge.

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Historically, the amount of water removed by pumping often exceeded the amount of water naturally recharged to the aquifer. Pumping has caused groundwater levels in some wells to decrease by as much as 185 feet between 1941 and the mid 1980s. Monitoring of groundwater levels on-base since 1987 indicates a local rise in groundwater levels. Changes in land use, most notably a reduction in the amount of agricultural land and an increase in urbanization, have resulted in a rising water table. Specifically, reductions in the amount of groundwater withdrawal caused by decreased use of agriculture and increased surface infiltration has resulted in rising water tables. In recent years, the filling of the Perris Reservoir southeast of the base, and subsequent seepage below and across the earth-filled dam are also a suspected contributor to recharge and rising water levels in the basin.

Groundwater generally flows toward the southeast across the main base. This southeasterly direction is consistent with the regional flow in this portion of Perris Valley. Tetra Tech identified a groundwater high from the September 1996 groundwater elevation data in the vicinity of IRP Site 2, approximately 0.4 mile south of the subject site, near the north-central portion of the main base. It is assumed that this groundwater high may be associated with the bedrock high observed in this area. The groundwater gradient in the northern portion of the base, which includes the subject site, is relatively gentle but steepens at the southeast portion of the base. In the north portion of the main base,

groundwater elevations indicate the direction of flow toward the north. This northern flow may be caused by groundwater withdrawal in production wells north of the base or may be the result of a buried channel thought to exist in this area.

Based on a 2012 potentiometric map of the main base from the Final Third Five-Year Review Report, September 29, 2014, prepared by AECOM Technical Services, Inc., groundwater elevations at the subject site ranged from approximately 1513 to 1524 feet above mean sea level (amsl). Based on the range in ground surface elevations from approximately 1547 to 1552 feet amsl, the groundwater beneath the subject site is anticipated to be first encountered around 30 feet bgs. The recent geotechnical investigation by LCI encountered groundwater at the K-4 Parcel of the subject site at depths of approximately 19 and 23 feet bgs.

HISTORY OF SITE USAGE

To obtain a history of previous site usage, this firm conducted a search for historical aerial photographs, researched property ownership/parcel information, and researched building information. EDR was contacted for Sanborn Fire Insurance Map coverage, city directory information, and historical topographic maps and aerial photographs. A representative of the owner of the subject site was interviewed to obtain historical information and knowledge of any potential environmental concerns.

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Sanborn Fire Insurance Maps

No coverage of Sanborn Fire Insurance Maps was available for the subject site. The Certified Sanborn® Map Report from EDR is provided in Appendix B.

Topographic Maps

Historical topographic maps provided by EDR from 1901, 1942, 1943, 1947, 1953, 1967, 1973, 1980, and 2012 were reviewed. These maps, along with the approximate subject site boundaries shown, are included in the EDR Historical Topographic Map Report, provided in Appendix C.

The 1901 map, at a scale of 1"=2,200', shows partial coverage of the subject site and surrounding properties. The east approximate 2,100 feet of the subject site (Cactus Channel) and adjacent properties and area are not covered. The portion of the subject site and surrounding properties covered are shown as vacant land. The site is situated along

the south side of an east-west alignment for the present day Cactus Avenue, along which are segments of road. Two north-south roads cross the subject site, roughly coincident with Graham Street/Riverside Drive and former Joy Street.

The 1942 map, at a scale of 1"=2,200', shows the subject site as vacant land with no indication of a military base on or near the subject site. The north-south Graham Street/Riverside Drive is shown cutting across the subject site. A north-south dirt road, the present day Heacock Street, is shown adjacent to the east of the site with a “blue line” stream along its west side. No development is shown near the subject site.

The 1943 map, at a scale of 1"=2,200', shows partial coverage of the subject site and surrounding properties. The east approximate 2,100 feet of the subject site (Cactus Channel) and adjacent properties and area are covered, with that to the west of it not shown. The area covered shows the subject site and surrounding properties the same as on the 1942 map.

The 1947 map, at a scale of 1"=2,200', shows partial coverage of the subject site and surrounding properties. The east approximate 1,900 feet of the subject site (Cactus Channel) and adjacent properties and area are not covered. The portion of the subject site and surrounding properties covered are shown as vacant land, essentially the same as on the 1942 map.

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The 1953 map, at a scale of 1"=2,200', shows the subject site inclusive of a “blue line” stream, the present day Cactus Channel, the west end of which appears to still be natural, with the remainder channelized. The west end is situated at the south end of a natural drainage coursing north-northeast to south-southwest. A boundary line immediately south of the Cactus Channel appears to mark the military base boundary for March Field, of which the subject site is a part. Within the east end of the subject site K-4 Parcel is a smaller building or structure shown, located along the west/northwest side of a road (present day Chanute Avenue), a small square structure is shown. Adjacent to the east of the K-4 Parcel, near and just east of Chanute Avenue, is a north-south oriented, long rectangular structure, south of which are similarly oriented, but shorter structures in north-south alignment. These structures, according to a June 1944 US Army Corps of Engineers Map for March Field, “General Plan” (with building schedule), were temporary truck shelters. A second road is shown near and just east of these truck shelters, which connects with Chanute Avenue north of these shelters at an upside down “U”. Just south of the Cactus Channel and just east of the K-4 Parcel, two smaller, square structures are shown. These structures are not shown on the above-referenced 1944 map. A smaller, square

building is shown along the west side of Graham Street (present day Riverside Drive), approximately 150 feet south of the subject site. Approximately 500 feet west-southwest of this building is a smaller, square structure at the northwest end of the northwest-southeast trending road. Neither this building or structure are shown on the above-referenced 1944 map. Graham Street, a divided road, cuts across the subject site, north to south, at its present day location (as Riverside Drive). Other roads present at March Field, near the subject site, include 2nd Street, 4th Street, 8th Street, North Avenue, and Z Street. Heacock Street leads from the south, curving to the east, becoming Cactus Avenue adjacent to the east, apparently as paved roads. Many of the present day military base buildings and structures are shown over 1,000 feet from the subject site. A railroad spur track, trending southeast to northwest before bending to the west along the north side of the base, is located approximately 500 feet southwest of the west end of the subject site.

The 1967 map, at a scale of 1"=2,200', shows the subject site with no buildings or structures, and structures and buildings previously shown within approximately 1,000 feet of the subject site are absent, or perhaps a couple may have had significant additions. The three present day jet fuel ASTs are shown within several hundred feet of the west end of the subject site, including the Cactus Channel and K-4 Parcel. A paved road along Cactus Avenue is shown along the north side of the subject site, terminating at 4th Street. The north end of a partially truncated Chanute Avenue is shown encroaching into the south portion of the east end of the K-4 Parcel. The west end of the Cactus Channel onsite is indicated to be channelized. Two buildings are shown, one of which may be an addition to or replacement of the building previously present along the west side of Graham Street, south of the subject site. The former MAFB hospital area is shown with the hospital building present, along with 5th Street, 7th Street and Hospital Way. This area is south of the east end of the subject site. West of the hospital area, at the northwest corner of Z Street and 4th Street is a rectangular building of commercial size, about two-thirds the size of the hospital building, located over 500 feet south of the subject site.

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The 1973 map, at a scale of 1"=2,200', shows partial coverage of the subject site and surrounding properties. The east approximate 2,100 feet of the subject site (Cactus Channel) and adjacent properties and area are covered, with that to the west of it not shown. The area covered shows the subject site and surrounding properties the same as on the 1967 map.

The 1980 map, at a scale of 1"=2,200', shows the subject site and surrounding properties the same as on the 1973 map.

The 2012 map, at a scale of 1"=2,200', shows no buildings or structures, but does show infrastructure, such as roads. Cactus Avenue is shown along the entirety of the subject site north boundary. North-south roads intersecting Cactus Avenue, not previously shown, include Elsworth Street to the west, Newhope Street (present day Veterans Way), and Frederick Street. Roads at the base, now labeled under March Field, MAFB, and MARB, have increased in the general area of the west end of the subject site. The present day 215 Freeway, which began as a roadway shown on the 1942 map, is located approximately 0.6 mile west-southwest of the subject site.

Aerial Photographs

A search was conducted for available aerial photographs of the area on file at the County of Riverside Flood Control and Water Conservation District (CRFCWCD). The search revealed aerial photographs taken of the subject site and surrounding area in 1948, 1962, 1974, 1980, 1984, 1990, 1995, 2005, and 2010, the latest photog raph available.

The aerial photographs reviewed at the CRFCWCD consisted of vertical aerial stereo graphic photographic pairs of varying scales. These photographs were viewed using stereoscopes with magnifications of 2X and 4X for three-dimensional enhancement. Due to the relatively large photographic scales involved, the analysis and subsequent interpretation of detail from aerial photographs sometimes requires a degree of subjective judgement. The degree of certainty on the interpretation of details depends upon factors such as the scale and the quality of the photograph. However, an analysis of aerial photographs will reveal the general site history as to the relative us of the land, possible ground disturbance, activities, etc.

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Digital aerial photographs of the subject site and surrounding area were provided by EDR for the years 1938, 1949, 1953, 1966, 1978, 1985, 1989, 1994, 2006, 2009, 2012, and 2016. These photographs were reviewed to enhance and/or supplement the review of the CRFCWCD photographs. Copies of the electronic aerial photographs provided by EDR, with the approximate site boundaries shown, are presented in Appendix D.

A summary of the site and surrounding conditions during the various times, as reflected in the CRFCWCD photographs is given below:

1. January 19, 1948, Photo Nos. 13 and 14, Scale 1" = 2,625'

[The EDR 1938 digital aerial photograph shows the subject site as vacant dry farm land surrounded by similar properties, with no storm drain (Cactus) channel present, and Graham Street/Riverside Drive as a paved road, cutting through the subject site.]

These early photographs are of average quality. The subject site is generally vacant land with the exception of two small, east- to west-trending, rectangular apparent buildings, trailers, and/or tents along the southern boundary of the K-4 Parcel. Several items are stored along the west perimeter of a fenced area within the northeast portion of the K-4 Parcel. This fenced area extends offsite to the east. The Cactus Channel appears as a straight, east- to west-trending, unlined channel with a roadway crossing at Riverside Drive. The channel bends southward along the west side of Heacock Street, a dirt roadway. The present day Cactus Avenue does not exist. The land to the north of the site is generally vacant land in a relatively natural state. However, there is an area near and north of the subject site, approximately 2,425 feet long (east-west), and very similar to that depicted for a skeet range(s) , storage building, high tower shotgun range, control house, and/or turret on Map M-3 from November 1943 presented within the September 1994 Archives Search Report Findings, March Air Force Base and Associated Sites, a June 1944 US Army Corps of Engineers Map for March Field, “General Plan” (with building schedule), and December 1944 US Army Corps of Engineers Map for March Field, “Landing Field: Parking Apron & Landing Field Expansion Schedule for Paving Operations”, discussed under the **REVIEW OF EXISTING REPORTS** section of this Phase I ESA report. This shooting range area appears to be situated along and immediately north of the present day Cactus Avenue. In the area west of the K-4 Parcel, numerous stored items and small apparent buildings, trailers, and/or tents are present. This area looks very similar to that depicted for a bomb storage facility on the above-referenced maps from the 1940s. This area is generally coincident with the present day three jet fuel ASTs. The present day Chanute Avenue is not present. Just east of the future Chanute Avenue, long, north- to south-trending, rectangular buildings, structures, and/or tents are present. The longest and northernmost of these structures is estimated to be situated adjacent to the east of the K-4 Parcel. These structures, according to the above-referenced June 1944 US Army Corps of Engineers map, are temporary truck shelters. East of the northernmost temporary truck shelter are seven east- to west-trending, small rectangular buildings, structures, and/or tents are present. These structures may have included offices for utilities and/or US (Army) Engineering Department or District. A running track (shown as “Athletic Field” on above-referenced maps from the 1940s) is located along the south side of the Cactus Channel, east of Riverside Drive, a paved roadway. The area to the south of the K-4 Parcel contains

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small amounts of stored items. Overall, the subject site and adjacent areas are very similar to that depicted on the above-referenced maps from the 1940s.

[The EDR 1949 and 1953 digital aerial photographs show numerous smaller objects, possibly including equipment, vehicles, materials, and/or structures (likely temporary) within the east portion of the K-4 Parcel.]

2. <u>January 28, 1962, Photo Nos. 1-85 through 1-87, Scale 1" = 2,000'</u>

These photographs are of poor quality, blurry. The two small, rectangular structures previously noted in the south portion of the K-4 Parcel are gone. A dirt path leads from the central portion of the K-4 Parcel from the south, terminating in a circle-shaped clearing in the central portion of the K-4 Parcel. This circle-shaped clearing may coincide with a small concrete foundation observed in the south-central portion of the K-4 Parcel during our site reconnaissance. The fenced area within the northeast portion of the K-4 Parcel is still present, but notably vacant. Chanute Avenue is now present as a dirt road. The area bound by the fenced area within the northeast portion of the K-4 Parcel on the north, Chanute Avenue on the east, approximately 800 feet west of Chanute Avenue, and on the south by the approximate current K-4 Parcel southern boundary, contains numerous rows of north- to south-trending, thin, rectangular items and apparent buildings, trailers, and/or tents. The previously noted features west of the site (bomb storage facility) are no longer present, and three cylindrical ASTs are now present. These tanks trend northwest to southeast, with the southeasternmost tank smaller than the other two. Cactus Avenue is now present as a paved roadway adjacent to the Cactus Channel on the north, from the western subject site boundary to Riverside Drive. Internal roadways east of Riverside Drive, south of the Cactus Channel, are now present as small, paved roadways (North Avenue, 2nd, 4th, 5th, and 7th Streets, and Z Street). The structures previously noted east of Chanute Avenue are no longer present. The land north of Cactus Avenue and the channel is vacant land in a relatively natural state, with the shooting range area features absent. A structure is present in the south half of the previously noted running track. The north half of the running track is faintly visible. A structure is present at the southwest corner of Cactus Avenue and Riverside Drive. The area south of the K-4 Parcel contains abundant stored items and some buildings, trailers, and/or tents.

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[The EDR 1966 digital aerial photograph, though of poor quality, indicates the K-4 Parcel is vacant land.]

3. May 24, 1974, Photo Nos. 233 through 235, Scale 1" = 2,000'

The K-4 Parcel is vacant with exception to Chanute Avenue, which appears paved. The area previously noted to contain numerous rows of north- to south-trending, thin, rectangular items and buildings, trailers, and/or tents in the eastern portion of the K-4 Parcel is cleared of such, and appears to be paved in these better quality photos. The previously noted fenced area in the northeast portion of the K-4 Parcel and adjacent area to the east is no longer present. A roadway crossing (4th Street) over the Cactus Channel is present approximately 725 feet of east of Riverside Drive, just north of the previously noted running track, which is now completely unidentifiable. A parking lot is present adjacent to the previously noted building on the south portion of the previous running track on the east. The hospital, Hospital Way roadway (paved), and parking lot areas are present at the southwest corner of North Avenue and 8th Street. The land to the north of the subject site remains vacant land in a relatively natural state. The area south of the K-4 Parcel is now vacant.

4. February 1, 1980, Photo Nos. 243 and 244, Scale 1" = 2,000'

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The K-4 Parcel is vacant with exception to Chanute Avenue and previously noted paved area. An apparent dirt path trends north to south across the K-4 Parcel in the area of the current power poles (approximately 725 feet west of Chanute Avenue). It is difficult to discern, but it appears that power poles are present along this path. A small dirt path trends east to west along the south side of the Cactus Channel from the west subject site boundary to Riverside Drive. A structure is present at the northeast corner of the Cactus Channel and Riverside Drive/Graham Street, at the terminus of the dirt path. Cactus Avenue is not present along the south side of this development, however, a partially paved roadway is present in this area and connects to the crossing at 4th Street. Additional parking lot areas for the hospital have been added. The remainder of the land to the north remains essentially the same as previously described. Ponded water is visible north of Cactus Avenue, just west of the western boundary of the K-4 Parcel.

5. February 7, 1984, Photo Nos. 1482 and 1483, Scale 1" = 1,600'

The K-4 Parcel is generally the same as previously described with exception to a dirt path that leads from the off-site ASTs to the west, to the northwest corner of the paved area on the K-4 Parcel which previously contained numerous rows of north- to south-trending, thin, rectangular items and buildings, trailers, and/or tents. Power poles are clearly visible along the previously noted north to south dirt path across the K-4 Parcel, approximately 700 feet

west of Chanute Avenue, and turns east along the south side of the Cactus Channel within the previously noted dirt path within the north portion of the K-4 Parcel to the building at the southeast corner of the Cactus Channel and Riverside Drive. A building is now present south of the K-4 Parcel, and oriented northeast to southwest with a perimeter fence. The remaining area of the K-4 Parcel remains as previously described.

6. January 23, 1990, Photo Nos. 5-26 through 5-28, Scale 1" = 1,600'

Chanute Avenue appears recently re-surfaced. A small trailer is present on the K-4 Parcel in the southeast portion of the previously noted paved area that contained numerous rows of north- to south-trending, thin, rectangular items and buildings, trailers, and/or tents. Frederick Street is now present and paved. The portion of Cactus Avenue south of the building located at the northeast corner of the Cactus Channel and Riverside Drive/Graham Street is paved wider (north to south) than previously noted. The Cactus Channel appears to have been mowed, due to the lack of vegetation evident. A building is present adjacent to the ASTs on the southeast to the west of the K-4 Parcel. The tops of the two larger ASTs appear different than previously viewed. The remainder of the surrounding land appears generally as previously described.

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7. January 28, 1995, Photo Nos. 5-23 through 5-25, Scale 1" = 1,600'

The paved area and trailer on the K-4 Parcel are gone, and the present day offsite and adjacent electrical substations are now present. Veterans Way is now present (paved). Cactus Avenue, paved, now extends to Heacock Street from Riverside Drive/Graham Street. There is a large pond of water approximately 500 feet south of central portion of the K-4 Parcel. Some development has occurred south of the east third of the K-4 Parcel, east of the ponded water. Commercial developments are present along the north side of Cactus Avenue, east of Veterans Way to Elsworth Street. Buildings are now present at the southeast corner of Cactus Avenue and Riverside Drive.

8. April 14, 2005, Photo Nos. 5-22 through 5-24, Scale 1" = 1,600'

Chanute Avenue onsite is in disrepair. The remainder of the subject site is generally as previously described. A small, paved access road is present south and west of the K-4 Parcel. Continued development has occurred south of the K-4 Parcel, which includes a clearing with stored items, small buildings, and a large, rectangular concrete slab. Heavy vegetation is visible in the Cactus Channel.

9. March 11, 2010, Photo Nos. 5-23 through 5-25, Scale 1" = 1,600'

End-dumped piles of fill soil are present in the east portion of the K-4 Parcel, from the electrical substations west approximately 420 feet and from the southern K-4 Parcel boundary north approximately 430 feet. The remainder of the subject site generally appears as described in the previous photographs. Joy Street, no longer existing at the present day, is now shown, as is the current eastern portion of the Harbor Freight building north of Cactus Avenue. From Joy Street westward to Heacock Street, numerous concrete tilt-up buildings are now present.

[The EDR digital aerial photographs from 2012 and 2016 show the subject site and adjacent properties largely the same as in the 2010 CRFCWCD photographs. However, the former MAFB hospital area at the southwest corner of North Avenue and 8th Street was cleared, and buildings and pavement were removed at the southwest corner of Cactus Channel and Riverside Drive. North of the subject site, between just east of Veterans Way and what was Joy Street, industrial development, including two large buildings, took place.]

Ownership/Assessor's Parcel Information

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The subject site is located in the County of Riverside, with the March Air Reserve Base area. The K-4 Parcel of the subject site is comprised of Assessor's Parcel Numbers (APNs) 297-150-006, -007, and -038, 297-160-005, and 297-200-004, roughly 35 acres of vacant land (Parcel Quest Lite, 2018). The Cactus Channel portion of the subject site crosses all of the K-4 Parcel Assessor's parcels, except for APN 297-160-005, and also crosses APNs 297-150-037, 297-200-012, 297-250-011, -013, and -014. These latter parcels are currently owned by the MJPA.

The subject site was formerly part of March Field during World War II under the US Army, followed by the USAF as part of MAFB/MARB. Some time following closure of MAFB in 1996, ownership was transferred to the MJPA for redevelopment. Parcel K-4 was conveyed from LNR Property Corp. to Meridian Park, LLC around August 2015.

Building Information Review

To develop a history of buildings/construction at the subject site, various sources were researched and reviewed. Based on historical aerial photographs, the subject site was vacant in 1938 with no development. During World War II and extending into the 1950s, the site was part of March Field, followed by MAFB. Maps from the 1940s during World

War II indicate no structures or buildings on the subject site. A review of historical aerial photographs from the 1940s and 1950s indicate numerous small structures or objects were present at the K-4 Parcel of the subject site, possibly including buildings, trailers, and/or tents. As indicated by historical aerial photographs from the 1960s, the K-4 Parcel was vacant land. The bridge crossover at Graham Street/Riverside Drive was originally constructed in the 1940s. The bridge crossover at 4th Street was constructed some time between 1953 and 1966.

City Directory Information

Historical city directories from 1975 to 2014 were searched by EDR for addresses along Cactus Avenue. Listings were available from 1992 to 2014, primarily commercial, which included fast food restaurants, credit union, financial services, truck supply, gasoline station (under Chevron, Inc.), engineering firms, church, and government agencies. None of the provided listings are for the subject site or adjacent properties within the bounds of the former MAFB.

The EDR-City Directory Image Report is provided in Appendix E.

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Interview

On August 7, 2018, a representative of Meridian Park, LLC, Mr. Jeff Gordon, was interviewed by telephone. Mr. Gordon indicated the K-4 Parcel had been owned since around August 2015, and was purchased from LNR Property Corp., who may have been the entity that previously purchased it from the MJPA, who took ownership of the parcel following transfer from the USAF.

The Cactus Channel is not owned by Meridian Park, LLC, but is under the county flood control district by ownership and/or easement. Meridian Park, LLC and other property owners have planned to make improvements to the channel (including a concrete box channel structure), which will be included under an Environmental Impact Report, and thus, is part of the study area of this Phase I ESA.

Mr. Gordon stated they have no environmental reports for the K-4 parcel, which would have been previously assessed under the BRAC process. He also indicated they have no knowledge of the specific history of the parcel, other than it was formerly part of MAFB.

When asked about the area with end-dumped materials in the southeast portion of the K-4 parcel, Mr. Gordon indicated the previous property owner accepted these materials which were generated during an EMWD pipeline project within a public roadway in relative proximity to the subject site.

SITE RECONNAISSANCE

On July 27, 2018, a representative from this firm conducted a reconnaissance of the subject site and immediate surrounding areas. To orient our site reconnaissance, a Preliminary Site Plan for K-4 Parcel (Figure 2), a Site Overview aerial photograph for the Cactus Channel (Figure 3), and a recent color aerial photograph image of the subject site from Google Earth Pro (Figure 4) were obtained.

The K-4 Parcel lies within the greater March Air Reserve Base area along the south side of Cactus Avenue from Veterans Way to approximately 600 feet east of Frederick Street, and extending approximately 700 feet south of Cactus Avenue. The roughly rectangular site comprises 35.4 ± acres, and contains a small 'cut out' within the east portion. This 'cut out' is approximately 200 feet east to west and 430 feet north to south, beginning approximately 140 feet west of the southeast corner of the site. This 'cut out' contains two electrical substations. The southern substation is surrounded by a masonry wall, while the northern substation, identified by signage as the Tanker Substation belonging to Southern California Edison (SCE), is surrounded by a chain-link fence. An electrical box on a pedestal was present outside the SCE substation on the southeast side. A telecommunications manhole was also noted in this area.

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Chanute Avenue trends northward from the southeastern portion of the K-4 Parcel, east of the 'cut out', along the eastern site boundary for approximately 350 feet as a highly dilapidated paved roadway. As previously mentioned, the north boundary of the K-4 Parcel is Cactus Avenue, a paved roadway. South of this roadway is an unlined drainage channel (Cactus Channel). Just beyond the drainage channel, on the south side, is a chain-link fence with barbed wire on top. A dirt roadway traverses the K-4 Parcel from east to west just south of this chain-link fence. Along this dirt roadway, numerous marker identifiers, manholes, and other features belonging to EMWD are present. In addition, numerous manholes associated with underground electrical lines were also noted to trend east to west near this dirt roadway. Two sets of power poles and lines, trending from the east, enter the K-4 Parcel around the dirt roadway in the northeast portion. One of these trends onto the eastern portion of the K-4 Parcel, and turns south to connect with the existing electrical substations. The second remains trending east to approximately 120 feet west

of Frederick Street, where it turns and trends south across the K-4 Parcel and offsite. In the northeast corner of the K-4 Parcel, one of the power poles has a mounted electrical transformer with no leakage was noted. Near this power pole, EMWD features, including a cathodic protection rectifier, a pad-mounted electrical transformer (no leakage was noted), and manhole cover for underground electric lines are present. A small pile of gravel and two rolls of chain-link fencing were also observed in this area.

The area to the west of the north-south trending power poles and the electric substations contains approximately 3 to 5 feet of loose, smoothed out, fill material stockpiles. It is estimated that roughly 20,000 cubic yards of fill materials are present. Some construction debris, mainly concrete, was noted within areas of these fill materials. The area to the west of the smoothed out fill materials is vacant. However, a small, approximate 14-inch by 14-inch, square foundation was noted in the south-central portion of the K-4 Parcel, and may coincide with a dirt path terminating in a circle-shaped clearing, as shown in the historical CRFCWCD 1962 aerial photographs.

Within the northwest corner of the K-4 Parcel, several EMWD markings, electrical- and telecommunication-related manhole covers, a pile of old sand bags, and one 10-foot section of plastic pipe were noted.

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Evidence of previous soil engineering work was observed at two locations of percolation/infiltration testing along the north portion of the K-4 Parcel, south of the dirt roadway. The locations contain 3-inch polyvinylchloride (PVC) pipe in the ground to depths of approximately 5.1 and 6.1 feet bgs. Both locations are dry; however, the bottoms were muddy. Another location within the south-central portion appeared to be a deeper boring location with some spoils piled and a white stake with red flagging.

Two electrical-related manhole covers were noted along the southern K-4 Parcel boundary, one just west of the electrical substations and the other at the approximate location of the north-sound trending power poles on the site.

The K-4 Parcel was generally void of vegetation, and was recently mowed. Chain-link fence with barbed wire on top bounded the parcel on the north, south, and west. A small, paved perimeter road lies beyond the fence to the west and south, with various structures of MARB beyond, including three large jet fuel ASTs.

The Cactus Channel area of the site stretches from approximately Elsworth Street to Heacock Street, approximately 1.5 miles, and is bound by vacant land on the south, a

portion of which is located at the K-4 Parcel, and Cactus Avenue, a paved roadway on the north. Two roadway bridges are present across the channel at Riverside Drive and 4th Street.

The Cactus Channel is typically a broad, low-lying channel with various locations of standing water from Elsworth Street to Frederick Street. Heavy vegetation exists within the areas of standing water. The sides of the channel have been recently mowed. Beyond Frederick Street eastward to Heacock Street, the channel was dry and became slightly deeper and "V"-shaped, and contained very minor vegetation, being recently mowed along the edges.

Various storm drain inlets were observed along the north side of the Cactus Channel, the westernmost of which is roughly 100 feet east of Elsworth Street, effectively the beginning/west end of the channel. One storm drain inlet, towards the east end, was noted along the south side of the channel. These varied in size. Also noted along the northern edge of the channel, were utility improvements, consisting of traffic signals, EMWD fixtures, and an AT&T facility.

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The eastern end of the channel contained a retaining wall with chain-link fence on top along the northern edge. This wall is associated with a right turn lane on Cactus Avenue onto Heacock Street. An old, concrete retaining wall was present along the mid-portion of the southern wall of the eastern end of the channel. At the eastern end of the channel, construction of large, concrete storm drain boxes was being conducted to connect the Cactus Channel to the channel along the west side of Heacock Street.

Trash mainly consisted of windblown trash, bottles, tires, aluminum cans, empty paint can, and clothes. Minor asphalt and concrete debris was observed. Two areas along the northern edge of the channel were noted to contain 1-quart sized, empty, plastic motor oil containers. One location had two such containers, and the second location had one. No soil staining was noted at either location.

The topography of the subject site is generally planar with a gentle fall to the south-southeast. Along the Cactus Channel, elevation differences range from approximately 3 to 5 feet bgs along much of the channel, starting at the west end, leading east to just past the 4th Street bridge, where the channel bottom increases from around 7 to 8 feet bgs to around 15 to 16 feet bgs at the far east end where construction of large, concrete storm drain boxes is taking place.

Adjoining Properties

The subject site is bordered to the north by Cactus Avenue, an asphalt-paved, 6-lane thoroughfare, whose right-of-way is greater than 100 feet wide (north-south). Beyond Cactus Avenue to the north are numerous commercial and industrial properties, including Harbor Freight Distribution Center, Serta Simmons Bedding, Moreno Valley United States Post Office Distribution, Federal-Mogul Corporation, Altura Credit Union, County of Riverside Department of Public Social Services, restaurants (including fast food), Circle K convenience store, and two gasoline stations. The gasoline stations include a Chevron at the northeast corner of the intersection at Cactus Avenue and Elsworth Street, addressed 22520 Cactus Avenue, and a Union 76 at the northwest corner of the same intersection, associated with the Circle K convenience store, addressed 22470 Cactus Avenue. Bordering to the east of the subject site is an earthen channel along the west side of Heacock Street, an asphalt-paved, 5- to -6 lane roadway. Beyond Heacock Street to the east generally are single-family residences. An apparent EMWD water pumping facility is located at the southeast corner of the intersection at Cactus Avenue and Heacock Street. Bordering to the south of the subject site are vacant or developed portions of the former MAFB, now MARB, with most of the active military base adjacent to the south of the most of the west portion of the site, including the K-4 Parcel. This active portion of the base includes three large jet fuel (JP-8) ASTs (one tank is 1.26 million gallons and two tanks are 2.31 million gallons), located within a fenced area approximately 55 feet west-southwest of the southwest corner of the K-4 Parcel, the closest distance to the subject site. The ASTs and associated concrete bermed areas are approximately 200 feet or more from the subject site. The ‘cut out’ bordering the east portion of the subject site appears to be a northerly extension of the active base, including the two previously mentioned electrical substations, the northern of which belongs to SCE. No other features of environmental concern were observed at the active base (MARB). A rectangular, ‘island’ area of the active MARB with two east-west oriented, roughly rectangular office buildings, just south of the Cactus Channel portion of the subject site between 2nd and 4th Streets, includes various military agencies, including a US Marine Corps recruiting station, USAF 452d Communications Squadron, US Army Corps of Engineers, and USAF 362d Recruiting Squadron. The former base area to the south of the central portion of the subject site includes newly constructed complex of over half a dozen commercial buildings over 500 feet away.

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Color photographs of the subject site and adjoining properties are presented within Appendix F.

REGULATORY AGENCY RECORDS REVIEW

For records relating to environmental compliance and hazardous materials/waste within the County of Riverside, the County of Riverside Department of Environmental Health (CRDEH) generally is the lead agency. The California Regional Water Quality Control Board, Santa Ana Region (CRWQCB-SAR) or CRDEH may be the lead agency for soil and groundwater investigations and remediation.

County of Riverside Department of Environmental Health

As the subject site has no known associated addresses, no specific records request for the subject site could be made, and based on the historical military usage of the site, site-specific records are held by other agencies, including the SARWQCB and USAF. Previously prepared environmental reports and other information reviewed, much of which was obtained from the USAF online Administrative Records website, is discussed under the **REVIEW OF EXISTING REPORTS**.

California Regional Water Quality Control Board - Santa Ana Region

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The California State Water Resources Control Board (SWRCB) maintains the online GeoTracker database, which includes CRWQCB-SAR records for: 1) cleanup sites, including leaking underground storage tank (LUST) sites, cleanup program sites, military cleanup sites, and California Department of Toxic Substances Control (DTSC) cleanup sites; 2) permitted facilities, including waste discharge requirements sites, permitted USTs, DTSC hazardous waste sites, land disposal sites, irrigated lands regulatory program sites, and oil/gas sites; and 3) other sites, including project sites, non-case information sites, sampling points - public, and field points.

This database was searched for records that may pertain to the subject site, and none were found. Sites are identified that are associated with the former MAFB, the two closest of which to the subject site are OU2-A - Site No. 11 (bulk fuel storage area) and OU-4 - Base Hospital and Clinic.

The ROD document for Site No. 11 indicates no interim remedial actions were undertaken, but land use controls for soil were implemented. Elevated polycyclic aromatic hydrocarbons (PAHs) were reported to be above residential, but below industrial acceptable risk levels.

Summary information for the Base Hospital and Clinic indicate the main hospital building was five stories and the dental clinic was a one-story structure. Construction of the hospital was completed in 1966 and modified in subsequent years. The dental clinic was completed in 1985. Investigations were incited to investigate and evaluate the potential risk form release of mercury to the environment through leaks from sewer pipes, as well as risk to potential risk to workers inside the hospital and dental clinic from mercury vapors emanating from the sink drains. During investigations, sludge and sediment samples were taken from sewer piping within the hospital and dental clinic, and from all sewer manholes leading away from the hospital and dental clinic to determine the extent of mercury contamination in the sewer line. Additionally, indoor air samples were collected within the former Base Hospital and Clinic to evaluate potential inhalation hazards. Of the thirty (30) sludge/sediment sample results, only four exceeded the residential Preliminary Remediation Goal (PRG) of 23 mg/kg. A potential sewer line leak source was investigated and remedied. The sewer line was plugged down-gradient to allow for high pressure washing of the line to remove all sediment and sludge. All wash water and sludge were properly disposed of. The Remedial Investigation Report was released to the public on July 23, 2004, and the Proposed Plan was released on August 31, 2004. These documents were not available for review through GeoTracker. Twelve ambient indoor air samples were taken inside the hospital and dental clinic to confirm previous results obtained in July 2000. Every indoor air sample taken was below the residential PRG of 0.31 micrograms per cubic meter. The USAF determined that mercury was not a potential risk for human health and environment at this site.

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ENVIRONMENTAL DATABASE REVIEW

EDR was contacted to provide an environmental database search for the subject site. The database search provides information regarding landfills, USTs, hazardous waste generators, etc., at the subject site and surrounding properties in accordance with ASTM Standards and AAI. Around a dozen sites and the former MAFB and/or associated sites, not including the subject site, were found in EDR's database search. A copy of the EDR database report, which provides a complete list of the federal, state, tribal, and proprietary records searched, is provided in Appendix G.

NPL/SEMS

Pursuant to the Comprehensive Environmental Resource Conservation and Liability Act of 1980 (CERCLA), the USEPA has developed and maintained lists of contaminated properties under the Federal Superfund Program.

There is one site identified within 1 mile of the subject site, which is included in the USEPA Superfund Enterprise Management System (SEMS) list and the National Priority List (NPL) database. The site is MAFB, of which the subject site was formerly a part. MAFB is also listed in other databases, including as a Resource Conservation and Recovery Act (RCRA) large quantity generator (LQG), under the US ENG (engineering) CONTROLS and US INST (institutional) CONTROL databases, multiple listings under the ENVIROSTOR database, and as AST, DOD (Department of Defense), ROD, PRP (Potentially Responsible Parties), and UXO (unexploded ordnance) sites. MAFB started out in 1918 as Alessandro Aviation Field, and has served as a training base and refueling operations base. Industrial operations (including aircraft maintenance and repair) involved use of solvents and disposal of solvent wastes. Various uses of the base have occurred over time, including pilot, bombing, and gunnery training. MAFB participated in the IRP, established in 1978. Under this program, the United States DOD sought to identify, investigate, and clean up contamination from hazardous materials. As part of the IRP, the USAF investigated potentially contaminated disposal areas. MAFB Well No. 1, on-base, was found to be contaminated with TCE, PCE, and cis-1,2-dichloroethene at levels that exceeded State of California drinking water standards. The well was taken out of service. Soils at the base are contaminated with toluene and benzene. An estimated 11,600 people obtain drinking water from municipal wells within 3 miles of hazardous substances at MAFB. The USAF conducted remedial investigation and identified alternatives for remedial action. At least 38 areas (IRP sites) of soil and/or groundwater contamination have been identified at MAFB. Three operable units were designated, which include these sites of contamination. Contamination has occurred at MAFB in association with various activities, including disposal of waste in waste pits, landfill placement, fuel storage, discharge into effluent ponds and a drainage channel, fire training, and maintenance. Contaminants identified at MAFB include PCBs, solvents (including TCE and PCE), petroleum hydrocarbons (including diesel, gasoline, oil, hydraulic fluids, and jet fuel), paint thinners, paint strippers, and battery acids. Onsite and offsite TCE and PCE groundwater plumes have impacted several groundwater production wells. MAFB, identified as a RCRA LQG, has generated numerous hazardous wastes, including heavy metals (include cadmium, lead, mercury, and silver), volatile organic compounds (including solvents), and ignitable and corrosive wastes. General generator Notices of Violation were issued in 1984 and 1995. MAFB is listed with numerous engineering controls in place, including operation and maintenance of groundwater extraction and discharge with the use of liquid-phase carbon adsorption, soil vapor extraction (in-situ), bioremediation (ex-situ), groundwater monitoring, areas of contaminated soil that have been capped, soil disposal, soil recycling, soil excavation, impermeable barrier of some type for soil, low temperature thermal desorption of soil, and no action regarding areas of soil and/or groundwater. Institutional controls are in place as

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well, including covenants, deed notices, base use plan change, and subdivision, zoning, and building, demolition, or excavation regulations. The groundwater plumes and most of the IRP sites are located south of the subject site, 500 feet or more away. A couple of sites, including the bulk fuels storage area and Base Hospital and Clinic, have associated IRP sites, and are located within 500 feet. These sites are discussed under the **REGULATORY AGENCY RECORDS REVIEW** and **REVIEW OF EXISTING REPORTS** sections of this report. These IRP sites are not anticipated to have a significant environmental impact to the subject site.

RCRA-LQG

RCRA large quantity generators include sites that generate over 1,000 kilograms (kg) of hazardous waste or over 1 kg of acutely hazardous waste per month. Three RCRA-LQG sites are listed within 0.25 mile of the subject site, including MAFB, which is discussed above. The other two sites are Chevron Station No. 200908 at 22520 Cactus Avenue and Moreno Valley Unocal at 22470 Cactus Avenue, both located across Cactus Avenue to the north or northwest over 100 feet from the subject site. The Chevron site is listed with generation of aqueous solution with <10% total organic residues, other organic solids, ignitable, and benzene hazardous wastes. The Unocal site is listed with generation of benzene, ignitable, and corrosive hazardous wastes. Neither the Chevron or Unocal sites have reported violations, and based on that and their distance away, these two RCRA-LQG sites should have no significant environmental impact to the subject site.

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RCRA-SQG

RCRA small quantity generators include sites that generate between 100 and 1,000 kg of hazardous waste per month. Four RCRA-SQG sites are listed within 0.25 mile of the subject site, including MAFB, which was previously above. All four of the RCRA-SQG sites have no reported violations. The closest site, Harbor Freight Tools Distribution, across Cactus Avenue from the subject site, over 100 feet away, is listed with generation of numerous hazardous waste categories, including ignitable, corrosive, heavy metals, benzene, methyl ethyl ketone, PCE, and TCE. Based on the distances away and lack of reported violations, these RCRA-SQG sites are not anticipated to have an adverse environmental impact to the subject site.

ENVIROSTOR

The California DTSC Site Mitigation and Brownfields Reuse Program's ENVIROSTOR database identifies sites that have known contamination or sites for which there may be reasons to investigate further. There are four sites, in addition to MAFB previously discussed, listed in the ENVIROSTOR database. Most of these four sites are school evaluation sites located over 0.5 mile from the subject site. The closest listed site, Alper Cleaners at 14420 Elsworth Street, is located several hundred feet north of the subject site. This site has a status indicating a regulatory case was referred to the local agency. Based on distance from the subject site, no adverse environmental impact to the subject site from these four ENVIROSTOR sites is anticipated.

LUST

The State Water Resource Control Board (SWRCB) maintains a list of all leaking underground storage tanks (LUST) within the state. According to the SWRCB LUST database, there are four sites (two are listed twice) within 0.5 mile of the subject site. All four of these sites have closed LUST environmental cases, including the Chevron and Unocal (under Texaco (Shell)) sites across Cactus Avenue from the subject site. None of these LUST sites should have an adverse environmental impact to the subject site based on their closed regulatory case and/or distance from the subject site.

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UST

The UST database is maintained by the SWRCB and lists all registered USTs. This database lists two sites, Chevron Station #200908 and Moreno Valley Unocal, located across Cactus Avenue from the subject site, listed under other databases, including the LUST database. The Chevron is listed with 4 USTs and the Unocal with 3 USTs. These UST sites should have no adverse environmental impact to the subject site due to the distance away and closed LUST environmental regulatory case.

AST

The SWRCB maintains a list of aboveground storage tanks (ASTs). The data comes from their hazardous substance storage container database. One site, Department of Defense, Media Center AFRTS-BC, located at 23755 Z Street, over 400 feet south of the subject site, is listed in the AST database. This site is listed with 2,050 gallons of unspecified hazardous substance, but may be for diesel fuel for a backup generator. Based on the lack

of reported AST release(s), distance away, and being topographically downgradient, this AST site is not anticipated to have an adverse environmental impact to the subject site.

SWRCY

This state database is a listing of recycling facilities in California. One site, Menlo Recycling Center at 22405 Golden Crest Drive, is listed over 0.1 mile west of the subject site. This site is listed as being non-rural, not a grandfathered facility, and with an operation start date on August 3, 2016. This recycling facility receives aluminum, glass, plastic, and bimetal. Based on the distance away and nature of the recycling operation, this site should present no adverse environmental impact to the subject site.

SWEEPS UST

The Statewide Environmental Evaluation and Planning System (SWEEPS) database is an UST listing that was updated and maintained by a company contracted by the SWRCB. Two sites are listed in this database within 0.25 mile of the subject site. The closest site, Chevron #200908 at 22520 Cactus Avenue, over 100 feet from the subject site, is also listed in other regulatory databases, including the LUST database. This site is listed with four 10,000-gallon unleaded gasoline USTs. Based on the closed LUST regulatory case, lack of reported UST release, and/or distance from the subject site, the listed SWEEPS UST sites should have no adverse environmental impact to the subject site.

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CA FID UST

The California Facility Inventory Database (CA FID) contains a historical listing of active and inactive UST locations from the SWRCB. The same two sites listed in the SWEEPS UST are also listed in the CA FID UST database.

DRYCLEANERS

This database is a list of drycleaner-related facilities that have EPA identification numbers. These are facilities with certain Standard Industrial Classification (SIC) codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; and laundry and garment services. Alper Cleaners, under three listings, is shown in this database, and is located several hundred feet north of the subject site. This site is listed under the ENVIROSTOR database as being referred to a

local regulatory agency. Based on the distance away and lack of reported release(s), this drycleaner site should have no adverse environmental impact to the project site.

HIST CORTESE

The historical Cortese (HIST CORTESE) list is a historical listing from the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (CALSITES). Two of the sites listed in the LUST database are also listed in the HIST CORTESE database, including Chevron #200908 and ARCO AM/PM Mini Market #5128.

EDR Hist Auto

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. One site Chevron USA, Inc. at 22520 Cactus Avenue, is listed in this database. This site is shown with listings from 2000 through 2011. Based on the closed LUST regulatory case and distance from the subject site, this EDR Hist Auto is not anticipated to have an adverse environmental impact to the subject site.

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EDR Hist Cleaner

This EDR proprietary United States Historical Cleaners (US Hist Cleaners) database includes records based on EDR's search of selected national collections of business directories, and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches. One site, Alper Cleaners at 14420 Elsworth Street, several hundred feet from the subject site, is listed in the EDR Hist Cleaner database. This site is listed under Alper Cleaners from 1993, 2002

through 2011, and 2014. Based on the distance away and no reported environmental release, this EDR Hist Cleaner site should have no adverse environmental impact to the project site.

Orphan Summary

The EDR Radius Map™ Report with GeoCheck® Orphan Summary, which is a list of all sites whose location is not readily identified and may be near or at the subject site, was reviewed. The subject site and adjoining properties do not appear to be listed in the Orphan Summary. A clandestine drug lab (CDL) listing is shown on Cactus Avenue within the zip code 92518, in which the subject site is located. Based on the listing, abandoned drug lab waste or equipment were located away from an actual illegal drug lab. This listing may or may not pertain to the subject site. However, this listing is not anticipated to have a significant impact to the subject site, as the equipment or waste were likely cleaned up following discovery, and may not have been located on or near the subject site.

Division of Oil, Gas, and Geothermal Resources

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The California Division of Oil, Gas, and Geothermal Resources (DOGGR) maintains a list of all producing and abandoned oil and gas wells within the State of California. We reviewed the online DOGGR Well Finder, which indicates no abandoned or producing gas and/or oil wells have been located within one mile of the subject site (DOGGR, 2018).

VAPOR ENCROACHMENT EVALUATION

As part of this Phase I ESA, a VES was conducted to determine if a VEC exists, based on the information obtained during the Phase I ESA. A VEC is the presence or likely presence of chemicals of concern (COC) vapors in the subsurface of the target property caused by the release of vapors from contaminated soil or groundwater either on or near the target property (i.e., subject site).

Vapor Encroachment Screen

A VES, comprised of Tier 1 and 2 (non-invasive) screening, was conducted by this firm for the subject site. The VES was conducted in general accordance with the Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions, American Society for Testing and Materials E2600-15. Although not required to satisfy the requirements of the Phase I ESA under ASTM E1527-13, ASTM E2600-15 was chosen

as a methodology to evaluate potential contaminant vapor concerns at or adjoining the subject site.

The subject site is storm drain channel and vacant land with remnant roads and features from former military bases, and is currently planned for industrial development. The site was formerly part of March Field during World War II, followed by MAFB/MARB. Some time following closure of MAFB in 1996, ownership was transferred to the MJPA for redevelopment, and conveyed in relative recent years to private parties. It is located in a mixed residential, commercial, and industrial area. Based on the recent geotechnical investigation by LCI, the subject site and surrounding area are anticipated to be underlain by older alluvial soils, comprised of sandy and silty clays, silty and clayey sands, and sands. Based on the local geology and groundwater hydrogeology, groundwater beneath the subject site is shallow, and anticipated to be present within 30 feet bgs. Based on the shallow onsite groundwater, groundwater is considered to be a potential source of vapor into the subject site.

Based on the results of Tier 1 screening, utilizing the EDR Radius Map™ Report with Geocheck® and research of the history of the subject site and adjoining properties, the sites within 0.33 mile with current and/or former potential sources of soil vapor intrusion or encroachment include the former March Field and MAFB/MARB, both of which the subject site has been a part of, Alper Cleaners, Chevron Station No. 200908, and Texaco (Shell) Cactus Avenue/Moreno Valley Unocal. Based on the results of the VES, Tier 1 screening, a VEC at the subject site could not be ruled out.

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Under VES, Tier 2 screening, using the critical distance determination, the above-listed gasoline stations and drycleaners are located over 100 feet from the subject site. The two closest potential sources of soil vapor at the former March Field/former MAFB/MARB are IRP Site Nos. 11 (bulk fuel storage area) and former base hospital and dental clinic area (USAF Building Nos. 2990 and 2991, respectively). The reported releases of hydrocarbons or mercury at these sites are over 200 feet from the subject site. All of these sites are located beyond the critical distance for hydrocarbons at 30 feet or all chemicals of concern at 100 feet away from the subject site. Based on the results of the Tier 2 screening, a VEC at the subject site can be ruled out because a VEC does not or is not likely to exist.

DATA GAPS

Under AAI, data gaps that remain after the conduct of all required activities must be identified. The source of information consulted to address the data gaps should be

identified, and the significance of the data gaps with respect to our ability to identify conditions indicative of releases or threatened release of hazardous substances on, at, in, or to the property should be addressed.

No interviews were conducted with the USAF or MJPA, the owners of the subject site with the longest history. The MJPA was previously interviewed for an offsite property formerly part of the former MAFB/MARB, and they could provide no information of pertinence. The MJPA previously referred us to the USAF, who referred us to the MJPA. Given the extensive history and documentation of past and recent environmental assessment and/or remediation near the subject site, provided mostly in USAF online documents, there are no significant data gaps remaining after our conduct of the AAI.

CONCLUSIONS AND RECOMMENDATIONS

During future grading subsurface utility lines will be encountered, including water, electric, and telecommunications. If water lines are encountered, asbestos-containing materials may be present. Appropriate precautions and handling of such materials should be undertaken. If any of these materials are to be disposed, they should be lawfully transported offsite to an appropriate disposal facility.

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There are around a dozen sites and the former MAFB and/or associated sites, not including the subject site, listed in environmental regulatory databases within 1 mile of the subject site. Based on the results of our VES, Tier 1 and 2 screening, a VEC at the subject site can be ruled out because a VEC does not or is not likely to exist. Based on our review of environmental regulatory databases, review of previously prepared environmental reports, and VES, no environmentally impaired properties, listed within these databases, have current or former releases of hazardous substances and/or petroleum products that have migrated to and/or significantly impacted the subject site.

We have performed this Phase I ESA in conformance with ASTM E1527-13 and AAI set forth in 40 CFR Part 312 for the for the K-4 Parcel and Cactus Channel, approximately 46 acres of vacant land, located along/near the south side of Cactus Avenue, at March Air Reserve Base in the Moreno Valley area of Riverside County, California. Based on the findings of the Phase I ESA and with consideration given to the recommendations contained in this report, the subject site exhibits no evidence of RECs, HRECs, and/or CRECs indicative of releases or threatened releases of hazardous substances on, at, in,

or to the subject site, except for the following:

- The subject site has historical use under three former military bases, including US Army Air Force March Field during World War II, USAF MAFB following World War II, and MARB from 1996 until some time later, being transferred to the MJPA, constituting a REC.

Based on the research conducted during this Phase I ESA, including the review of numerous environmental reports prepared under the BRAC process, the above REC does not appear to have significantly impacted the subject site. However, the specific nature of the objects, buildings, and/or structures onsite within the K-4 Parcel during World War II and years following into the early 1960s are undetermined. Any impacts to the subject site from this time period are likely localized and not anticipated to have a significant impact to the planned industrial development of the subject site. Similarly, no significant impact to the planned onsite development from the imported fill materials from a local EMWD pipeline project is anticipated. To confirm these conclusions regarding the environmental condition of the subject site, soil sampling should be conducted. Such sampling would be from random, gridded locations across the site and/or fill materials, and would include analysis for heavy metals, hydrocarbons, pesticides, herbicides, polychlorinated biphenyls, volatile organic compounds, and/or semi-volatile organic compounds. If desired, a work plan to conduct this sampling can be prepared.

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Based on the past use of the subject site as part of military bases for over 50 years, both the US Army Air Force and USAF, future development of the subject site, including grading activities, have the potential to encounter subsurface hazardous materials and/or wastes, buried trash and debris, UXO, and contaminated media, including soil, soil vapor/gas, and/or groundwater. If any of these are encountered during site development, further environmental assessment, evaluation, and/or remediation may be necessary.

The former base hospital and dental clinic area, within a couple hundred feet to the south of the east end of the subject site, is an HREC, and IRP Site No. 11, the past and current bulk fuels storage area within 100 feet of the west end of the K-4 Parcel, is a CREC. Based on past environmental assessment in these areas, neither of these sites appear to have had a significant environmental impact to the subject site.

STATEMENT OF QUALIFICATIONS

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the property. We have developed and performed the all appropriate inquires in conformance with the standards and practices set forth in 40 CFR Part 312.

Mr. John Leuer is the President of LOR Geotechnical Group, Inc., founded in 1988. As a cofounder and President of the company, Mr. Leuer has managed LOR through hundreds of Phase I Environmental Site Assessments, as well as numerous Phase II Environmental Site Assessments and remediation projects, primarily remedial excavation. Mr. Leuer has over 36 years experience in the geotechnical and environmental fields. Mr. Leuer has substantial experience coordinating projects for many city, county and state agencies, as well as in the public sector, gaining a reputation for being responsive to clients needs while providing strong technical expertise. LOR Geotechnical Group, Inc. is one of three firms that previously provided report review for underground storage tank closure for the County of San Bernardino, Fire Department Hazardous Materials Division.

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Mr. Leuer holds a B.S. in Civil Engineering from Cal State University at Northridge. He is a registered Geotechnical and Civil Engineer in the State of California. Mr. Leuer is a member of the American Society of Civil Engineers.

Mr. Mathew L. Hunt has over 19 years experience in the environmental field. Mr. Hunt works under LOR Geotechnical Group's environmental operations and has conducted over 350 Phase I Environmental Site Assessments for the private and public sectors. The properties have ranged from agricultural to residential to commercial/industrial. In addition to his experience with environmental assessments for property transfers, he has worked on projects that require mitigation prior to development. Mr. Hunt is well versed in hazardous waste sampling and characterization methodologies in soil and groundwater regimes for groundwater monitoring, site assessment, and site remediation. Projects have ranged from leaking USTs at gasoline stations to commercial and government (including Superfund/CERCLA sites) projects involving metals, perchlorate, and solvents.

Mr. Hunt has a B.S. in soil science from California Polytechnic State University, San Luis Obispo and a M.S. in soil and water science from the University of California, Riverside.

LIMITATIONS

This report was prepared solely for the use and benefit of LOR's client, Meridian Park, LLC, their affiliates, and assigns, including local jurisdiction, lenders, and future tenants or buyers/owners. They may release this information to third parties, who may use and rely upon this information at their discretion. However, any use of or reliance upon this information by a party other than Meridian Park, LLC, their affiliates, and assigns, including local jurisdiction, lenders, and future tenants or buyers/owners, shall be solely at the risk of such third party and without legal recourse against LOR Geotechnical Group, Inc.; its subsidiaries and affiliates; or their respective employees, officers, or directors; regardless of whether the action in which recovery of damages is sought is based upon contract, statute, or otherwise. This information shall not be used or relied upon by a party which does not agree to be bound by the above statement.

The content and conclusions provided by LOR in this assessment are based on information collected during our investigation, which may include, but is not limited to, visual site inspections, interviews with the site owner, regulatory agencies and other pertinent individuals, a review of available public documents, subsurface exploration and laboratory testing of soil samples, and our professional judgement based on said information at the time of preparation of this document. Any subsurface samples results and observations presented herein are considered to be representative of the area of investigation; however, soil conditions may vary between sample locations and may not necessarily apply to the general site as a whole. If future subsurface or other conditions are revealed which may vary from these findings, the newly-revealed conditions must be evaluated and may invalidate the conclusions of this report.

DRAFT

This report has been prepared in accordance with generally accepted practices using standards of care and diligence normally practiced by recognized consulting firms performing services of a similar nature. LOR Geotechnical Group, Inc. (LOR) is not responsible for the accuracy of information provided by other individuals or entities which is used in this report. This report presents our professional judgement based upon data and findings identified in this report, and the interpretation of such data based upon our experience and background, and no warranty, either expressed or implied, is made. The conclusions presented are based upon the current regulatory climate and may require revision if future regulatory changes occur.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Governmental Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a significant amount of time without a review by LOR Geotechnical Group, Inc., verifying the suitability of the conclusions and recommendations. Based on ASTM E1527-13 and AAI, certain components of this report are no longer valid after 180 days of their being performed, including interviews, visual inspection of the subject property and adjoining properties, and review of federal, tribal, state, and local government records. Once this 180-day period has expired, this report should be updated or revised to meet the requirements for continued viability under the ASTM and AAI standards.

DRAFT

CLOSURE

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR part 312.

We appreciate this opportunity to be of service and trust this report provides the information desired at this time. Should questions arise, please do not hesitate to contact this office.

Respectfully submitted,
LOR Geotechnical Group, Inc.

Mathew L. Hunt
Environmental Scientist

John P. Leuer, CE 34996
President

DRAFT

MLH:JPL\ss

Distribution: Addressee, PDF via email: Timothy.Reeves@lewismc.com
Mr. Jeff Gordon, PDF via email: JGordon@waypointpg.com

REFERENCES

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DRAFT

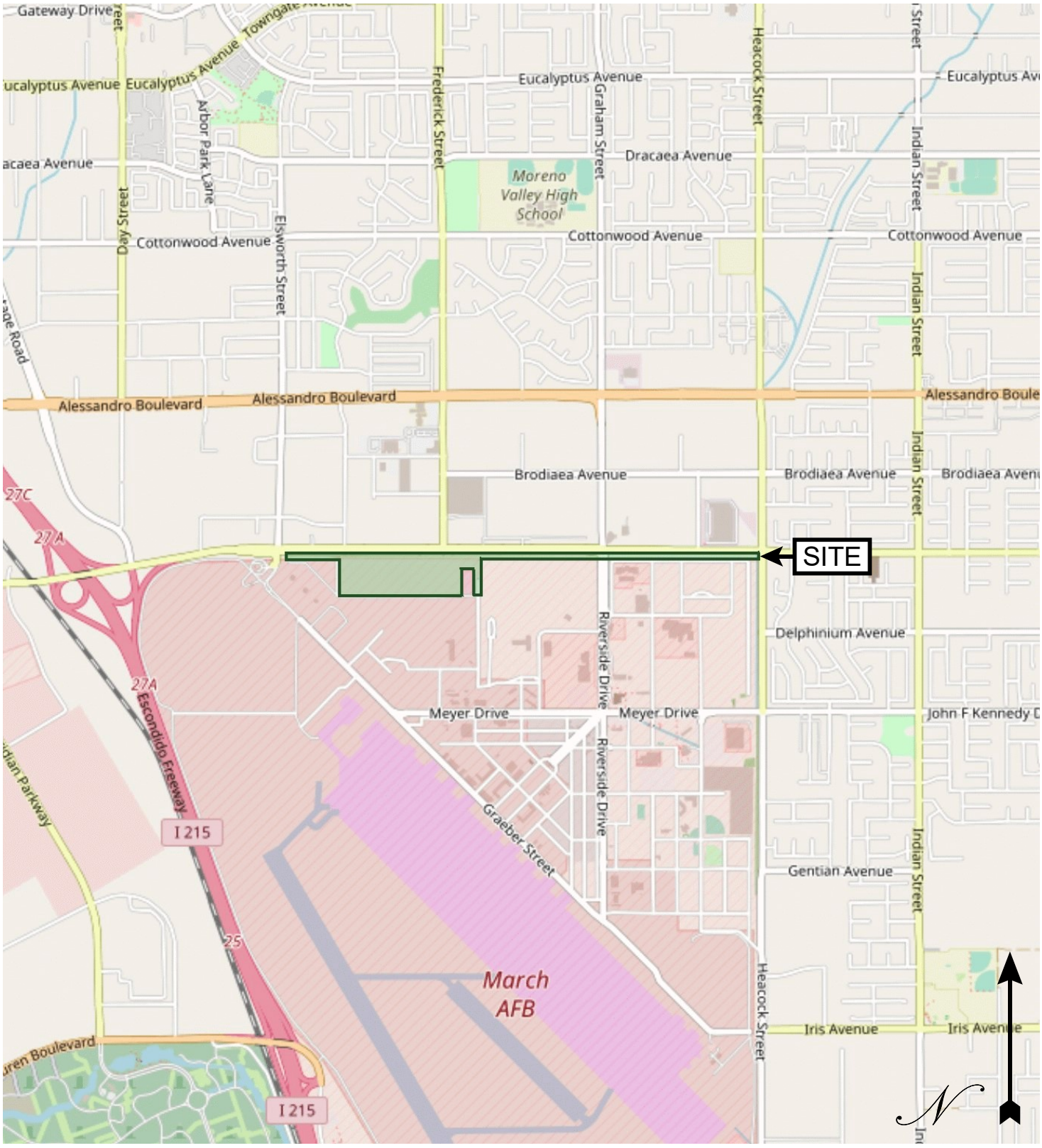
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FIGURES

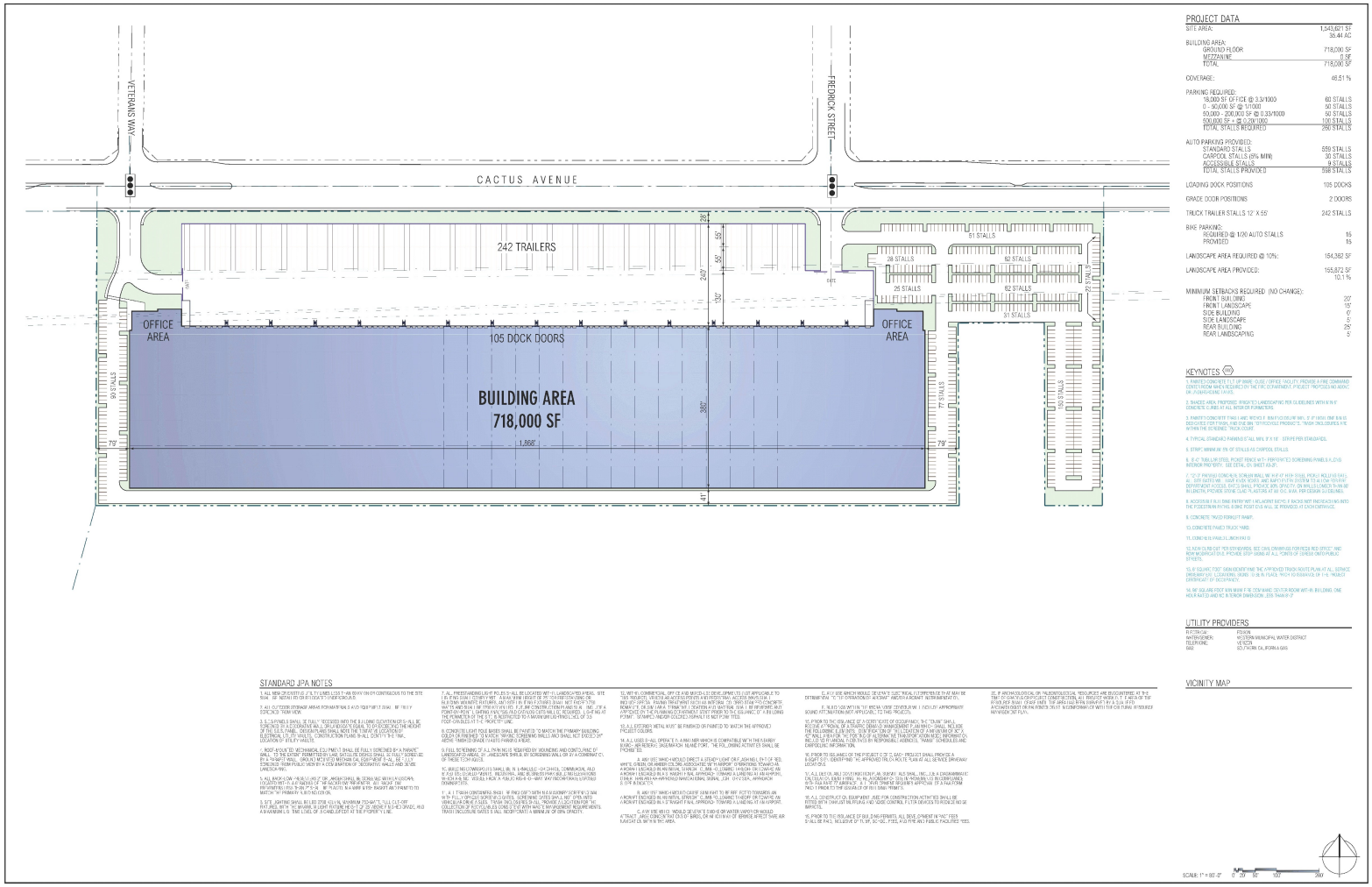
DRAFT



Basemap Source: Environmental Data Resources, Inc. Online Lightbox™

INDEX MAP

PROJECT:	K-4 PARCEL AND CACTUS CHANNEL, MARCH AIR RESERVE BASE, CA	PROJECT NO.:	23466.2
CLIENT:	MERIDIAN PARK, LLC	FIGURE:	1
LOR Geotechnical Group, Inc.		DATE:	AUGUST 2018
		SCALE:	1" ~ 2,270'



RGA
Office of Architectural Design
15231 Alton Parkway, Suite 100
Irvine, CA 92618
T 949-341-9920
FX 949-341-9922

MERIDIAN

K-4 PARCEL

CACTUS AVE. RIVERSIDE, CA

PRELIMINARY SITE PLAN - SCHEME 03

	10/01/18	SITE PLAN - SCHEME 03
	09/07/18	CONCEPTUAL SITE PLAN
MARK	DATE	DESCRIPTION

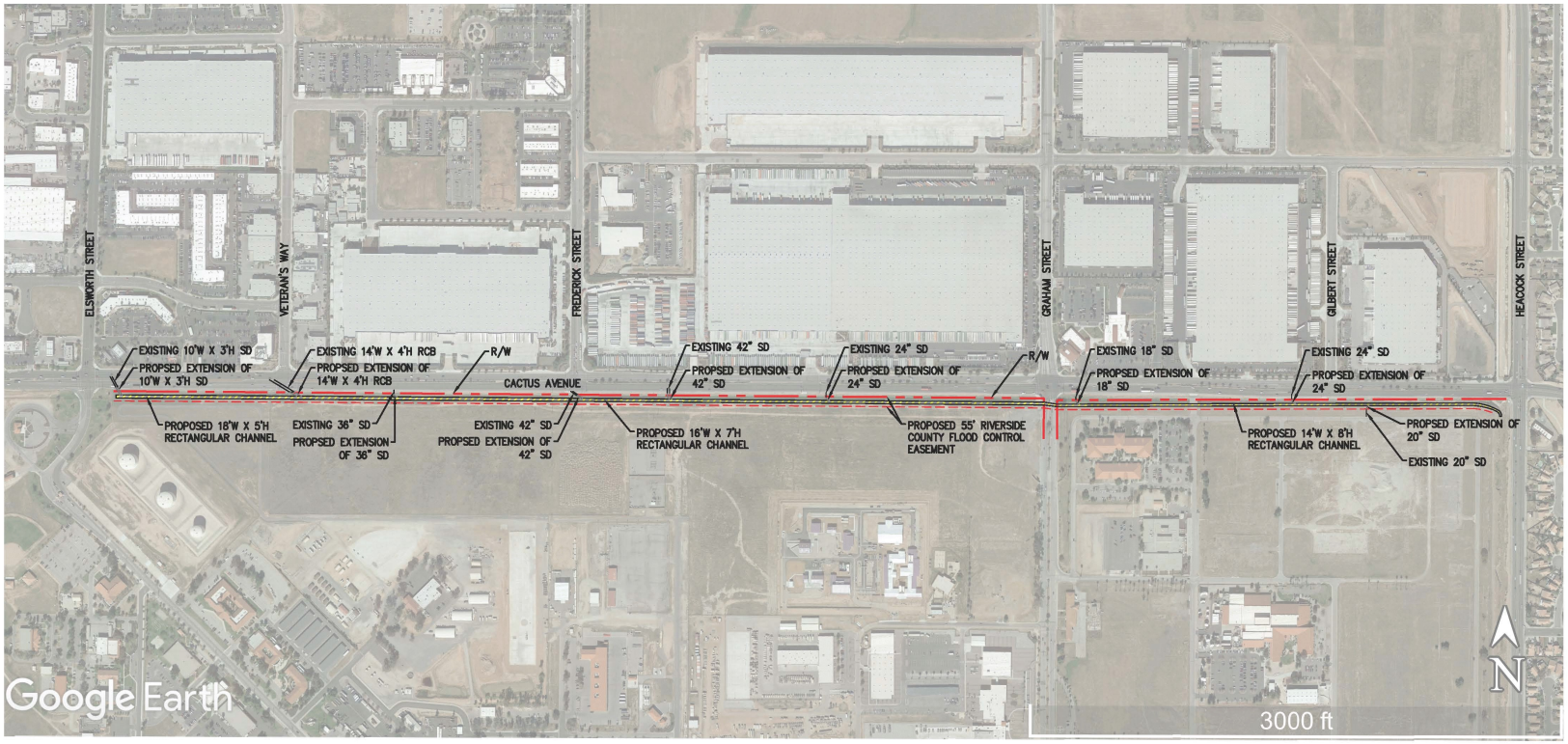
RGA PROJECT NO:	1804-00-01-03
DRAWN BY:	CP
CHKD. BY:	CS
COPYRIGHT © '18, OFFICE OF ARCHITECTURAL DESIGN	

A1-03

Basemap Source: RGA

PRELIMINARY SITE PLAN FOR K-4 PARCEL

PROJECT:	**K-4 PARCEL AND CACTUS CHANNEL, MARCH AIR RESERVE BASE, RIVERSIDE COUNTY, CA**	**PROJECT NO.:**	**23466.2**
CLIENT:	**MERIDIAN PARK, LLC**	**FIGURE:**	**2**
		DATE:	**AUGUST 2018**
LOR Geotechnical Group, Inc.		**APPROX. SCALE:**	**1" = 400'**



SCALE: 1"=600'

CACTUS AVE CHANNEL

SITE OVERVIEW

RIVERSIDE, CA

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

FILENAME: M:\2017\17-380 Lewis K4 Site Moreno Valley\Exhibit\EXH003 - Overall Site Exhibit\Site Exhibit.dwg, LAST SAVED ON: Jul 17 2018 4:07pm PLOTTED BY: NICHOLAS, ON: Jul 17 2018 4:10pm, CF

Basemap Source: DRC Engineering, Inc.

SITE OVERVIEW FOR CACTUS CHANNEL

PROJECT:	**K-4 PARCEL AND CACTUS CHANNEL, MARCH AIR RESERVE BASE, RIVERSIDE COUNTY, CA**	**PROJECT NO.:**	**23466.2**
CLIENT:	**MERIDIAN PARK, LLC**	**FIGURE:**	**3**
LOR Geotechnical Group, Inc.		**DATE:**	**AUGUST 2018**
		APPROX. SCALE:	**1" = 1,050'**



Approximate Site Boundary

Aerial Image Source: Google Earth Pro Computer Program

RECENT COLOR AERIAL PHOTOGRAPH

PROJECT:	**K-4 PARCEL AND CACTUS CHANNEL, MARCH AIR RESERVE BASE, RIVERSIDE COUNTY, CA**	**PROJECT NO.:**	**23466.2**
CLIENT:	**MERIDIAN PARK, LLC**	**FIGURE:**	**4**
LOR Geotechnical Group, Inc.		**DATE:**	**AUGUST 2018**
		APPROX. SCALE:	**1" = 1,400'**

APPENDIX A

Complete ASTM E1527-13 User Questionnaire

DRAFT

E1527–13

USER QUESTIONNAIRE

INTRODUCTION

In order to qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "*Brownfields Amendments*"), the *user* must provide the following information (if available) to the *environmental professional*. Failure to provide this information could result in a determination that "*all appropriate inquiry*" is not complete.

(1.) Environmental liens that are filed or recorded against the property (40 CFR 312.25).
Are you aware of any environmental cleanup liens against the *property* that are filed or recorded under federal, tribal, state or local law?

NO.

(2.) Activity and use limitations that are in place on the property or that have been filed or recorded against the property (40 CFR 312.26(a)(1)(v) and (vi)).
Are you aware of any activity and land use limitations (AULs), such as *engineering controls*, land use restrictions, or *institutional controls* that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state, or local law?

NO.

(3.) Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28).
As the user of this Phase I Environmental Site Assessment (ESA) do you have any specialized knowledge or experience related to the *property* or nearby properties? For example, are you involved in the same line of business as the current or former *occupants* of the *property* or an adjoining *property* so that you would have specialized knowledge of the chemicals and processes used by this type of business?

NO.

(4.) Relationship of the purchase price to the fair market value of the *property* if it were not contaminated (40 CFR 312.29).

Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property*?

Yes.

(5.) Commonly known or *reasonably ascertainable* information about the *property* (40 CFR 312.30).

Are you aware of commonly known or reasonably ascertainable information about the *property* that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example, as *user*, (a.) Do you know the past uses of the *property*? (b.) Do you know of specific chemicals that are present or once were present at the *property*? (c.) Do you know of spills or other chemical releases that have taken place at the *property*? (d.) Do you know of any environmental cleanups that have taken place at the *property*?

We do not know of any spills, etc. We do know that if there were any spills while this was Air Force property, they would have been cleared prior to conveyance

6.) The degree of obviousness of the presence of likely presence of contamination at the property, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).

As the *user* of this *ESA*, based on your knowledge and experience related to the *property*, are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property*?

None

In addition to the above information, certain information should be collected, if available, and provided to the *environmental professional* selected to conduct the Phase I ESA. This information is intended to assist the *environmental professional*, but is not necessarily required to qualify for one of the LLPs. The information includes:

(a) the reason why the Phase I ESA is required and/or is being performed:

Prior to future development of the property.

(b) the type of *property* and type of *property* transaction, for example, sale, purchase, exchange, etc.:

Property has been owned for several years. Beginning ent. Rewards, EIE, etc.

(c) the complete and correct address for the *property* (a map or other documentation showing the *property* location and boundaries is helpful):

no address at this time

(d) the scope of services desired for the Phase I ESA (including whether any parties to the *property* transaction may have a required standard scope of services on whether any considerations beyond the requirements of Practice E1527 are to be considered):

Standard.

(e) identification of all parties who will rely on the Phase I ESA report:

ownership, local jurisdiction, lenders, future tenants or buyers.

(f) identification of the site contact and how the contact can be reached:

Jeff Gordon (949) 279-7339

(g) any special terms and conditions which must be agreed upon by the *environmental professional*:

Only to notify ownership when visiting site. It is necessary to cross adjacent property for access.

(h) any other knowledge or experience with the property that may be pertinent to the *environmental professional* (for example, copies of any available prior *environmental site assessment reports*, documents, correspondence, etc., concerning the *property* and its environmental condition):

We know of no previous environmental studies performed on the property.

ADDITIONAL SPACE FOR ANSWERS (if needed):

The *User* Questionnaire was completed by:

Name:	Jeff Gordon
Title:	Project Manager
Firm:	Waypoint Property Group
Address:	567 San Nicolas Dr. #220, Newport Beach, CA 92660
Phone:	(949)279-7339
Date:	8/2/18
User's relationship to the *property*:	Waypoint is a partner of Meridian Park, LLC the owner

Copies of the completed questionnaire will be filed at:

LOR Geotechnical Group, Inc.; 6121 Quail Valley Court; Riverside, California 92507

Copies of the completed questionnaire may be mailed or delivered to:

LOR Geotechnical Group, Inc.; 6121 Quail Valley Court; Riverside, California 92507

User represents that to the best of their knowledge, the above statements and facts are true and correct, and to the best of their actual knowledge, no material facts have been suppressed or misstated.

Signature: _____ Date: 8/2/18

APPENDIX B

EDR Certified Sanborn® Map Report

DRAFT

K-4 Parcel and Cactus Channel Former MAFB

Cactus Avenue/Harbor Freight

March Air Reserve Base, CA 92518

Inquiry Number: 5378862.3

August 01, 2018

Certified Sanborn® Map Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

08/01/18

Site Name:

K-4 Parcel and Cactus Channe
Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 9
EDR Inquiry # 5378862.3

Client Name:

LOR Geotechnical Group, Inc.
6121 Quail Valley Court
Riverside, CA 92507
Contact: Mathew Hunt

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by LOR Geotechnical Group, Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Certification # 86D2-4FFB-A2DA

PO # 23466.2

Project K-4 Parcel and Cactus Channel

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Sanborn® Library search results

Certification #: 86D2-4FFB-A2DA

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

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APPENDIX C

EDR Historical Topo Map Report

DRAFT

K-4 Parcel and Cactus Channel Former MAFB

Cactus Avenue/Harbor Freight

March Air Reserve Base, CA 92518

Inquiry Number: 5378862.4

August 01, 2018

EDR Historical Topo Map Report

with QuadMatch™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topo Map Report

08/01/18

Site Name:

K-4 Parcel and Cactus Channe
Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 9
EDR Inquiry # 5378862.4

Client Name:

LOR Geotechnical Group, Inc.
6121 Quail Valley Court
Riverside, CA 92507
Contact: Mathew Hunt

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by LOR Geotechnical Group, Inc. were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

P.O.# 23466.2

Project: K-4 Parcel and Cactus Channe

Coordinates:

Latitude:	33.909906 33° 54' 36" North
Longitude:	-117.256759 -117° 15' 24" West
UTM Zone:	Zone 11 North
UTM X Meters:	476263.83
UTM Y Meters:	3752196.28
Elevation:	1552.00' above sea level

Maps Provided:

2012	1901
1980	
1973	
1967	
1953	
1947	
1943	
1942	

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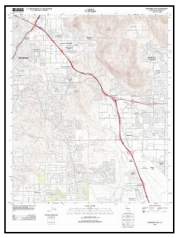
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Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

2012 Source Sheets

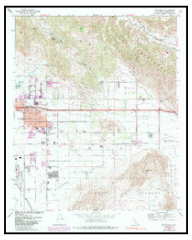


Riverside East
2012
7.5-minute, 24000

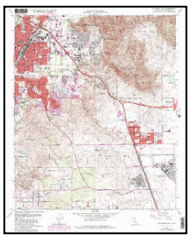


Sunnymead
2012
7.5-minute, 24000

1980 Source Sheets

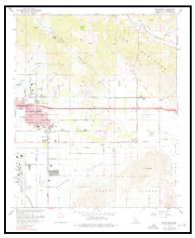


Sunnymead
1980
7.5-minute, 24000
Aerial Photo Revised 1978



Riverside East
1980
7.5-minute, 24000
Aerial Photo Revised 1978

1973 Source Sheets



Sunnymead
1973
7.5-minute, 24000
Aerial Photo Revised 1973

1967 Source Sheets



Riverside East
1967
7.5-minute, 24000
Aerial Photo Revised 1966

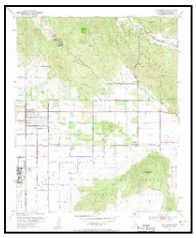


Sunnymead
1967
7.5-minute, 24000
Aerial Photo Revised 1966

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

1953 Source Sheets



Sunnymead
1953
7.5-minute, 24000
Aerial Photo Revised 1951



Riverside East
1953
7.5-minute, 24000
Aerial Photo Revised 1951

1947 Source Sheets



RIVERSIDE
1947
15-minute, 50000

1943 Source Sheets

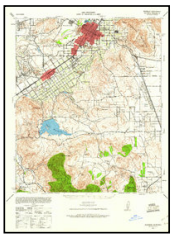


PERRIS
1943
15-minute, 62500

1942 Source Sheets



Perris
1942
15-minute, 62500
Aerial Photo Revised 1939



Riverside
1942
15-minute, 62500
Aerial Photo Revised 1939

Topo Sheet Key

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

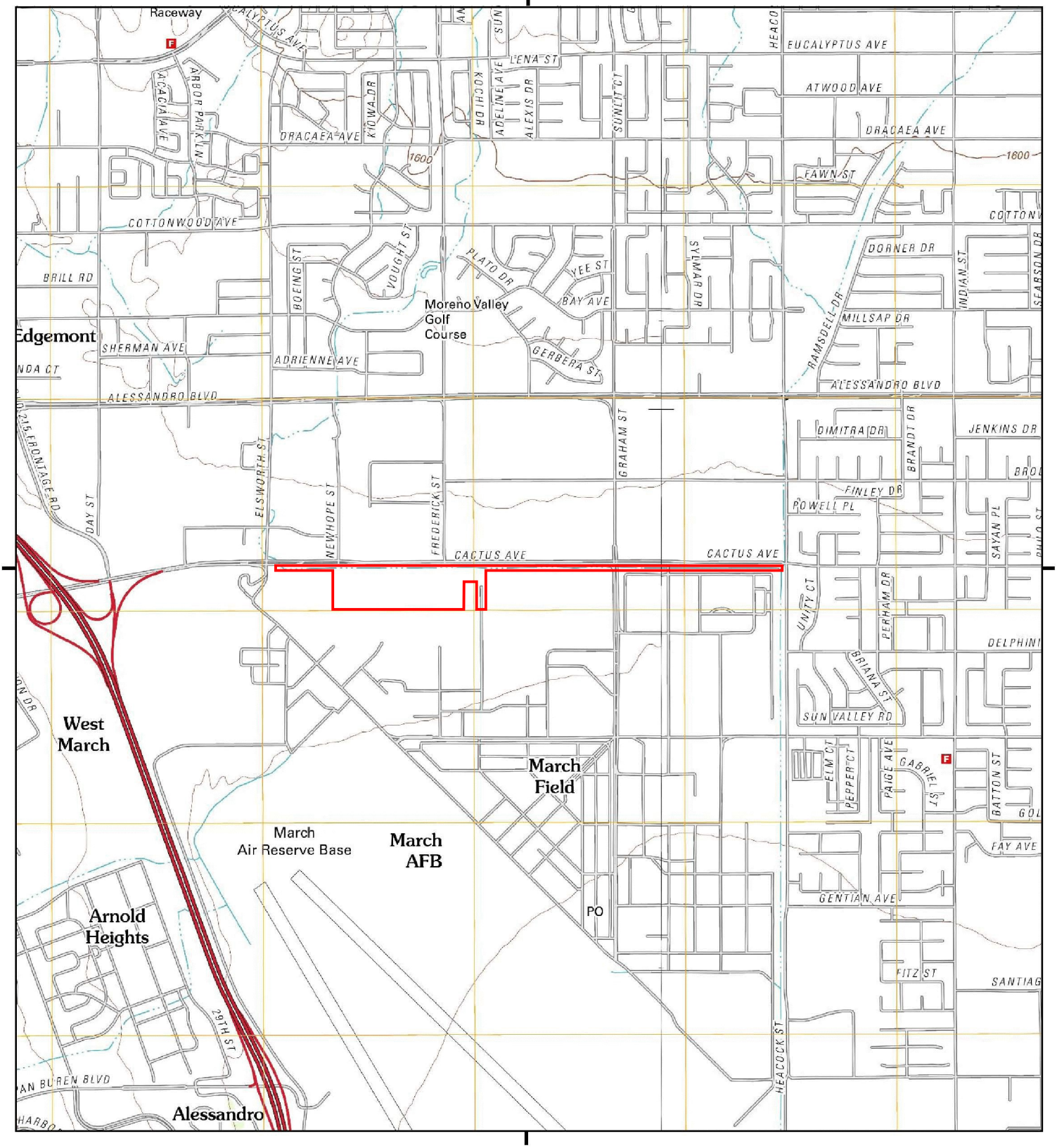
1901 Source Sheets



Riverside
1901
15-minute, 62500

Historical Topo Map

2012



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W E
SW S SE

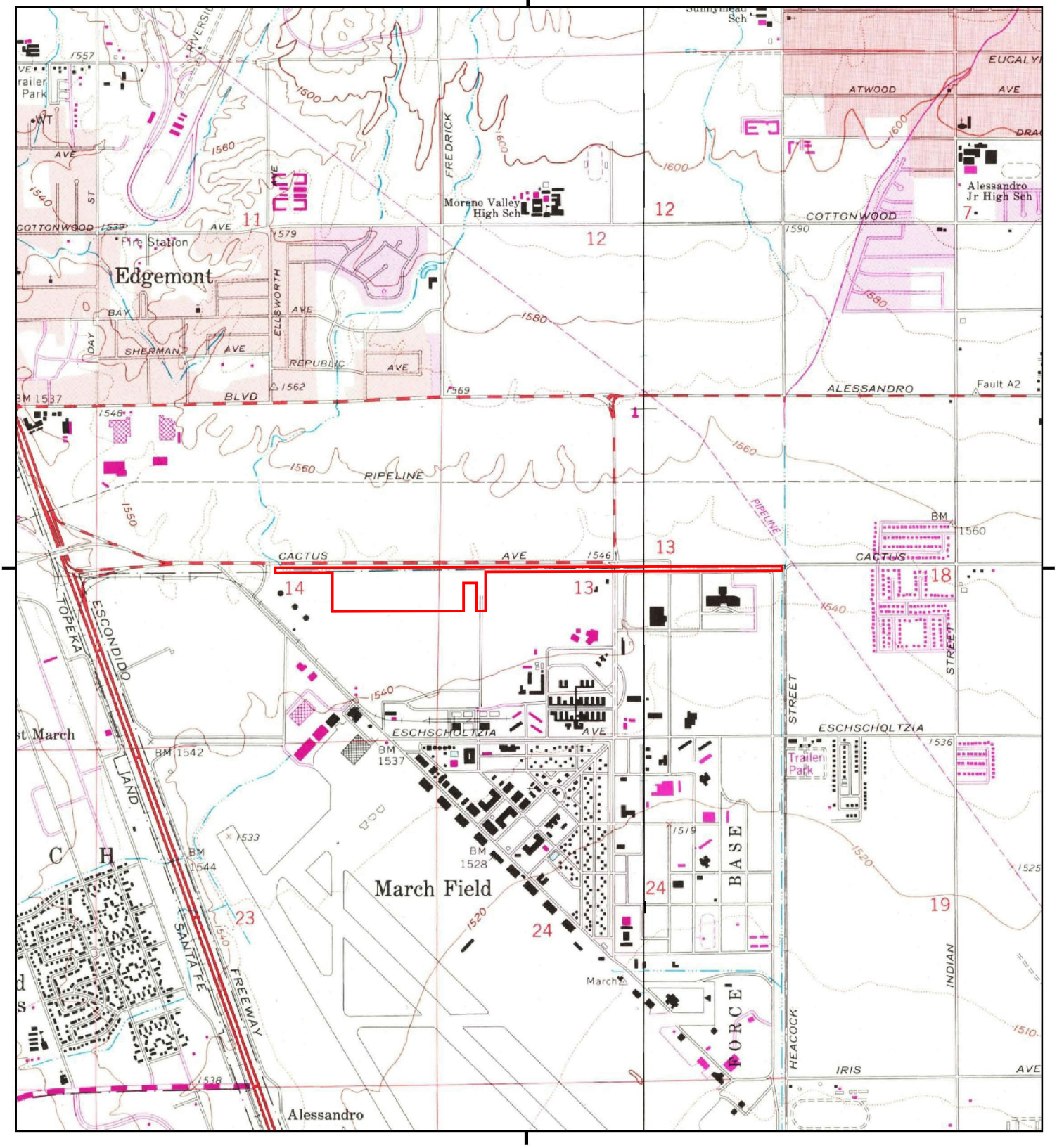
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NE, Sunnymead, 2012, 7.5-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

Historical Topo Map

1980



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SW S SE

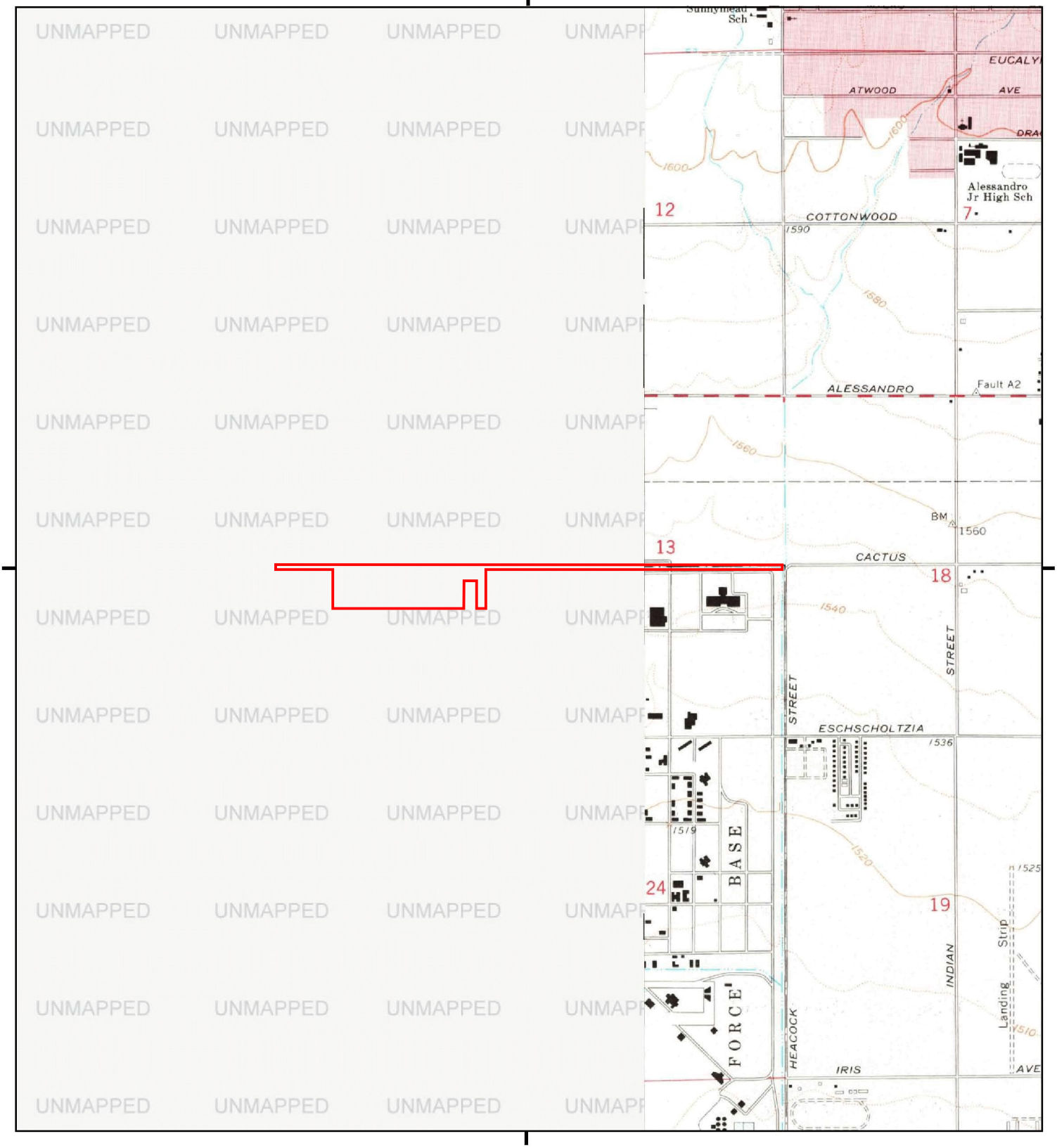
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NE, Sunnymead, 1980, 7.5-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

Historical Topo Map

1973



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

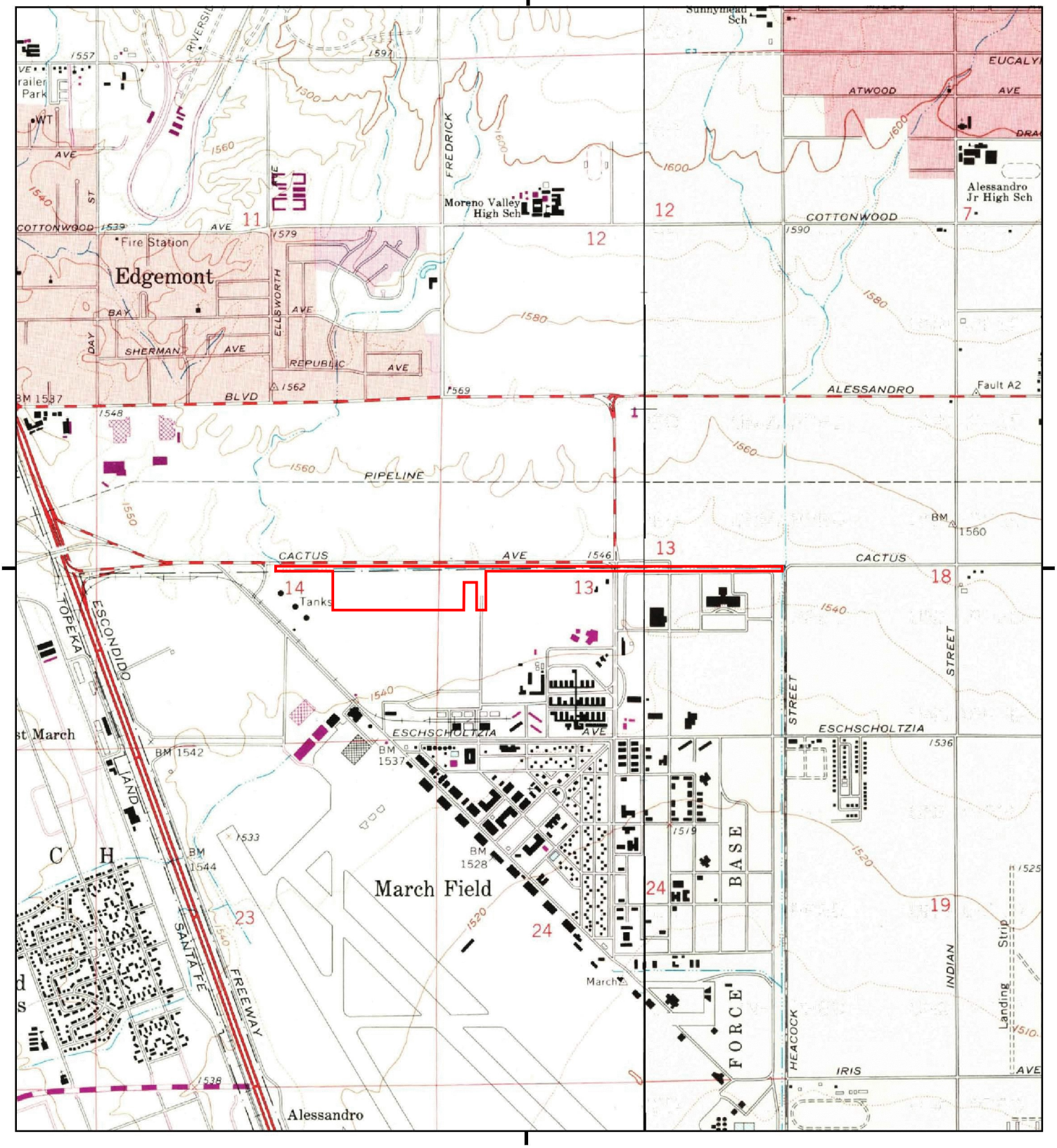
NE, Sunnymead, 1973, 7.5-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

Historical Topo Map

1967



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

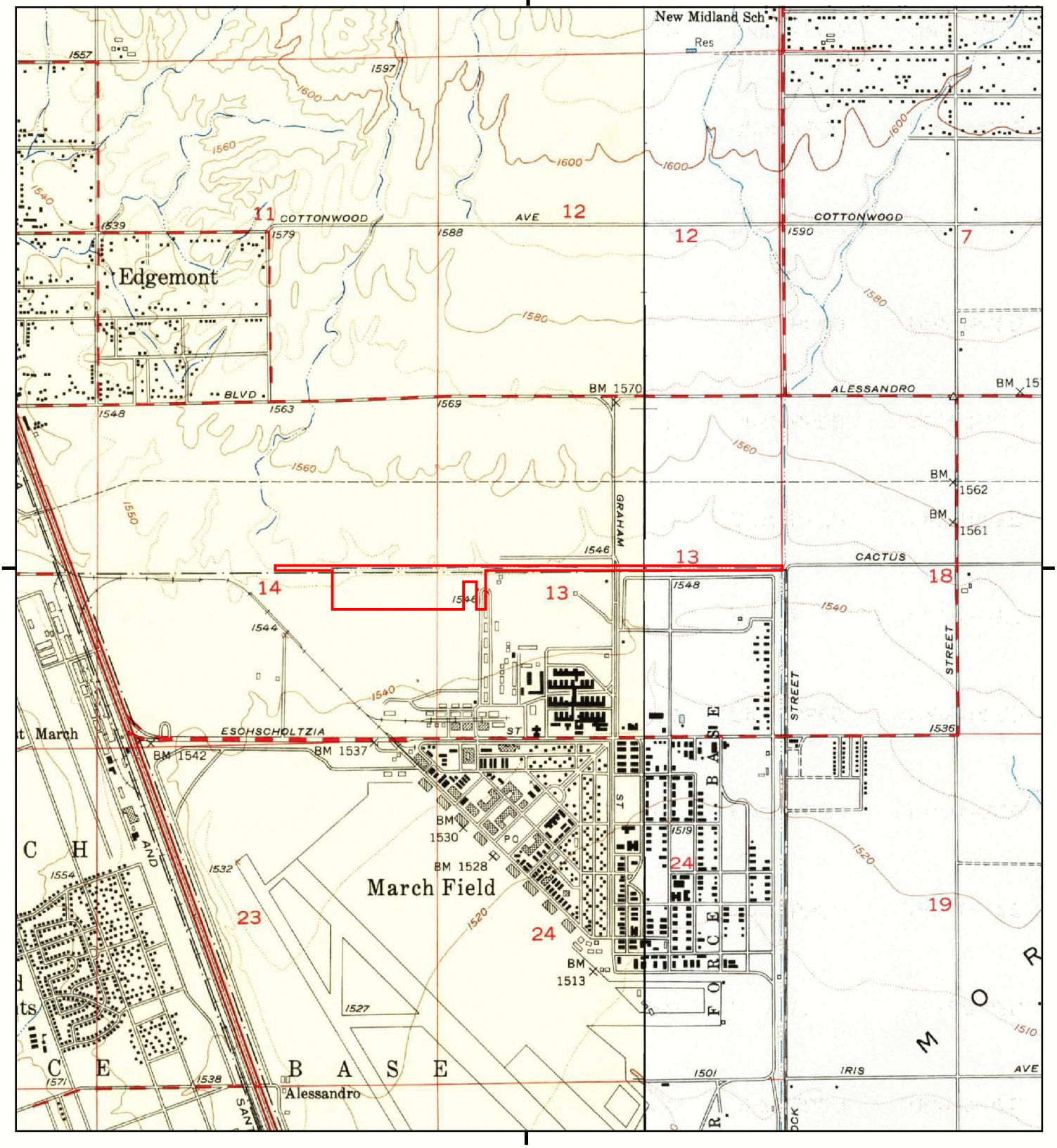
TP, Riverside East, 1967, 7.5-minute
NE, Sunnymead, 1967, 7.5-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

Historical Topo Map

1953



This report includes information from the following map sheet(s).

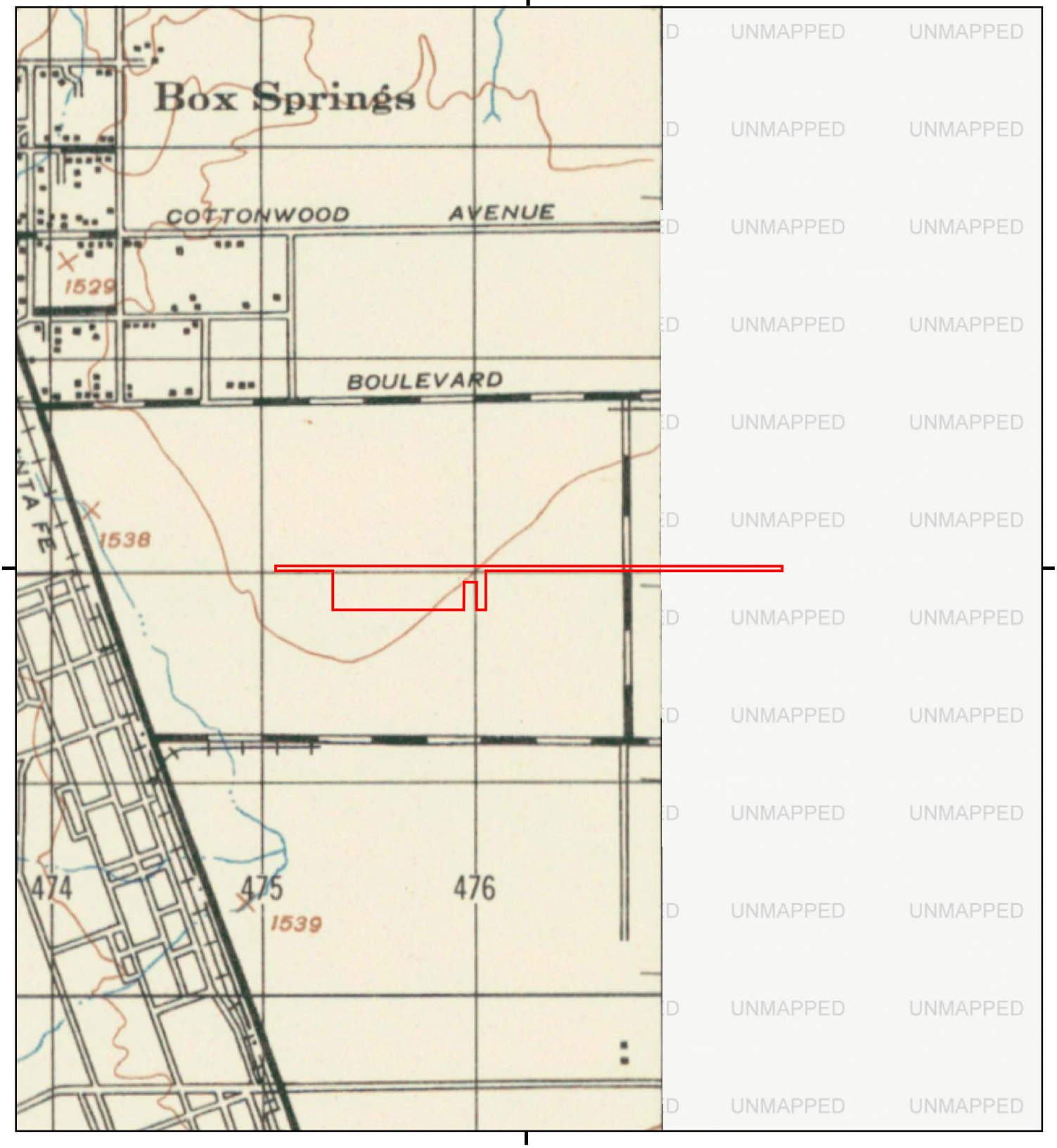
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside East, 1953, 7.5-minute
NE, Sunnymead, 1953, 7.5-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

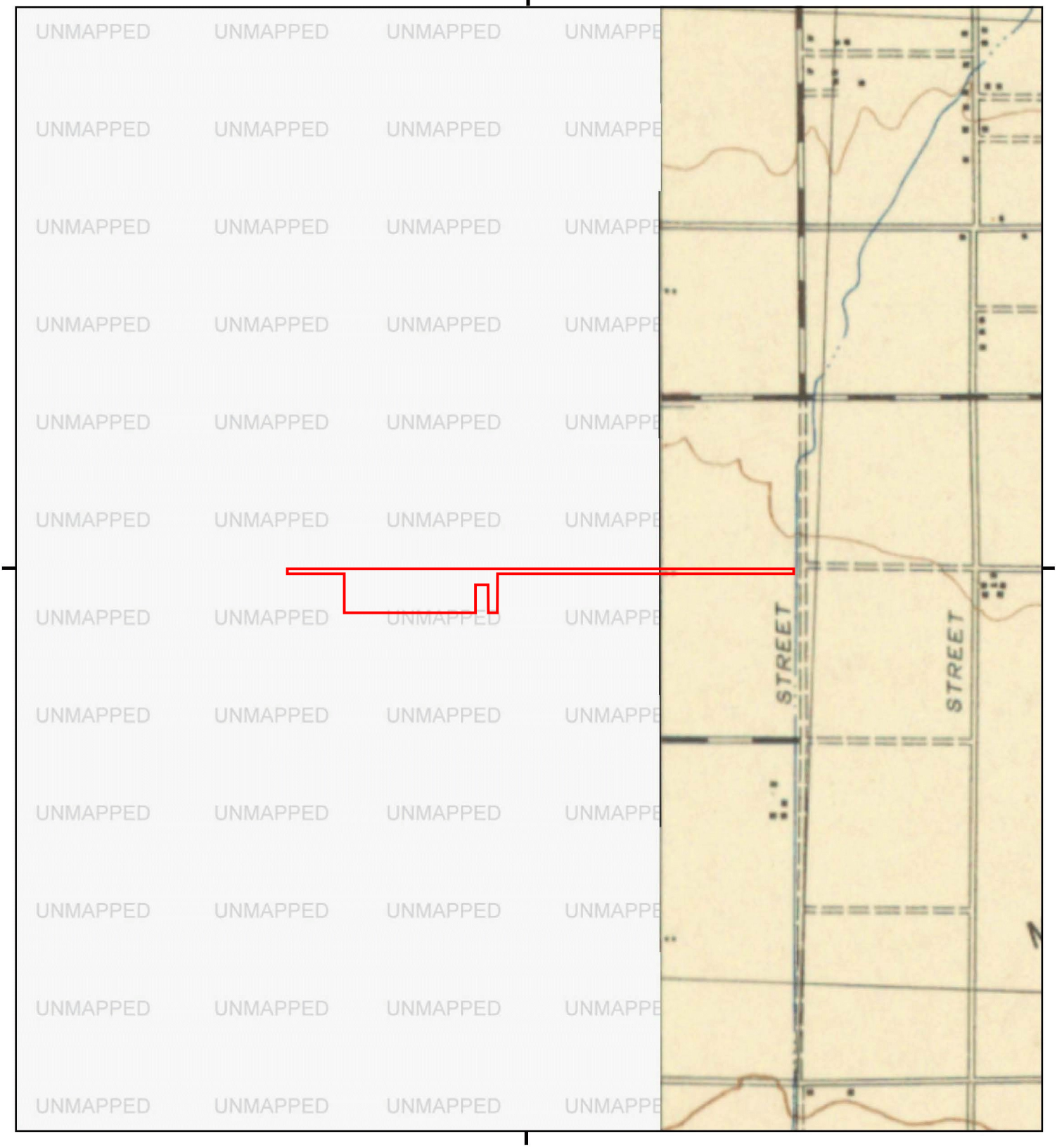
TP, RIVERSIDE, 1947, 15-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

Historical Topo Map

1943



This report includes information from the following map sheet(s).

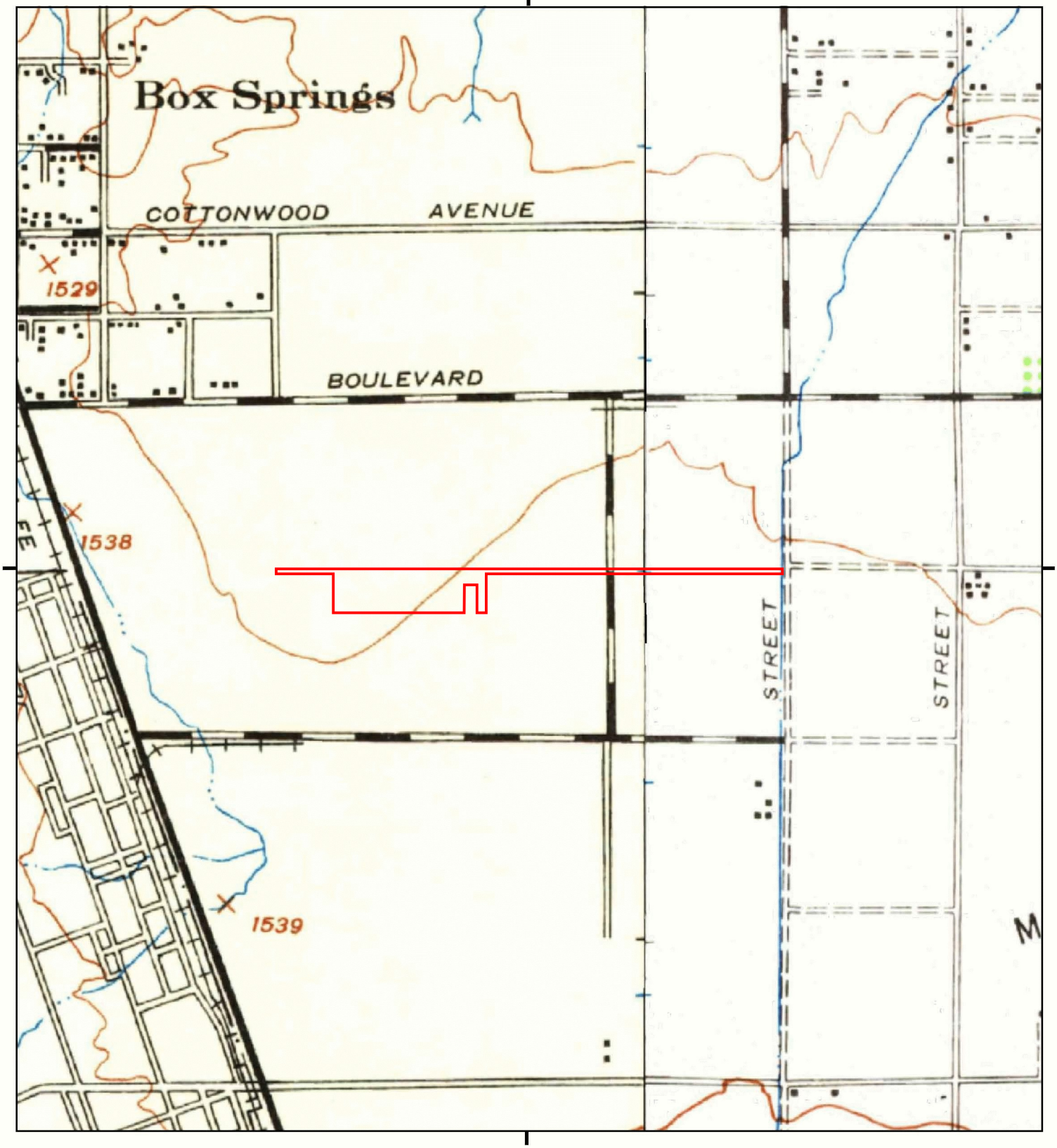
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

E, PERRIS, 1943, 15-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N



This report includes information from the following map sheet(s).

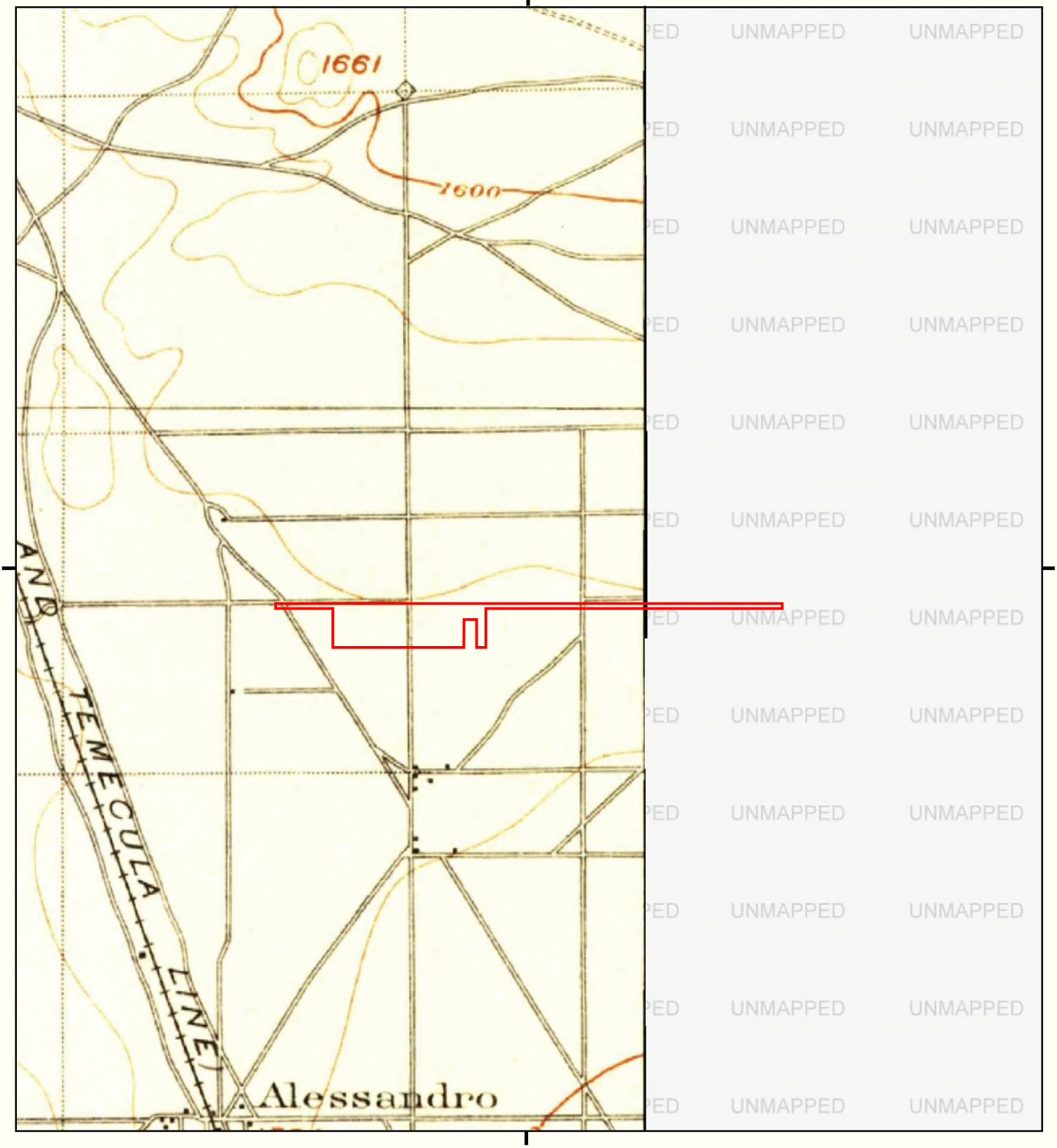
0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside, 1942, 15-minute
E, Perris, 1942, 15-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5

NW N NE
W E
SW S SE

TP, Riverside, 1901, 15-minute

SITE NAME: K-4 Parcel and Cactus Channel Former I
ADDRESS: Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518
CLIENT: LOR Geotechnical Group, Inc.

N

APPENDIX D

EDR Historical Aerial Photographs

DRAFT

K-4 Parcel and Cactus Channel Former MAFB

Cactus Avenue/Harbor Freight

March Air Reserve Base, CA 92518

Inquiry Number: 5378862.8

August 03, 2018

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

08/03/18

Site Name:

K-4 Parcel and Cactus Channe
Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 9
EDR Inquiry # 5378862.8

Client Name:

LOR Geotechnical Group, Inc.
6121 Quail Valley Court
Riverside, CA 92507
Contact: Mathew Hunt

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:

Year	Scale	Details	Source
2016	1"=1125'	Flight Year: 2016	USDA/NAIP
2012	1"=1125'	Flight Year: 2012	USDA/NAIP
2009	1"=1125'	Flight Year: 2009	USDA/NAIP
2006	1"=1125'	Flight Year: 2006	USDA/NAIP
1994	1"=1125'	Acquisition Date: June 01, 1994	USGS/DOQQ
1989	1"=1125'	Flight Date: August 15, 1989	USDA
1985	1"=1125'	Flight Date: July 28, 1985	USDA
1978	1"=1125'	Flight Date: September 20, 1978	USDA
1966	1"=1125'	Flight Date: January 01, 1966	USGS
1953	1"=1125'	Flight Date: January 01, 1953	USGS
1949	1"=1125'	Flight Date: May 06, 1949	USDA
1938	1"=1125'	Flight Date: June 14, 1938	USDA

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INQUIRY #: 5378862.8

YEAR: 2016

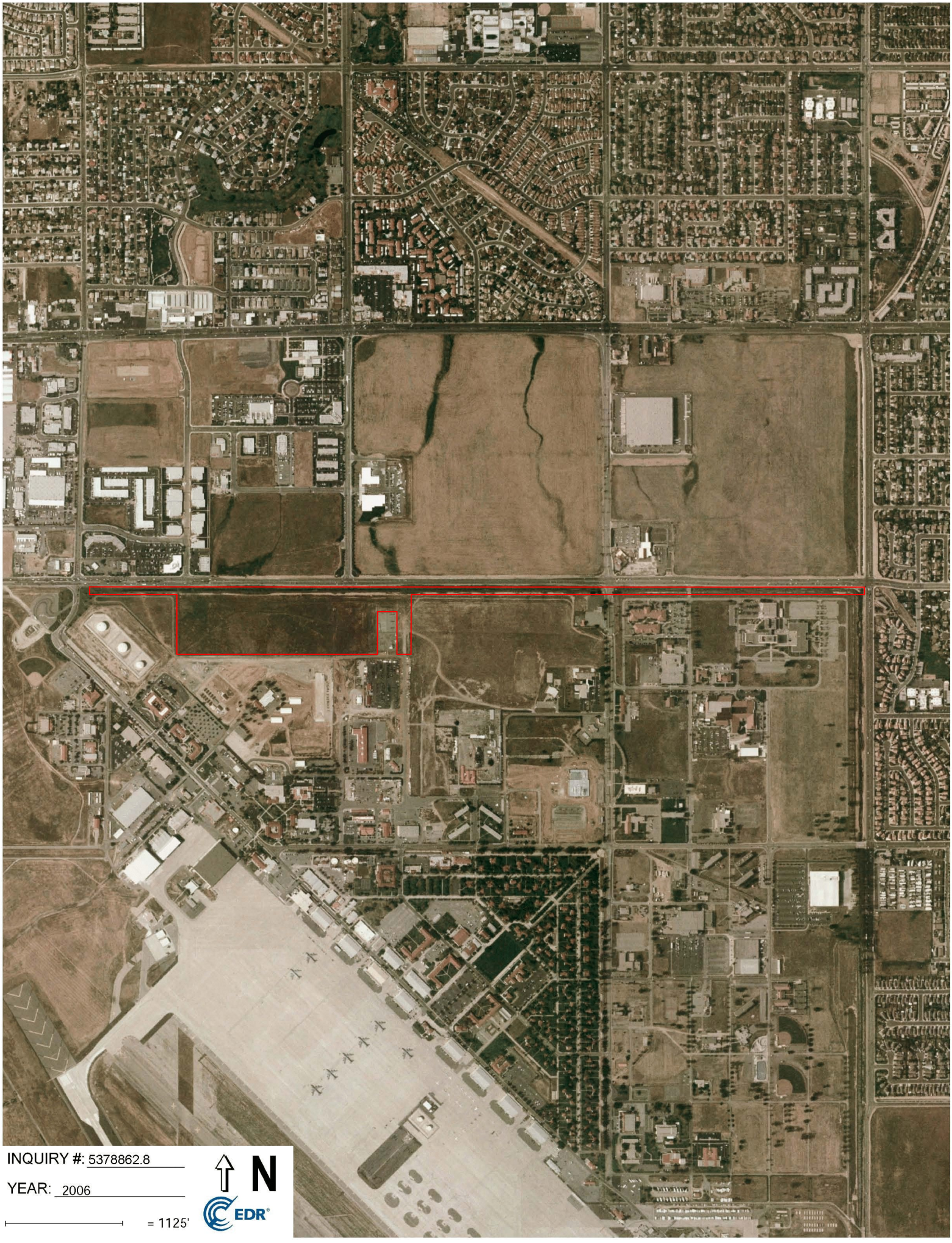
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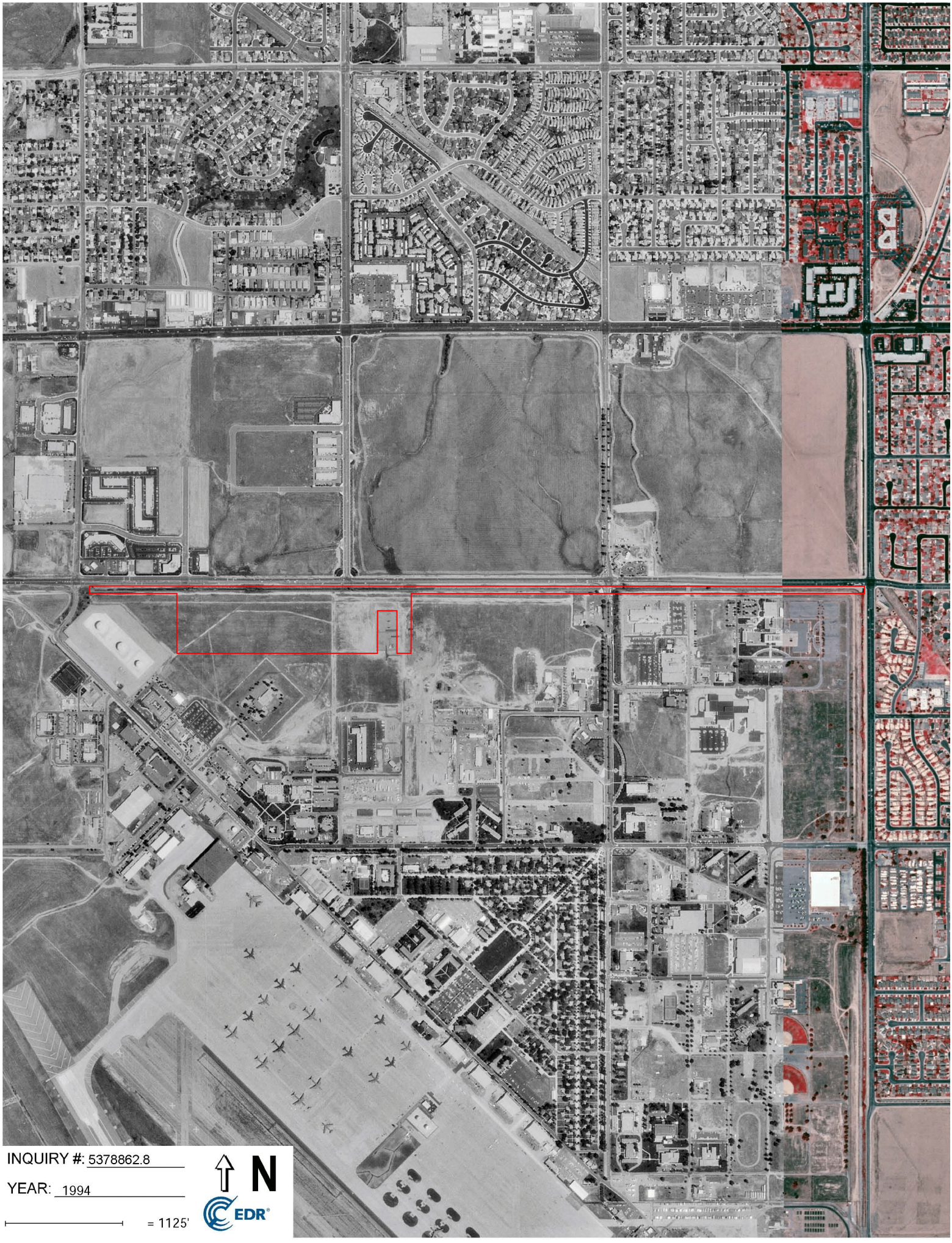
N

EDR


INQUIRY #: 5378862.8
YEAR: 2012
= 1125'
N
EDR


INQUIRY #: 5378862.8
YEAR: 2009
= 1125'
N
EDR


INQUIRY #: 5378862.8
YEAR: 2006
= 1125'
N
EDR


INQUIRY #: 5378862.8
YEAR: 1994
= 1125'
N
EDR



INQUIRY #: 5378862.8

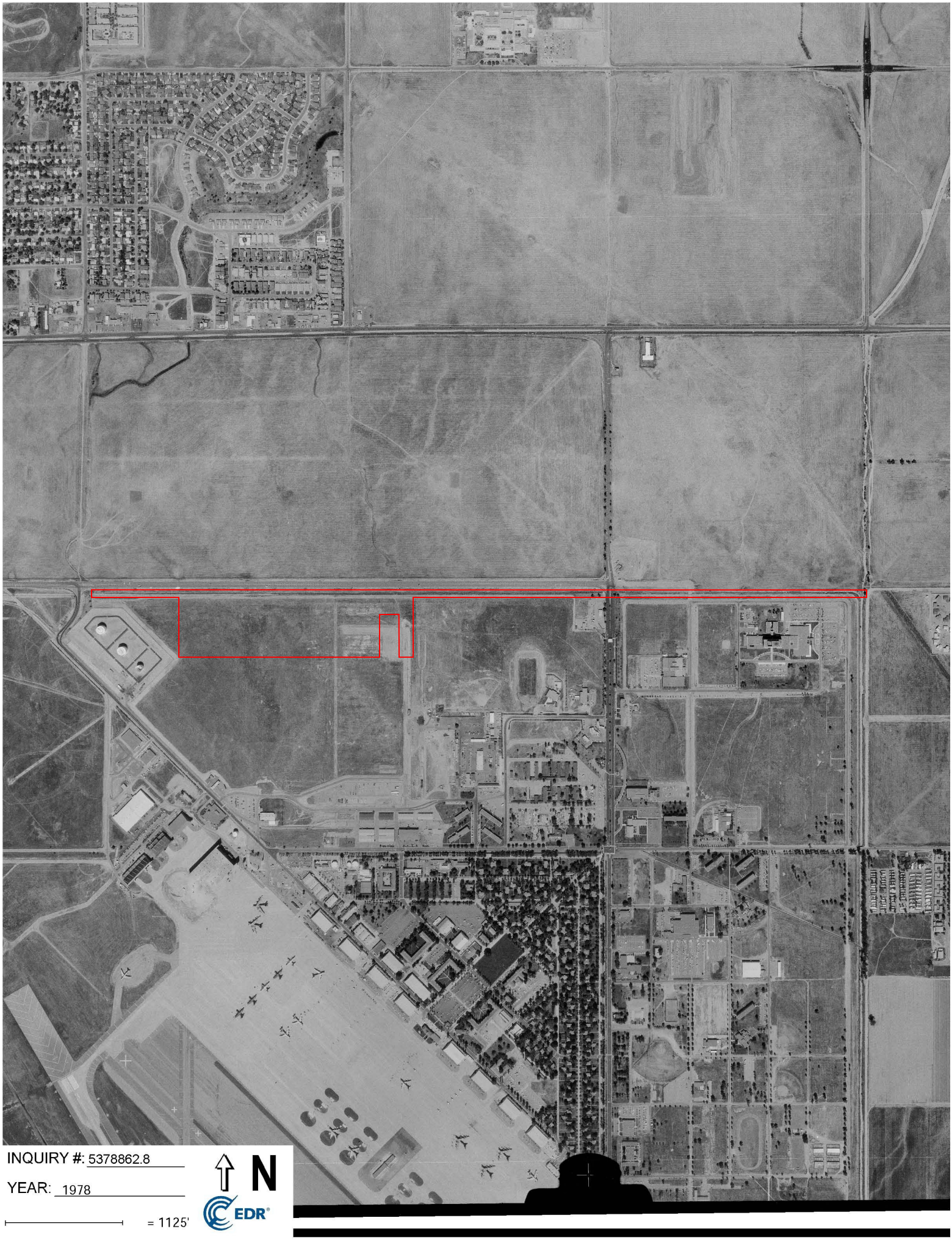
YEAR: 1989

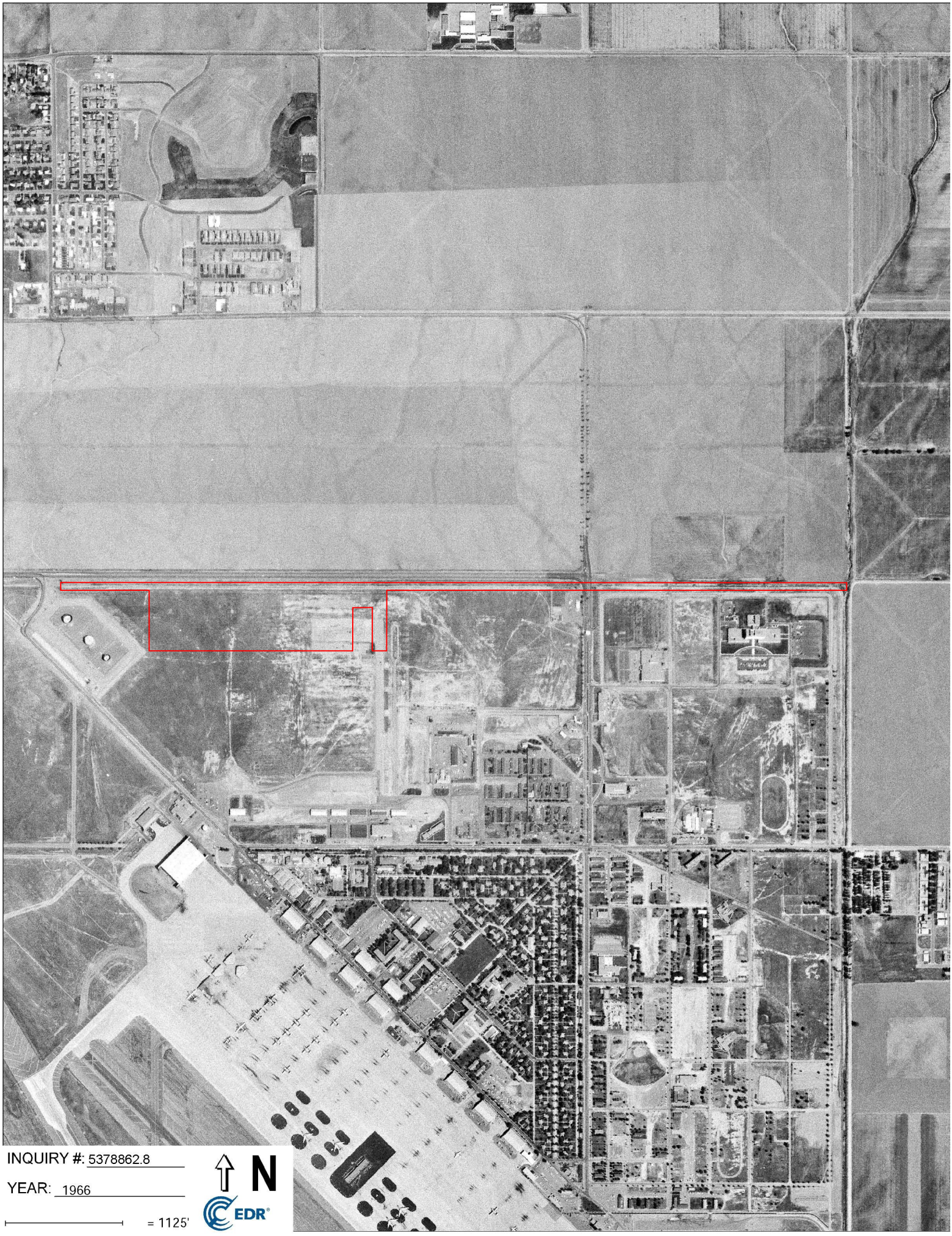
= 1125'

N

EDR


INQUIRY #: 5378862.8
YEAR: 1985
= 1125'
N
EDR


INQUIRY #: 5378862.8
YEAR: 1978
= 1125'
N
EDR


INQUIRY #: 5378862.8
YEAR: 1966
= 1125'
N
EDR



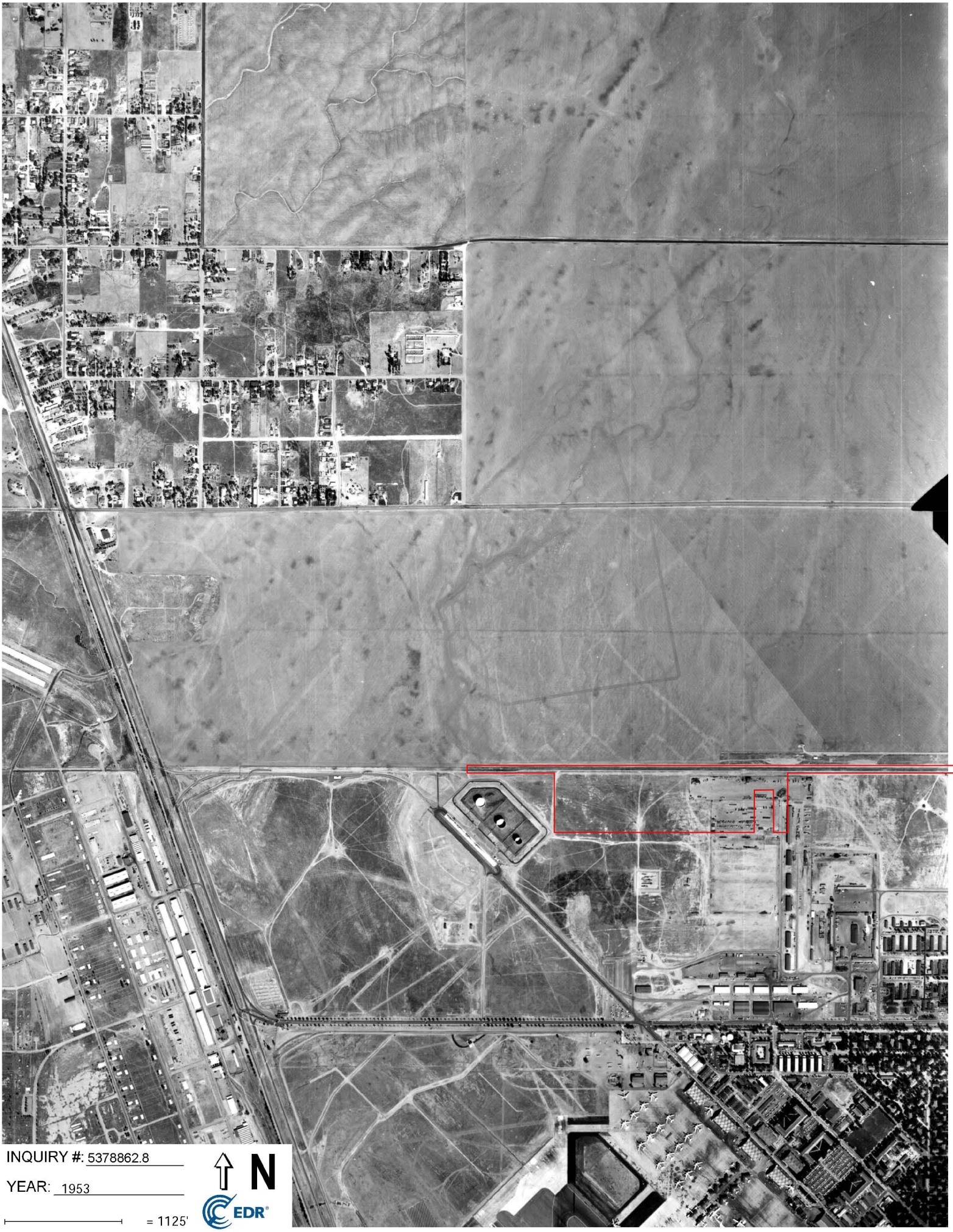
INQUIRY #: 5378862.8

YEAR: 1953

= 1125'

N

EDR



INQUIRY #: 5378862.8

YEAR: 1953

= 1125'

N

EDR



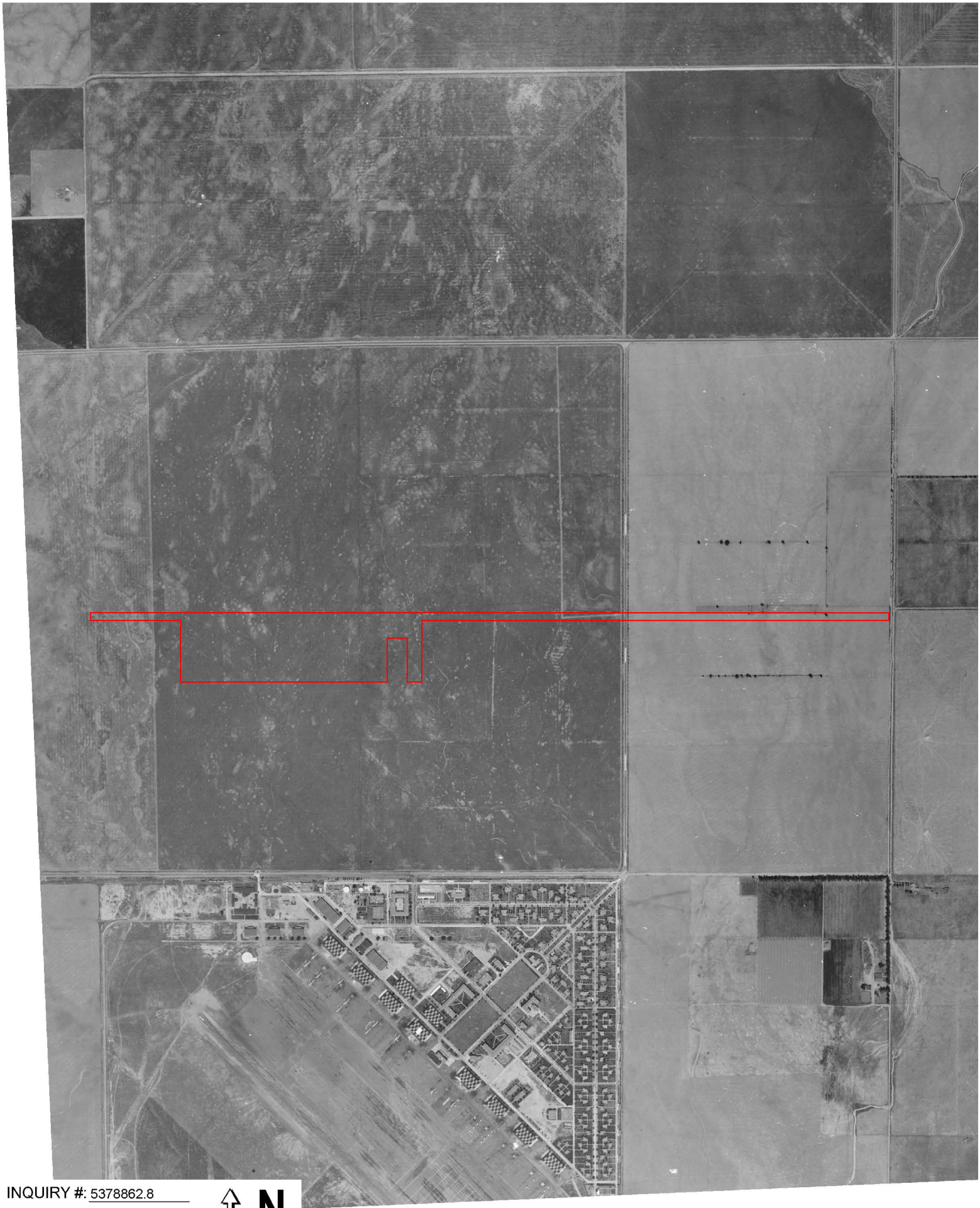
INQUIRY #: 5378862.8

YEAR: 1949

= 1125'

N

EDR



INQUIRY #: 5378862.8

YEAR: 1938

= 1125'

N

EDR

APPENDIX E

The EDR - City Directory Image Report

DRAFT

K-4 Parcel and Cactus Channel Former MAFB
Cactus Avenue Harbor Freight
March Air Reserve Base, CA 92518

Inquiry Number: 5378862.10
August 07, 2018

The EDR-City Directory Image Report

Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

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Findings

City Directory Images

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RECORD SOURCES

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

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Data by
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RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2014	☑	☐	EDR Digital Archive
2010	☑	☐	EDR Digital Archive
2005	☑	☐	EDR Digital Archive
2000	☑	☐	EDR Digital Archive
1995	☑	☐	EDR Digital Archive
1992	☑	☐	EDR Digital Archive
1985	☐	☐	Haines Criss-Cross Directory
1980	☐	☐	Haines Criss-Cross Directory
1975	☐	☐	Haines Criss-Cross Directory

FINDINGS

TARGET PROPERTY STREET

Cactus Avenue Harbor Freight
March Air Reserve Base, CA 92518

Year	CD Image	Source	
CACTUS AVE			
2014	pg A1	EDR Digital Archive	
2010	pg A2	EDR Digital Archive	
2005	pg A3	EDR Digital Archive	
2000	pg A4	EDR Digital Archive	
1995	pg A5	EDR Digital Archive	
1992	pg A6	EDR Digital Archive	
1985	-	Haines Criss-Cross Directory	Street not listed in Source
1980	-	Haines Criss-Cross Directory	Street not listed in Source
1975	-	Haines Criss-Cross Directory	Street not listed in Source

FINDINGS

CROSS STREETS

No Cross Streets Identified

City Directory Images

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 2014

24353 ALESSNDRO SPANISH CONGREGATION
LAKE PERRIS CONGREGATION
LOS OLVOS SPANISH CONGREGATION
SUNNYMEAD CONGREGATION
24611 RUIZ, ROBERT D

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 2010

22380	PANAGIOTU COSTA
22420	H & H SUBS TWO INC
	PERSONNEL PLUS INC
22520	CHEVRON USA INC
22580	CARLS JR RESTAURANT
22690	AHERN THOMAS & PRISCILLA
	AMERIPRISE FINANCIAL SVCS INC
	FEDERAL MTR CARIER SAFETY ADM
	KEITH INTERNATIONAL
	RIVERSIDE COUNTY OF
	RURAL DEVELOPMENT
	STANTEC CONSULTING SVCS INC
	USDA FOREST SERVICE
22722	SMART & FINAL STORES CORP
23520	VISTERRA CREDIT UNION
23700	MADISON
24353	ALESSNDRO SPANISH CONGREGATION
	LAKE PERRIS CONGREGATION
	LOS OLVOS SPANISH CONGREGATION
	SUNNYMEAD CONGREGATION
24611	COLTON TRUCK SUPPLY
	RUIZ, ROBERT D

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 2005

22380 HARPIN INC
PETSAS LOUIS GEORGE
22470 DEL TACO INC
MORENO VLLEY DELRAHIM INC
22520 CHEVRON USA INC
22580 CARLS JR RESTAURANT
22690 AMERIPRISE FINANCIAL SVCS INC
FEDERAL MTR CARIER SAFETY ADM
HOLIDAY DECORATORS
RIVERSIDE COUNTY OF
RURAL DEVELOPMENT
RWR PASCOE ENGINEERING IN
STANTEC CONSULTING INC
23520 MARCH COMMUNITY CREDIT UNION
24611 RUIZ, ROBERT D

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 2000

22380	BURGER KING
22470	DEL TACO INC
22520	CHEVRON USA INC
22580	CARLS JR RESTAURANT
22690	AMERICAN EX FINCL ADVISORS
	AWESOME, ZENA
	KEITH COMPANIES INC
	RURAL DEVELOPMENT
	RWR PASCOE ENGINEERING IN
	UNITED STS OFC OF MTR CARE SFT
23520	MARCH FEDERAL CREDIT UNION

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 1995

22580	CARLS JR RESTAURANT
22690	BUTLER FRANK S
	HOLIDAY DECORATORS
	KEITH ENGINEERING INC
	STANISLAW PAUL
	TRANSAMERICA FINANCE CORP
	WASHINGTON SHAWN
	WINCHESTER ASSET MANAGEMENT
23520	MARCH FEDERAL CREDIT UNION
24611	RUIZ, P

Target Street	Cross Street	Source
✓	-	EDR Digital Archive

CACTUS AVE 1992

22690 KEITH ENGINEERING INC
RWR PASCOE ENGINEERING INC
WINCHESTER ASSET MANAGEMENT
23520 MARCH FEDERAL CREDIT UNION

APPENDIX F

Color Site Photographs

DRAFT



PHOTO 1 - VIEW FACING SOUTH, LOOKING ALONG CHANUTE AVENUE, HIGHLY DILAPIDATED ONSITE. THE CHAIN-LINK FENCE SHOWN IN THE FOREGROUND MARKS THE SOUTH BOUNDARY OF THE K-4 PARCEL OF THE SUBJECT SITE, BEYOND WHICH IS THE ACTIVE MILITARY MARCH AIR RESERVE BASE (MARB). THE SOUTHEAST CORNER OF THE K-4 PARCEL IS OUT OF VIEW TO THE LEFT (EAST).



PHOTO 2 - VIEW TO THE LEFT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, TOWARDS THE SOUTHEAST CORNER OF THE K-4 PARCEL, WHICH IS COINCIDENT WITH THE FENCE CORNER JUST RIGHT OF CENTER. THE COMMERCIAL BUILDINGS IN THE FAR BACKGROUND TO THE LEFT WERE BUILT WITHIN THE LAST YEAR AND A HALF.



PHOTO 3 - WESTERLY VIEW FROM NEAR THE SOUTHEAST CORNER OF THE K-4 PARCEL, LOOKING TOWARDS THE OFFSITE, ADJACENT 'CUT OUT' AREA WITH ELECTRICAL SUBSTATION.



PHOTO 4 - VIEW TO THE NORTH FROM THE SOUTHEAST PORTION OF THE K-4 PARCEL, ADJACENT TO THE EAST OF THE NEIGHBORING 'CUT OUT' ELECTRICAL SUBSTATIONS.



PHOTO 5 - VIEW LOOKING OFFSITE TO THE NORTHEAST FROM THE EAST-CENTRAL PORTION, NEAR THE EAST BOUNDARY OF THE K-4 PARCEL. THE DILAPIDATED ASPHALT OF CHANUTE AVENUE IS VISIBLE IN THE FOREGROUND.



PHOTO 6 - VIEW TO THE WEST, SHOWING THE ENTRANCE GATE INTO THE SOUTHERN CALIFORNIA EDISON (SCE) ELECTRICAL "TANKER" SUBSTATION, SITUATED IN THE 'CUT OUT' AREA INTERNALLY ADJACENT TO THE EASTERN PORTION OF THE K-4 PARCEL. RELATIVELY MINOR AMOUNTS OF ELECTRICAL EQUIPMENT ARE PRESENT WITHIN THIS SUBSTATION COMPOUND. THE SECOND ELECTRICAL SUBSTATION TO THE LEFT, WITHIN THE BLOCK WALLED COMPOUND, LIKELY BELONGS TO MARB.



PHOTO 7 - VIEW TO THE SOUTHWEST FROM THE NORTHEAST CORNER OF THE K-4 PARCEL. NO LEAKAGE WAS OBSERVED AT THE POLE-MOUNTED ELECTRICAL TRANSFORMER TO THE LEFT OR PAD-MOUNTED ELECTRICAL TRANSFORMER RIGHT OF CENTER. NEAR THE POWER POLE TO THE LEFT IS EASTERN MUNICIPAL WATER DISTRICT (EMWD) EQUIPMENT, INCLUDING A CONTROL BOX, VALVE BOX, AND CATHODIC PROTECTION RECTIFIER.



PHOTO 8 - VIEW TO THE WEST FROM THE NORTHEAST CORNER OF THE K-4 PARCEL. THE UNLINED DRAINAGE CHANNEL PORTION OF THE SUBJECT SITE, CACTUS CHANNEL, IS SHOWN TO THE RIGHT OF THE CHAIN-LINK FENCING WITH BARBED WIRE TO THE RIGHT.



PHOTO 9 - SOUTHERLY VIEW ALONG THE WESTERN SIDE OF THE SCE ELECTRICAL SUBSTATION FROM THE NORTHEASTERN PORTION OF THE K-4 PARCEL OF THE SUBJECT SITE. IN UPPER MIDDLE AND RIGHT OF THE PHOTOGRAPH ARE SOMEWHAT SMOOTHED OUT, END-DUMPED PILES OF FILL MATERIALS.



PHOTO 10 - VIEW TO WEST FROM JUST OFF THE NORTHWEST CORNER OF THE EDISON ELECTRICAL SUBSTATION. IN THE BACKGROUND ARE THREE LARGE JET FUEL (JP-8) ABOVEGROUND STORAGE TANKS (ASTs), LOCATED OFFSITE TO THE WEST AND SOUTHWEST OF THE K-4 PARCEL, WITHIN MARB.



PHOTO 11 - VIEW TO THE SOUTH FROM THE SOUTHEAST PORTION OF THE K-4 PARCEL NEAR/AT THE SOUTH BOUNDARY, JUST SOUTH OF THE SOUTHWEST CORNER OF THE 'CUT OUT', OFFSITE SOUTHERNMOST ELECTRICAL SUBSTATION WHICH LIKELY BELONGS TO MARB.



PHOTO 12 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING WEST ALONG THE SOUTH BOUNDARY OF THE K-4 PARCEL. WHAT APPEARS TO BE DISTURBED SOIL TO THE RIGHT (NORTH), ARE END-DUMPED FILL MATERIALS THAT HAVE BEEN SOMEWHAT SMOOTHED OUT.



PHOTO 13 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING NORTHWEST ACROSS THE SOMEWHAT SMOOTHED OUT FILL MATERIALS IN THE CENTRAL AND SOUTH PARTS OF THE EAST PORTION OF THE K-4 PARCEL, JUST WEST OF THE OFFSITE, 'CUT OUT' ELECTRICAL SUBSTATIONS.



PHOTO 14 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING NORTH. THE SOMEWHAT SMOOTHED OUT FILL MATERIALS ARE VISIBLE TO THE LEFT.



PHOTO 15 - VIEW TO THE WEST WITHIN THE NORTHERN PORTION OF THE K-4 PARCEL, SOUTH OF THE INTERSECTION AT CACTUS AVENUE AND FREDERICK STREET. WATER UTILITY MARKINGS AND A PERCOLATION/INFILTRATION TEST HOLE WITH PLASTIC PIPE IS VISIBLE. OTHER EVIDENCE OF SOILS INVESTIGATION WAS OBSERVED, INCLUDING ANOTHER PERCOLATION/INFILTRATION TEST HOLE AND SOIL BORING (FILLED IN).



PHOTO 16 - VIEW THE WEST FROM THE NORTHWEST CORNER OF THE K-4 PARCEL. MARB BOUNDARY FENCING IS SHOWN WITH WARNING SIGNS. SOME FENCING DEBRIS IS PRESENT ON THE GROUND. TO THE RIGHT IS THE ONSITE CACTUS CHANNEL, FOLLOWED BY CACTUS AVENUE.



PHOTO 17 - VIEW TO THE EAST FROM THE NORTHWEST CORNER OF THE K-4 PARCEL. DENSE VEGETATION IS PRESENT TO THE LEFT BEYOND THE FENCE LINE, ALONG THE ONSITE CACTUS CHANNEL.



PHOTO 18 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING SOUTHEAST. A CORRUGATED, PARTIALLY CRUSHED, PLASTIC PIPE WITH METAL COLLARS AT THE ENDS IS FAINTLY VISIBLE IN THE UPPER RIGHT OF THE PHOTOGRAPH AS A DARKER LINEAR FEATURE. NO CHEMICAL ODOR OR SOIL STAINING WAS NOTED AT THIS ABANDONED PIPE.



PHOTO 19 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING SOUTH ALONG THE WEST BOUNDARY FOR THE K-4 PARCEL. AT THE RIGHT EDGE OF THE PHOTOGRAPH IS THE SMALLEST OF THE OFFSITE JET FUEL ASTs AT 1.26 MILLION GALLONS, LOCATED OVER 350 FROM THE K-4 PARCEL.



PHOTO 20 - VIEW TO THE NORTH FROM THE SOUTHWEST CORNER OF THE K-4 PARCEL. IN THE FAR BACKGROUND, ACROSS (ON THE NORTH SIDE OF) CACTUS AVENUE ARE OFFICE BUILDINGS AND INDUSTRIAL BUILDING.



PHOTO 21 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING NORTHEAST, LOOKING ACROSS THE K-4 PARCEL.



PHOTO 22 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING EAST FROM THE SOUTHWEST CORNER OF THE K-4 PARCEL. THE AREA OF MARB TO THE RIGHT (SOUTH), BEYOND THE BASE BOUNDARY FENCING, IS TYPICAL OF THAT BORDERING THE K-4 PARCEL, WITH AN AREA OF VACANT LAND FOLLOWED BY ACCESS/PERIMETER ROAD.



PHOTO 23 - VIEW TO THE SOUTH FROM THE SOUTHWEST CORNER OF THE K-4 PARCEL. BEYOND THE BASE BOUNDARY FENCE SHOWN IN THE FOREGROUND IS MARB.



PHOTO 24 - VIEW TO THE RIGHT OF THAT SHOWN IN THE PREVIOUS PHOTOGRAPH, FACING WEST FROM THE SOUTHWEST CORNER OF THE K-4 PARCEL. THE JET FUEL AST SHOWN O THE LEFT IS 1.26 MILLION GALLONS AND THE MIDDLE AND RIGHT JET FUEL ASTs ARE 2.31 MILLION GALLONS, ALL THREE OF WHICH ARE SITUATED WITHIN A CONCRETE BERMED AREA. THESE ASTs ARE AT LEAST 300 FEET FROM THE SUBJECT SITE.



PHOTO 25 - VIEW OF SMALL CONCRETE FOUNDATION LOCATED WITHIN SOUTH-CENTRAL PORTION OF THE K-4 PARCEL. THIS FOUNDATION MAY HAVE BEEN ASSOCIATED WITH A DIRT PATH TERMINATING IN A CIRCLE-SHAPED CLEARING, AS SHOWN IN THE HISTORICAL COUNTY OF RIVERSIDE FLOOD CONTROL AND WATER CONSERVATION DISTRICT 1962 AERIAL PHOTOGRAPHS.



PHOTO 26 - VIEW TO THE WEST FROM THE WESTERN END OF THE ONSITE CACTUS CHANNEL PORTION OF THE SUBJECT SITE. THE INTERSECTION OF CACTUS AVENUE AND ELSWORTH STREET/MARB ENTRANCE IS EVIDENT IN THE UPPER RIGHT.



PHOTO 27 - VIEW IN THE OPPOSITE DIRECTION OF THAT FOR THE PREVIOUS PHOTOGRAPH, LOOKING EAST ALONG THE CACTUS CHANNEL. THE STORM DRAIN INLET AT WHICH THE CHANNEL BEGINS, JUST EAST OF ELSWORTH STREET, IS PRESENT AT THE LEFT EDGE.



PHOTO 28 - VIEW TO THE EAST ALONG THE NORTH SIDE OF THE CACTUS CHANNEL. AN EMWD BOX WITH TRAFFIC SIGNAL BOX BEYOND ARE PRESENT, AMONG THE MANY UTILITY FEATURES PRESENT ALONG THE NORTH SIDE OF THE CHANNEL AND SOUTH SIDE OF CACTUS AVENUE. THE INTERSECTION OF CACTUS AVENUE AND VETERANS WAY IS EVIDENT TO THE LEFT IN THE BACKGROUND.



PHOTO 29 - VIEW TO THE EAST ALONG THE CACTUS CHANNEL, EAST OF VETERANS WAY. EMWD UTILITY FEATURES AND A TIRE ARE PRESENT. AS SHOWN, THE WEST PORTION OF THE CACTUS CHANNEL IS RELATIVELY SHALLOW, AROUND 3 TO 5 FEET DEEP, AND IS EFFECTIVELY A LARGE SWALE, MUCH OF WHICH IS DENSELY VEGETATED ALONG THE BOTTOM.



PHOTO 30 - VIEW TO THE EAST AT THE STORM DRAIN INLET EAST OF VETERANS WAY. SOME STANDING WATER IS PRESENT IN THE CACTUS CHANNEL BOTTOM.



PHOTO 31 - VIEW TO THE EAST FROM JUST WEST OF FREDERICK STREET. UTILITY FEATURES, INCLUDING A TRAFFIC SIGNAL BOX AND EMWD MARKINGS AND HYDRANT ARE PRESENT ALONG THE CACTUS AVENUE ROADSIDE. SOME TRASH, MINOR WEEDS, ARE VISIBLE IN THE DRY PORTION OF THE CACTUS CHANNEL TO THE RIGHT.



PHOTO 32 - VIEW TO THE NORTH, SHOWING THE STORM DRAIN INLET AT THE SOUTH SIDE OF THE INTERSECTION AT CACTUS AVENUE AND FREDERICK STREET.



PHOTO 33 - VIEW TO THE SOUTH, SHOWING A STORM DRAIN INLET ALONG CACTUS AVENUE, WHICH CONVEYS STORM WATER INTO THE CACTUS CHANNEL APPROXIMATELY 200 FEET EAST OF FREDERICK STREET.



PHOTO 34 - VIEW TO THE EAST FROM A STORM DRAIN INLET APPROXIMATELY 450 FEET EAST OF THE INTERSECTION AT CACTUS AVENUE AND FREDERICK STREET. SOME CONCRETE, BRICK, AND FOOD PAPER TRASH ARE PRESENT.



PHOTO 35 - VIEW OF TWO EMPTY, 1-QUART SIZED, AUTOMOBILE MOTOR OIL PLASTIC CONTAINERS ALONG THE NORTH SIDE OF THE CACTUS CHANNEL, APPROXIMATELY 550 FEET WEST OF HARBOR FREIGHT. NO SOIL STAINING WAS OBSERVED.



PHOTO 36 - VIEW FACING WEST, JUST WEST OF THE HARBOR FREIGHT AND CACTUS AVENUE INTERSECTION. SOME MINOR WINDBLOWN TRASH IS VISIBLE IN THE DRY CACTUS CHANNEL TO THE RIGHT.



PHOTO 37 - VIEW TO THE EAST AT THE INTERSECTION OF CACTUS AVENUE AND HARBOR FREIGHT. AN EMPTY, 1-QUART SIZED, AUTOMOBILE MOTOR OIL PLASTIC CONTAINER IS PRESENT AT THE BOTTOM OF THE PHOTOGRAPH. NO SOIL STAINING WAS OBSERVED.



PHOTO 38 - VIEW TO THE NORTH, SHOWING A STORM DRAIN INLET ALONG THE NORTH SIDE OF THE CACTUS CHANNEL, JUST EAST OF HARBOR FREIGHT.



PHOTO 39 - VIEW TO THE EAST FROM JUST WEST OF THE RIVERSIDE DRIVE BRIDGE CROSSING OVER THE CACTUS CHANNEL. SOME MINOR WINDBLOWN TRASH IS EVIDENT IN THE CHANNEL. THE TOP OF A STORM DRAIN INLET ALONG THE SOUTH SIDE OF CACTUS AVENUE IS SLIGHTLY VISIBLE IN THE UPPER LEFT OF THE PHOTOGRAPH.



PHOTO 40 - VIEW FACING EAST ALONG THE CACTUS CHANNEL, FROM THE BRIDGE CROSSING AT RIVERSIDE DRIVE. THE WHITISH-COLORED MATERIAL MAY BE A CEMENT, GYPSUM, OR SALT MATERIAL CAUSING THE LIGHT COLORING.



PHOTO 41 - VIEW TO THE EAST TOWARDS 4TH STREET BRIDGE CROSSING OVER THE CACTUS CHANNEL. A TIRE AND SOME WINDBLOWN TRASH ARE PRESENT IN THE CHANNEL TO THE RIGHT.



PHOTO 42 - VIEW FACING EAST ALONG THE CACTUS CHANNEL FROM EAST OF THE 4TH STREET BRIDGE CROSSING OVER THE CACTUS CHANNEL.



PHOTO 43 - VIEW TO THE EAST FROM JUST WEST OF GILBERT STREET, THE INTERSECTION OF WHICH AT CACTUS AVENUE IS EVIDENT IN THE BACKGROUND TO THE LEFT. THE CACTUS CHANNEL BOTTOM IS BECOMING MORE INCISED WITH STEEPER SIDES.



PHOTO 44 - VIEW TO THE SOUTHEAST FROM THE NORTH SIDE OF THE CACTUS CHANNEL, SHOWING THE ONLY OBSERVED STORM DRAIN INLET ALONG THE SOUTH SIDE OF THE CHANNEL. SOME ROCK RIP RAP IS VISIBLE IN CHANNEL, BENEATH THE INLET. BEYOND THE CHAIN-LINK FENCE AND PAVED ROAD (NORTH AVENUE) IS THE FORMER BASE HOSPITAL AREA.



PHOTO 45 - VIEW TO THE EAST ALONG THE NORTH SIDE OF THE CACTUS CHANNEL, TOWARDS THE EAST END, WHERE IT IS THE DEEPEST, WITH THE STEEPEST SIDES. CURRENT CONSTRUCTION AT THE EAST END OF THE CACTUS CHANNEL AND NORTH END OF THE HEACOCK CHANNEL ALONG THE WEST SIDE OF HEACOCK STREET IS VISIBLE IN THE DISTANCE.



PHOTO 46 - VIEW TO THE EAST, APPROXIMATELY 300 FEET WEST OF THE HEACOCK CHANNEL. THE WOODEN FORMS AND SUPPORTS SHOWN WITHIN THE EAST END OF THE CACTUS CHANNEL, WHERE IT TURNS SOUTHERLY AND MERGES INTO THE HEACOCK CHANNEL, MARK THE ONGOING CONSTRUCTION.



PHOTO 47 - VIEW TO THE SOUTHEAST, SHOWING THE EAST END OF THE CACTUS CHANNEL AND SUBJECT SITE. THIS CLOSEUP VIEW SHOWS THE CURRENT CONSTRUCTION OF CONCRETE BOX STRUCTURES AT THE EAST END OF CACTUS CHANNEL WHERE IT MEETS WITH A NORTH- TO SOUTH-TRENDING CHANNEL ALONG THE WEST SIDE OF HEACOCK STREET.

APPENDIX G

The EDR Radius Map™ Report with GeoCheck®

DRAFT

K-4 Parcel and Cactus Channel Former MAFB
Cactus Avenue/Harbor Freight
March Air Reserve Base, CA 92518

Inquiry Number: 5378862.2s
August 01, 2018

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

CACTUS AVENUE/HARBOR FREIGHT
MARCH AIR RESERVE BASE, CA 92518

COORDINATES

Latitude (North):	33.9099060 - 33° 54' 35.66''
Longitude (West):	117.2567590 - 117° 15' 24.33''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	476263.3
UTM Y (Meters):	3752002.0
Elevation:	1552 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012
Northeast Map:	5641326 SUNNYMEAD, CA
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140527, 20140603
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
CACTUS AVENUE/HARBOR FREIGHT
MARCH AIR RESERVE BASE, CA 92518

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
Reg	MARCH AIR FORCE BASE		DOD	Same	1 ft.
Reg	MARCH AIR FORCE BASE	22 CSG/CC	NPL, SEMS, RCRA-LQG, US ENG CONTROLS, US INST...	Same	1 ft.
A1	CHEVRON STATION NO 2	22520 CACTUS AVE	RCRA-LQG, LUST, CHMIRS, FINDS, ECHO, HAZNET	Higher	95, 0.018, West
A2	CHEVRON USA INC	22520 CACTUS AVE	EDR Hist Auto	Higher	95, 0.018, West
A3	CHEVRON #200908	22520 CACTUS AVE	LUST, SWEEPS UST, CA FID UST, CHMIRS, HIST CORTESE	Higher	95, 0.018, West
A4	CHEVRON STATION #200	22520 CACTUS AVE	UST	Higher	95, 0.018, West
A5	TEXACO (SHELL) CACTU	22470 CACTUS AVE	LUST	Higher	217, 0.041, West
A6	MORENO VALLEY UNOCAL	22470 CACTUS AVE	RCRA-LQG, UST, FINDS, ECHO, HAZNET	Higher	217, 0.041, West
7	EASTERN MUNICIPAL WA	14510 HEACOCK ST	SWEEPS UST, CA FID UST, EMI	Lower	219, 0.041, East
B8	ALPER CLEANERS, HERM	14420 ELSWORTH ST SU	DRYCLEANERS	Higher	424, 0.080, West
B9	ALPER CLEANERS	14420 ELSWORTH ST.,	ENVIROSTOR	Higher	424, 0.080, West
B10	ALPER CLEANERS INC	14420 ELLSWORTH ST S	DRYCLEANERS	Higher	424, 0.080, West
B11	ALPER CLEANERS	14420 ELLSWORTH ST S	DRYCLEANERS	Higher	424, 0.080, West
B12	ALPER CLEANERS	14420 ELSWORTH ST	EDR Hist Cleaner	Higher	424, 0.080, West
13	ULTRALIFE ENERGY SER	14419 VETERANS WAY	RCRA-SQG	Higher	651, 0.123, WNW
14	HARBOR FREIGHT TOOLS	23400 CACTUS AVE	RCRA-SQG, FINDS, ECHO	Higher	715, 0.135, NE
15	MENLO RECYCLING CENT	22405 GOLDEN CREST D	SWRCY	Higher	886, 0.168, West
16	NAVY OPERATIONAL SUP	23570 Z STREET	RCRA-SQG	Lower	899, 0.170, ESE
17	FRAZEE PAINT	14300 GRAHAM ST	RCRA-SQG, HAZNET, NPDES, CIWQS	Higher	959, 0.182, NE
18	DEPARTMENT OF DEFENS	23755 Z STREET	AST	Lower	997, 0.189, ESE
19	MARCH FIELD SKEET RA		UXO	Higher	1373, 0.260, NW
20	MARCH FIELD	14310 FREDERICK STRE	ENVIROSTOR, HWT	Higher	1625, 0.308, NW
C21	ARCO AM/PM MINI MARK	23501 ALESSANDRO BLV	SWEEPS UST, CA FID UST, HIST CORTESE	Higher	2423, 0.459, NNE
C22	ALESSANDRO ARCO AM/P	23501 ALESSANDRO BLV	LUST, UST	Higher	2423, 0.459, NNE
D23	CIRCLE K #1775	24051 JOHN F. KENNED	LUST	Lower	2609, 0.494, ESE
D24	CIRCLE K #1775	24051 JOHN F. KENNED	LUST	Lower	2609, 0.494, ESE
25	PROPOSED ALTERNATIVE	SEC CACTUS AVENUE AN	ENVIROSTOR, SCH	Higher	2921, 0.553, East
26	MARCH MIL AIRFIELD		ENVIROSTOR	Lower	3311, 0.627, SSE
27	BADGER SPRINGS MIDDL	24750 DELPHINIUM AVE	ENVIROSTOR, SCH, NPDES	Lower	4131, 0.782, East
28	CHAPARRAL ELEMENTARY	24850 DELPHINIUM AVE	ENVIROSTOR, SCH	Lower	4578, 0.867, East

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-CESQG ---------- RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

Federal ERNS list

ERNS ---------- Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE ---------- State Response Sites

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land
CPS-SLIC ---------- Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST ---------- Underground Storage Tank Listing
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP ---------- Voluntary Cleanup Priority Listing
VCP ---------- Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS ---------- Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT ---------- Waste Management Unit Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
CDL ---------- Clandestine Drug Labs
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
US CDL ---------- National Clandestine Laboratory Register
CERS HAZ WASTE ---------- CERS HAZ WASTE

Local Lists of Registered Storage Tanks

HIST UST ---------- Hazardous Substance Storage Container Database
CERS TANKS ---------- California Environmental Reporting System (CERS) Tanks

Local Land Records

LIENS ---------- Environmental Liens Listing

LIENS 2	CERCLA Lien Information
DEED	Deed Restriction Listing

Records of Emergency Release Reports

HMIRS	Hazardous Materials Information Reporting System
CHMIRS	California Hazardous Material Incident Report System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing
SPILLS 90	SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	Facility Index System/Facility Registry System
ECHO	Enforcement & Compliance History Information
DOCKET HWC	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM	EPA Fuels Program Registered Listing
CA BOND EXP. PLAN	Bond Expenditure Plan
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
EMI	Emissions Inventory Data
ENF	Enforcement Action Listing
Financial Assurance	Financial Assurance Information Listing
HAZNET	Facility and Manifest Data
ICE	ICE

HWP ---- EnviroStor Permitted Facilities Listing
HWT ---- Registered Hazardous Waste Transporter Database
MINES ---- Mines Site Location Listing
MWMP ---- Medical Waste Management Program Listing
NPDES ---- NPDES Permits Listing
PEST LIC ---- Pesticide Regulation Licenses Listing
PROC ---- Certified Processors Database
Notify 65 ---- Proposition 65 Records
UIC ---- UIC Listing
WASTEWATER PITS ---- Oil Wastewater Pits Listing
WDS ---- Waste Discharge System
WIP ---- Well Investigation Program Case List
UIC GEO ---- UIC GEO (GEOTRACKER)
NON-CASE INFO ---- NON-CASE INFO (GEOTRACKER)
SAMPLING POINT ---- SAMPLING POINT (GEOTRACKER)
PROJECT ---- PROJECT (GEOTRACKER)
PROD WATER PONDS ---- PROD WATER PONDS (GEOTRACKER)
OTHER OIL GAS ---- OTHER OIL & GAS (GEOTRACKER)
CIWQS ---- California Integrated Water Quality System
WELL STIM PROJ ---- Well Stimulation Project (GEOTRACKER)
CERS ---- CERS
MILITARY PRIV SITES ---- MILITARY PRIV SITES (GEOTRACKER)

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---- EDR Proprietary Manufactured Gas Plants

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: Also known as Superfund, the National Priority List database is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund program. The source of this database is the U.S. EPA.

A review of the NPL list, as provided by EDR, and dated 05/13/2018 has revealed that there is 1 NPL site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*8*

Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 05/18/2018 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*8*

Federal RCRA generators list

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 03/01/2018 has revealed that there are 3 RCRA-LQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	*22 CSG/CC*	*0 - 1/8 (0.000 mi.)*	*0*	*8*
CHEVRON STATION NO 2	*22520 CACTUS AVE*	*W 0 - 1/8 (0.018 mi.)*	*A1*	*36*
MORENO VALLEY UNOCAL	*22470 CACTUS AVE*	*W 0 - 1/8 (0.041 mi.)*	*A6*	*58*

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 03/01/2018 has revealed that there are 4 RCRA-SQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ULTRALIFE ENERGY SER	14419 VETERANS WAY	WNW 0 - 1/8 (0.123 mi.)	13	69
HARBOR FREIGHT TOOLS	***23400 CACTUS AVE***	***NE 1/8 - 1/4 (0.135 mi.)***	***14***	***72***
FRAZEE PAINT	***14300 GRAHAM ST***	***NE 1/8 - 1/4 (0.182 mi.)***	***17***	***79***

Lower Elevation	Address	Direction / Distance	Map ID	Page
NAVY OPERATIONAL SUP	23570 Z STREET	ESE 1/8 - 1/4 (0.170 mi.)	16	76

Federal institutional controls / engineering controls registries

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 02/13/2018 has revealed that there is 1 US ENG CONTROLS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***8***

US INST CONTROL: A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

A review of the US INST CONTROL list, as provided by EDR, and dated 02/13/2018 has revealed that there is 1 US INST CONTROL site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***8***

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where

environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 04/30/2018 has revealed that there are 6 ENVIROSTOR sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALPER CLEANERS Facility Id: 33720002 Status: Refer: 1248 Local Agency	14420 ELSWORTH ST.,	W 0 - 1/8 (0.080 mi.)	B9	67
MARCH FIELD Facility Id: 80000870 Status: Inactive - Action Required	***14310 FREDERICK STRE***	***NW 1/4 - 1/2 (0.308 mi.)***	***20***	***90***
PROPOSED ALTERNATIVE Facility Id: 60000563 Status: No Further Action	***SEC CACTUS AVENUE AN***	***E 1/2 - 1 (0.553 mi.)***	***25***	***107***

Lower Elevation	Address	Direction / Distance	Map ID	Page
MARCH MIL AIRFIELD Facility Id: 80000012 Status: Inactive - Needs Evaluation		SSE 1/2 - 1 (0.627 mi.)	26	110
BADGER SPRINGS MIDDL Facility Id: 60000826 Status: No Further Action	***24750 DELPHINIUM AVE***	***E 1/2 - 1 (0.782 mi.)***	***27***	***111***
CHAPARRAL ELEMENTARY Facility Id: 33010055 Status: No Action Required	***24850 DELPHINIUM AVE***	***E 1/2 - 1 (0.867 mi.)***	***28***	***113***

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

A review of the LUST list, as provided by EDR, has revealed that there are 6 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON STATION NO 2 Database: LUST, Date of Government Version: 06/11/2018 Database: RIVERSIDE CO. LUST, Date of Government Version: 04/05/2018 Status: Completed - Case Closed Facility Id: 971155 Global Id: T0606500508 Facility Status: 9	***22520 CACTUS AVE***	***W 0 - 1/8 (0.018 mi.)***	***A1***	***36***
CHEVRON #200908 Database: LUST REG 8, Date of Government Version: 02/14/2005 Facility Status: Leak being confirmed	***22520 CACTUS AVE***	***W 0 - 1/8 (0.018 mi.)***	***A3***	***44***

Global ID: T0606500508

TEXACO (SHELL) CACTU	22470 CACTUS AVE	W 0 - 1/8 (0.041 mi.)	A5	49

Database: LUST, Date of Government Version: 06/11/2018
Database: RIVERSIDE CO. LUST, Date of Government Version: 04/05/2018
Status: Completed - Case Closed
Facility Id: 200219022
Global Id: T0606566676
Facility Status: 9

ALESSANDRO ARCO AM/P	***23501 ALESSANDRO BLV***	***NNE 1/4 - 1/2 (0.459 mi.)***	***C22***	***93***

Database: LUST REG 8, Date of Government Version: 02/14/2005
Database: LUST, Date of Government Version: 06/11/2018
Database: RIVERSIDE CO. LUST, Date of Government Version: 04/05/2018
Status: Completed - Case Closed
Facility Status: Case Closed
Facility Id: 200016218
Global Id: T0606500632
Facility Status: 9
Global ID: T0606500632

Lower Elevation	Address	Direction / Distance	Map ID	Page
CIRCLE K #1775	24051 JOHN F. KENNED	ESE 1/4 - 1/2 (0.494 mi.)	D23	96

Database: LUST REG 8, Date of Government Version: 02/14/2005
Facility Status: Leak being confirmed
Global ID: T0606502742

CIRCLE K #1775	24051 JOHN F. KENNED	ESE 1/4 - 1/2 (0.494 mi.)	D24	97

Database: LUST, Date of Government Version: 06/11/2018
Database: RIVERSIDE CO. LUST, Date of Government Version: 04/05/2018
Status: Completed - Case Closed
Facility Id: 200420759
Global Id: T0606502742
Facility Status: 9

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, has revealed that there are 2 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON STATION #200	22520 CACTUS AVE	W 0 - 1/8 (0.018 mi.)	A4	49

Database: UST, Date of Government Version: 06/11/2018
Database: RIVERSIDE CO. UST, Date of Government Version: 04/05/2018
Facility Id: FA0014084
Facility Id: 193

MORENO VALLEY UNOCAL	***22470 CACTUS AVE***	***W 0 - 1/8 (0.041 mi.)***	***A6***	***58***

Database: UST, Date of Government Version: 06/11/2018
Database: RIVERSIDE CO. UST, Date of Government Version: 04/05/2018

Facility Id: FA0048257
Facility Id: 750

AST: A listing of aboveground storage tank petroleum storage tank locations.

A review of the AST list, as provided by EDR, has revealed that there is 1 AST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
DEPARTMENT OF DEFENS	23755 Z STREET	ESE 1/8 - 1/4 (0.189 mi.)	18	89
Database: AST, Date of Government Version: 07/06/2016				

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: A listing of recycling facilities in California.

A review of the SWRCY list, as provided by EDR, and dated 03/12/2018 has revealed that there is 1 SWRCY site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MENLO RECYCLING CENT	22405 GOLDEN CREST D	W 1/8 - 1/4 (0.168 mi.)	15	75
Cert Id: RC248793.001				

Local Lists of Registered Storage Tanks

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 2 SWEEPS UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908	***22520 CACTUS AVE***	***W 0 - 1/8 (0.018 mi.)***	***A3***	***44***
Status: A				
Tank Status: A				
Comp Number: 1855				

Lower Elevation	Address	Direction / Distance	Map ID	Page
EASTERN MUNICIPAL WA	***14510 HEACOCK ST***	***E 0 - 1/8 (0.041 mi.)***	***7***	***62***
Status: A				
Tank Status: A				

EXECUTIVE SUMMARY

Comp Number: 30886

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 2 CA FID UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908 Facility Id: 33004997 Status: A	***22520 CACTUS AVE***	***W 0 - 1/8 (0.018 mi.)***	***A3***	***44***

Lower Elevation	Address	Direction / Distance	Map ID	Page
EASTERN MUNICIPAL WA Facility Id: 33006973 Status: A	***14510 HEACOCK ST***	***E 0 - 1/8 (0.041 mi.)***	***7***	***62***

Other Ascertainable Records

DOD: Consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

A review of the DOD list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 DOD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE		0 - 1/8 (0.000 mi.)	0	8

ROD: Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid the cleanup.

A review of the ROD list, as provided by EDR, and dated 05/13/2018 has revealed that there is 1 ROD site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***8***

PRP: A listing of verified Potentially Responsible Parties

A review of the PRP list, as provided by EDR, and dated 10/25/2013 has revealed that there is 1 PRP site within approximately 0.001 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH AIR FORCE BASE	***22 CSG/CC***	***0 - 1/8 (0.000 mi.)***	***0***	***8***

UXO: A listing of unexploded ordnance site locations

A review of the UXO list, as provided by EDR, and dated 09/30/2016 has revealed that there is 1 UXO site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
MARCH FIELD SKEET RA		NW 1/4 - 1/2 (0.260 mi.)	19	90

DRYCLEANERS: A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaners' agents; linen supply; coin-operated laundries and cleaning; drycleaning plants except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

A review of the DRYCLEANERS list, as provided by EDR, has revealed that there are 3 DRYCLEANERS sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALPER CLEANERS, HERM Database: DRYCLEAN SOUTH COAST, Date of Government Version: 03/16/2018	14420 ELSWORTH ST SU	W 0 - 1/8 (0.080 mi.)	B8	66
ALPER CLEANERS INC Database: DRYCLEAN SOUTH COAST, Date of Government Version: 03/16/2018	14420 ELLSWORTH ST S	W 0 - 1/8 (0.080 mi.)	B10	68
ALPER CLEANERS Database: DRYCLEAN SOUTH COAST, Date of Government Version: 03/16/2018	14420 ELLSWORTH ST S	W 0 - 1/8 (0.080 mi.)	B11	68

HIST CORTESE: The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

A review of the HIST CORTESE list, as provided by EDR, and dated 04/01/2001 has revealed that there are 2 HIST CORTESE sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #200908 Reg Id: 083303096T	***22520 CACTUS AVE***	***W 0 - 1/8 (0.018 mi.)***	***A3***	***44***
ARCO AM/PM MINI MARK Reg Id: 083303648T	***23501 ALESSANDRO BLV***	***NNE 1/4 - 1/2 (0.459 mi.)***	***C21***	***92***

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR Hist Auto: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station,

service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Auto list, as provided by EDR, has revealed that there is 1 EDR Hist Auto site within approximately 0.125 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON USA INC	22520 CACTUS AVE	W 0 - 1/8 (0.018 mi.)	A2	43

EDR Hist Cleaner: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Cleaner list, as provided by EDR, has revealed that there is 1 EDR Hist Cleaner site within approximately 0.125 miles of the target property.

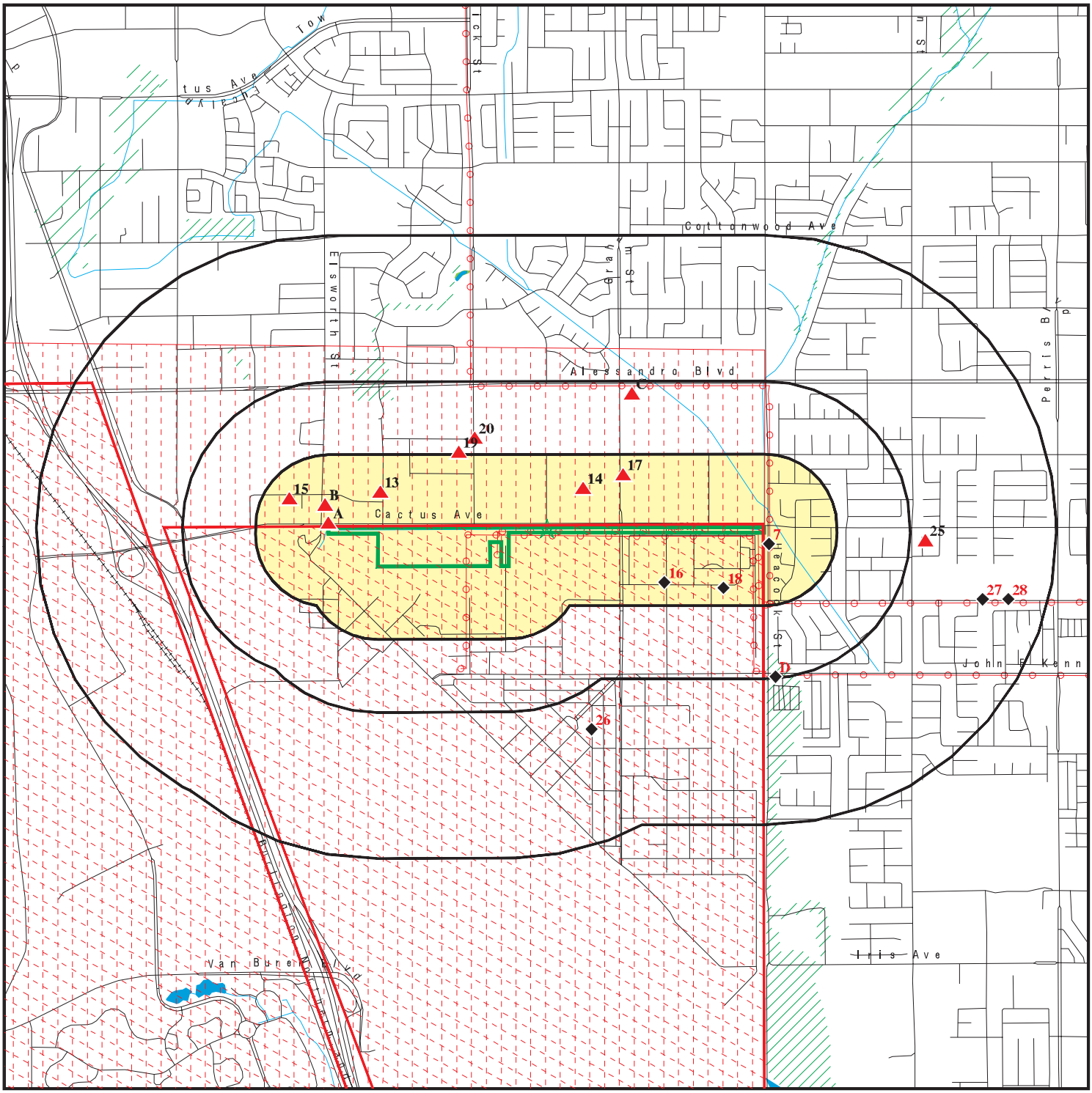
Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
ALPER CLEANERS	14420 ELSWORTH ST	W 0 - 1/8 (0.080 mi.)	B12	69

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 5 records.

Site Name	Database(s)
UCR - PARKING LOT 6	CDL LUST
U.S. AIR FORCE - MARCH AFB (FORMER	CPS-SLIC
RIVERSIDE PLUME	CPS-SLIC
UCR (PESTICIDE PITS)	CPS-SLIC

OVERVIEW MAP - 5378862.2S



Target Property

Sites at elevations higher than or equal to the target property

Sites at elevations lower than the target property

Manufactured Gas Plants

National Priority List Sites

Dept. Defense Sites

0 1/4 1/2 1 Miles

Indian Reservations BIA

Power transmission lines

100-year flood zone

500-year flood zone

National Wetland Inventory

State Wetlands

Upgradient Area

Areas of Concern

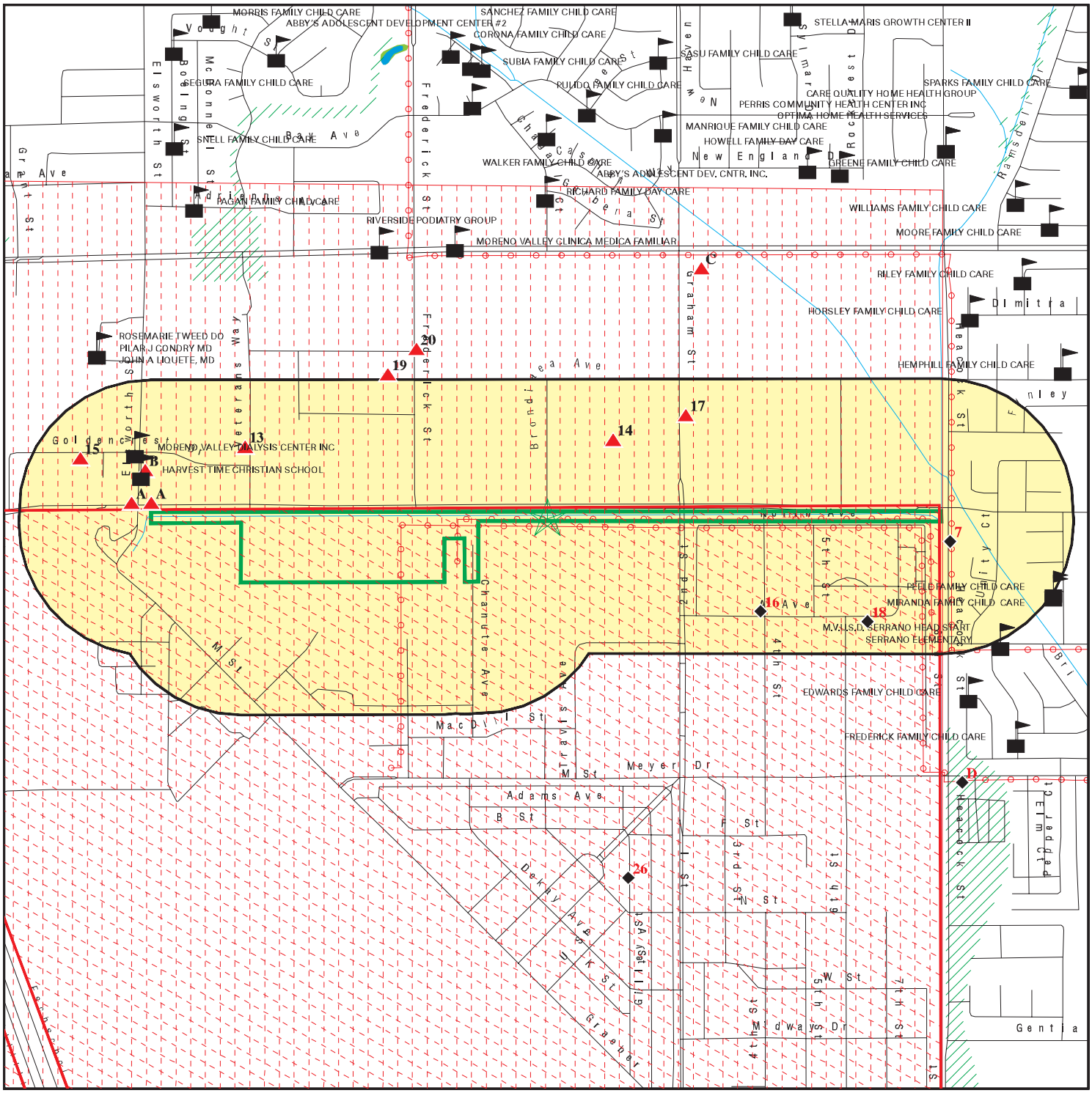
N

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	K-4 Parcel and Cactus Channel Former MAFB	CLIENT:	LOR Geotechnical Group, Inc.
ADDRESS:	Cactus Avenue/Harbor Freight March Air Reserve Base CA 92518	CONTACT:	Mathew Hunt
LAT/LONG:	33.909906 / 117.256759	INQUIRY #:	5378862.2s
		DATE:	August 01, 2018 12:20 pm

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DETAIL MAP - 5378862.2S



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	K-4 Parcel and Cactus Channel Former MAFB	CLIENT:	LOR Geotechnical Group, Inc.
ADDRESS:	Cactus Avenue/Harbor Freight March Air Reserve Base CA 92518	CONTACT:	Mathew Hunt
		INQUIRY #:	5378862.2s
LAT/LONG:	33.909906 / 117.256759	DATE:	August 01, 2018 12:24 pm

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		1	0	0	0	NR	1
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	0.001		0	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		1	0	0	NR	NR	1
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		3	0	NR	NR	NR	3
RCRA-SQG	0.250		1	3	NR	NR	NR	4
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		1	0	0	NR	NR	1
US INST CONTROL	0.500		1	0	0	NR	NR	1
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		1	0	1	4	NR	6
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		3	0	3	NR	NR	6

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
CPS-SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		2	0	NR	NR	NR	2
AST	0.250		0	1	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	1	0	NR	NR	1
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		2	0	NR	NR	NR	2
HIST UST	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		2	0	NR	NR	NR	2
CERS TANKS	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0
LIENS 2	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		1	0	0	0	NR	1
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		1	0	0	0	NR	1
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		1	NR	NR	NR	NR	1
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	1	0	NR	1
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		3	0	NR	NR	NR	3

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		1	0	1	NR	NR	2
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.001		0	NR	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
UIC GEO	0.001		0	NR	NR	NR	NR	0
NON-CASE INFO	0.001		0	NR	NR	NR	NR	0
SAMPLING POINT	0.001		0	NR	NR	NR	NR	0
PROJECT	0.001		0	NR	NR	NR	NR	0
PROD WATER PONDS	0.001		0	NR	NR	NR	NR	0
OTHER OIL GAS	0.001		0	NR	NR	NR	NR	0
CIWQS	0.001		0	NR	NR	NR	NR	0
WELL STIM PROJ	0.001		0	NR	NR	NR	NR	0
CERS	0.001		0	NR	NR	NR	NR	0
MILITARY PRIV SITES	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		1	NR	NR	NR	NR	1
EDR Hist Cleaner	0.125		1	NR	NR	NR	NR	1
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	27	5	6	4	0	42

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

DOD **MARCH AIR FORCE BASE (CLOSED)** **DOD** **CUSA143538**
Region **N/A**

MARCH AIR FORCE BASE (CLO (County), CA

< 1/8
1 ft.

DOD:
Feature 1: Air Force DOD
Feature 2: Not reported
Feature 3: Not reported
URL: Not reported
Name 1: March Air Force Base (Closed)
Name 2: Not reported
Name 3: Not reported
State: CA
DOD Site: Yes
Tile name: CARIVERSIDE

NPL **MARCH AIR FORCE BASE** **NPL** **1000169261**
Region **22 CSG/CC** **SEMS** **CA4570024527**
RIVERSIDE, CA 92518 **RCRA-LQG**

< 1/8 **US ENG CONTROLS**
1 ft. **US INST CONTROL**
ROD
PRP

NPL:
EPA ID: CA4570024527
Cerclis ID: 902761
EPA Region: 9
Federal: Y
Final Date: 1989-11-21 00:00:00
Site Score: 31.940000000000001
Latitude: 33.906389
Longitude: -117.2557

Category Details:
NPL Status: Currently on the Final NPL
Category Description: Depth To Aquifer-> 50 And <= 100 Feet
Category Value: 65

NPL Status: Currently on the Final NPL
Category Description: Distance To Nearest Population-> 0 And <= 1/4 Mile
Category Value: 10

Site Details:
Site Name: MARCH AIR FORCE BASE
Site Status: Final
Site Zip: 92518
Site City: RIVERSIDE
Site State: CA
Federal Site: Yes
Site County: RIVERSIDE
EPA Region: 09
Date Proposed: 07/14/89
Date Deleted: Not reported
Date Finalized: 11/21/89

MARCH AIR FORCE BASE (Continued) **1000169261**

Substance Details:

NPL Status:	Currently on the Final NPL
Substance ID:	Not reported
Substance:	Not reported
CAS #:	Not reported
Pathway:	Not reported
Scoring:	Not reported

NPL Status:	Currently on the Final NPL
Substance ID:	A046
Substance:	POLYCHLORINATED BIPHENYLS
CAS #:	1336-36-3
Pathway:	GROUND WATER PATHWAY
Scoring:	3

NPL Status:	Currently on the Final NPL
Substance ID:	U210
Substance:	TETRACHLOROETHENE
CAS #:	127-18-4
Pathway:	GROUND WATER PATHWAY
Scoring:	2

NPL Status:	Currently on the Final NPL
Substance ID:	U228
Substance:	TRICHLOROETHYLENE (TCE)
CAS #:	79-01-6
Pathway:	GROUND WATER PATHWAY
Scoring:	2

Summary Details:

Conditions at proposal July 14, 1989): March Air Force Base MAFB) covers approximately 7,000 acres near Riverside in the Moreno Valley in Riverside County, California. MAFB is adjacent to light industrial, agricultural, and residential areas. Established in 1918 as the Alessandro Aviation Field, MAFB has served as a training base and refueling operations base. Industrial operations including aircraft maintenance and repair) involved use of solvents and disposal of solvent wastes. MAFB is participating in the Installation Restoration Program IRP), established in 1978. Under this program, the Department of Defense seeks to identify, investigate, and clean up contamination from ha ardous materials. As part ofIRP, the Air Force investigated 28 potentially contaminated disposal areas. MAFB Well No. 1 on-base was found to be contaminated with trichloroethylene, tetrachloroethylene, and cis-1,2-dichloroethylene at levels that exceed State drinking water standards. It was taken out of service. Soils on the base are contaminated with toluene and ben ene. An estimated 11,600 people obtain drinking water from municipal wells within 3 miles of ha ardous substances on MAFB. The Air Forceis conducting a remedial investigation/ feasibility study RI/FS) to determine the type and extent of contamination at the base and identify alternatives for remedial action. Status November 21, 1989): Field work continues on the RI/FS.

Site Status Details:

NPL Status:	Final
Proposed Date:	07/14/1989
Final Date:	11/21/1989
Deleted Date:	Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Narratives Details:
- NPL Name: MARCH AIR FORCE BASE
- City: RIVERSIDE
- State: CA

SEMS:
- Site ID: 902761
- EPA ID: CA4570024527
- Cong District: Not reported
- FIPS Code: 6065
- Latitude: 33.906388999999997
- Longitude: -117.2557
- FF: Y
- NPL: Currently on the Final NPL
- Non NPL Status: Not reported

SEMS Detail:
- Region: 9
- Site ID: 902761
- EPA ID: CA4570024527
- Site Name: MARCH AIR FORCE BASE
- NPL: F
- FF: Y
- OU: 0
- Action Code: HR
- Action Name: HAZRANK
- SEQ: 1
- Start Date: 1987-06-01 00:00:00
- Finish Date: 6/1/1987
- Qual: Not reported
- Current Action Lead: EPA Perf

- Region: 9
- Site ID: 902761
- EPA ID: CA4570024527
- Site Name: MARCH AIR FORCE BASE
- NPL: F
- FF: Y
- OU: 0
- Action Code: NP
- Action Name: PROPOSED
- SEQ: 1
- Start Date: 1989-07-14 00:00:00
- Finish Date: 7/14/1989
- Qual: Not reported
- Current Action Lead: EPA Perf

- Region: 9
- Site ID: 902761
- EPA ID: CA4570024527
- Site Name: MARCH AIR FORCE BASE
- NPL: F
- FF: Y
- OU: 0
- Action Code: NF
- Action Name: NPL FINL

MARCH AIR FORCE BASE (Continued) **1000169261**

SEQ: 1
Start Date: 1989-11-21 00:00:00
Finish Date: 11/21/1989
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: AR
Action Name: ADMIN REC
SEQ: 1
Start Date: 2000-10-24 00:00:00
Finish Date: Not reported
Qual: Not reported
Current Action Lead: EPA Perf

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 0
Action Code: SI
Action Name: SI
SEQ: 1
Start Date: 1987-06-01 00:00:00
Finish Date: 6/1/1987
Qual: L
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 1
Action Code: LY
Action Name: FF RA
SEQ: 1
Start Date: 1996-03-05 00:00:00
Finish Date: Not reported
Qual: Not reported
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y

MARCH AIR FORCE BASE (Continued) **1000169261**

OU:	0
Action Code:	PA
Action Name:	PA
SEQ:	1
Start Date:	1987-02-01 00:00:00
Finish Date:	2/1/1987
Qual:	L
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	RO
Action Name:	ROD
SEQ:	1
Start Date:	1996-06-20 00:00:00
Finish Date:	6/20/1996
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	1
Start Date:	1990-09-27 00:00:00
Finish Date:	6/20/1996
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	7
Start Date:	2004-04-01 00:00:00
Finish Date:	4/1/2004
Qual:	Not reported
Current Action Lead:	Fed Fac
Region:	9
Site ID:	902761
EPA ID:	CA4570024527

MARCH AIR FORCE BASE (Continued) **1000169261**

Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	6
Start Date:	1995-07-01 00:00:00
Finish Date:	7/1/1997
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	0
Action Code:	DS
Action Name:	DISCVRY
SEQ:	1
Start Date:	1985-02-01 00:00:00
Finish Date:	2/1/1985
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	4
Start Date:	1992-01-24 00:00:00
Finish Date:	4/30/1995
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	4
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	2
Start Date:	1990-09-27 00:00:00
Finish Date:	9/29/2005
Qual:	Not reported
Current Action Lead:	Fed Fac

MARCH AIR FORCE BASE (Continued) **1000169261**

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	4
Action Code:	RO
Action Name:	ROD
SEQ:	3
Start Date:	2005-09-29 00:00:00
Finish Date:	9/29/2005
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	1
Action Code:	LX
Action Name:	FF RD
SEQ:	1
Start Date:	1996-04-07 00:00:00
Finish Date:	4/18/1996
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	5
Action Code:	LW
Action Name:	FF RI/FS
SEQ:	5
Start Date:	2005-10-30 00:00:00
Finish Date:	Not reported
Qual:	Not reported
Current Action Lead:	Fed Fac

Region:	9
Site ID:	902761
EPA ID:	CA4570024527
Site Name:	MARCH AIR FORCE BASE
NPL:	F
FF:	Y
OU:	2
Action Code:	RO
Action Name:	ROD
SEQ:	5
Start Date:	2005-09-30 00:00:00
Finish Date:	9/30/2005

MARCH AIR FORCE BASE (Continued) **1000169261**

Qual: Not reported
Current Action Lead: Fed Fac

Region: 9
Site ID: 902761
EPA ID: CA4570024527
Site Name: MARCH AIR FORCE BASE
NPL: F
FF: Y
OU: 2
Action Code: RO
Action Name: ROD
SEQ: 4
Start Date: 2004-05-11 00:00:00
Finish Date: 5/11/2004
Qual: Not reported
Current Action Lead: Fed Fac

RCRA-LQG:
Date form received by agency: 02/29/2016
Facility name: MARCH AIR RESERVE BASE
Facility address: 610 MEYER DR
BLDG 2403
MARCH ARB, CA 92518
EPA ID: CA4570024527
Mailing address: MEYER DR
BLDG 2403
MARCH ARB, CA 92518
Contact: CRAIG HUNTER
Contact address: MEYER DR BLDG 2403
MARCH ARB, CA 92518
Contact country: US
Contact telephone: 951-655-5082
Contact email: CRAIG.HUNTER.1@US.AF.MIL
EPA Region: 09
Land type: Federal
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:
Owner/operator name: US AIR FORCE
Owner/operator address: GRAEBER BLDG 470
MARCH ARB, CA 92518
Owner/operator country: US

MARCH AIR FORCE BASE (Continued) **1000169261**

Owner/operator telephone: 951-655-4665
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Federal
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1945
Owner/Op end date: Not reported

Owner/operator name: GEN. RUSSELL A. MUNCY
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Federal
Owner/Operator Type: Operator
Owner/Op start date: 11/01/2013
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: No

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: No

. Waste code: 141
. Waste name: Off-specification, aged, or surplus inorganics

. Waste code: 151

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: Asbestos-containing waste

. Waste code: 181
. Waste name: Other inorganic solid waste

. Waste code: 223
. Waste name: Unspecified oil-containing waste

. Waste code: 241
. Waste name: Tank bottom waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 331
. Waste name: Off-specification, aged, or surplus organics

. Waste code: 343
. Waste name: Unspecified organic liquid mixture

. Waste code: 352
. Waste name: Other organic solids

. Waste code: 723
. Waste name: Liquids with chromium (VI) > 500 mg/l

. Waste code: 791
. Waste name: Liquids with pH < 2

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D003
. Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

. Waste code: D005
. Waste name: BARIUM

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

Historical Generators:
Date form received by agency: 10/22/2014
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/20/2013
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 07/15/2010
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: 181
. Waste name: Other inorganic solid waste

. Waste code: 214
. Waste name: Unspecified solvent mixture

. Waste code: 223
. Waste name: Unspecified oil-containing waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 342

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: Organic liquids with metals (see 121)

. Waste code: 343
. Waste name: Unspecified organic liquid mixture

. Waste code: 352
. Waste name: Other organic solids

. Waste code: 461
. Waste name: Degreasing sludge

. Waste code: 541
. Waste name: Photochemicals / photo processing waste

. Waste code: 792
. Waste name: Liquids with pH < 2 with metals

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE

MARCH AIR FORCE BASE (Continued) **1000169261**

OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/26/2008
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D011
. Waste name: SILVER

. Waste code: D018
. Waste name: BENZENE

. Waste code: D021
. Waste name: CHLOROBENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: U188
. Waste name: PHENOL

. Waste code: U227
. Waste name: ETHANE, 1,1,2-TRICHLORO-

Date form received by agency: 02/08/2006
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT

MARCH AIR FORCE BASE (Continued) **1000169261**

WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

Date form received by agency: 02/25/2004
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D011
. Waste name: SILVER

MARCH AIR FORCE BASE (Continued) **1000169261**

. Waste code: D018
. Waste name: BENZENE

Date form received by agency: 04/10/2002
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D003
. Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

. Waste code: D004
. Waste name: ARSENIC

. Waste code: D005
. Waste name: BARIUM

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: P098
. Waste name: POTASSIUM CYANIDE

Date form received by agency: 10/12/2000
Site name: MARCH ARB CA
Classification: Large Quantity Generator

MARCH AIR FORCE BASE (Continued) **1000169261**

Date form received by agency: 07/14/2000
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: F001
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F002
. Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR

MARCH AIR FORCE BASE (Continued) **1000169261**

MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 03/04/1999
Site name: MARCH ARB, CA
Classification: Large Quantity Generator

Date form received by agency: 09/01/1996
Site name: MARCH AIR RESERVE BASE
Classification: Large Quantity Generator

Date form received by agency: 03/26/1996
Site name: MARCH AFB, CA
Classification: Large Quantity Generator

Date form received by agency: 03/31/1994
Site name: MARCH AIR FORCE BASE, CA
Classification: Large Quantity Generator

Date form received by agency: 03/30/1992
Site name: MARCH AIR FORCE BASE
Classification: Large Quantity Generator

Biennial Reports:

Last Biennial Reporting Year: 2017

Annual Waste Handled:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 15899.4

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 186

MARCH AIR FORCE BASE (Continued) **1000169261**

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.
Amount (Lbs): 1

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 8

Waste code: D006
Waste name: CADMIUM
Amount (Lbs): 843

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 1026

Waste code: D008
Waste name: LEAD
Amount (Lbs): 843

Waste code: D009
Waste name: MERCURY
Amount (Lbs): 2

Waste code: D011
Waste name: SILVER
Amount (Lbs): 1

Waste code: D018
Waste name: BENZENE
Amount (Lbs): 3436

Waste code: D035
Waste name: METHYL ETHYL KETONE
Amount (Lbs): 11381

Facility Has Received Notices of Violations:
Regulation violated: FR - 262.30-34.C
Area of violation: Generators - General
Date violation determined: 04/27/1995
Date achieved compliance: 04/27/2000
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/28/1995
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A

MARCH AIR FORCE BASE (Continued) **1000169261**

Area of violation: Generators - General
Date violation determined: 03/05/1984
Date achieved compliance: 04/04/1995
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 05/18/1984
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 11/02/2006
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/06/1996
Evaluation: FOLLOW-UP INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/04/1995
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/27/2000
Evaluation lead agency: EPA

Evaluation date: 03/05/1984
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/04/1995
Evaluation lead agency: EPA

US ENG CONTROLS:
EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Actual Date: 09/30/2005
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: Explanation Of Significant Differences
Action Completion date: 08/24/2000
Operable Unit: 01
Contaminated Media : Soil

MARCH AIR FORCE BASE (Continued) **1000169261**

Engineering Control: Bioremediation (Ex-Situ)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Discharge
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Extraction
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Liquid Phase Carbon Adsorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Groundwater
Engineering Control: Other, (N.O.S.)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION

MARCH AIR FORCE BASE (Continued) **1000169261**

Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Cap
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Disposal
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Excavation
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Impermeable Barrier
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Low Temperature Thermal Desorption
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Operations & Maintenance (O&M)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Recycling
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 001
Action Name: RECORD OF DECISION
Action Completion date: 06/20/1996
Operable Unit: 01
Contaminated Media : Soil
Engineering Control: Soil Vapor Extraction (in-situ)
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: Monitoring
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 003
Action Name: RECORD OF DECISION
Action Completion date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 005
Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Groundwater
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

Action ID: 005
Action Name: RECORD OF DECISION
Action Completion date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Engineering Control: No Action
Contact Name: Not reported
Contact Phone and Ext: Not reported
Event Code Description: Not reported

US INST CONTROL:
EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Deed Notices
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil

MARCH AIR FORCE BASE (Continued) **1000169261**

Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Subdivision regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Zoning regulation
Actual Date: 09/30/2005
Complet. Date: 09/29/2005
Operable Unit: 04
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004
Operable Unit: 02
Contaminated Media : Groundwater
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

MARCH AIR FORCE BASE (Continued) **1000169261**

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Covenant
Actual Date: 06/15/2004
Complet. Date: 05/11/2004
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Base use plan change
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

EPA ID: CA4570024527
Site ID: 0902761
Name: MARCH AIR FORCE BASE
Action Name: RECORD OF DECISION
Address: 22 CSG/CC
RIVERSIDE, CA 92518
EPA Region: 09
County: RIVERSIDE
Event Code: Not reported
Inst. Control: Building, demolition, or excavation regulation
Actual Date: 09/30/2005
Complet. Date: 09/30/2005
Operable Unit: 02
Contaminated Media : Soil
Contact Name : Not reported
Contact Phone and Ext : Not reported
Event Code Description: Not reported

ROD:
Full-text of USEPA Record of Decision(s) is available from EDR.

MARCH AIR FORCE BASE (Continued) **1000169261**

PRP:
PRP name: STATE OF CALIFORNIA/DEPT. OF HEALTH SERVICES
STATE OF CALIFORNIA/DEPT. OF WATER QUALITY
U.S. AIR FORCE
U.S. AIR FORCE

A1
West
< 1/8
0.018 mi.
95 ft.

Relative:
Higher

Actual:
1552 ft.

CHEVRON STATION NO 200908
22520 CACTUS AVE
MORENO VALLEY, CA 92553

Site 1 of 6 in cluster A

RCRA-LQG **1006805060**
LUST **CAR000120345**
CHMIRS
FINDS
ECHO
HAZNET

RCRA-LQG:
Date form received by agency: 03/01/2014
Facility name: CHEVRON 200908
Facility address: 22520 CACTUS AVE
MORENO VALLEY, CA 92553
EPA ID: CAR000120345
Mailing address: CACTUS AVE
MORENO VALLEY, CA 92553
Contact: KATHY NORRIS
Contact address: P.O. BOX 6004
SAN RAMON, CA 94583
Contact country: Not reported
Contact telephone: 877-386-6044
Contact email: NAWTDESK@CHEVRON.COM
EPA Region: 09
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:
Owner/operator name: CHEVRON USA INC
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 06/12/1990
Owner/Op end date: Not reported

Owner/operator name: CHEVRON USA INC

CHEVRON STATION NO 200908 (Continued) **1006805060**

Owner/operator address: P.O. BOX 6004
SAN RAMON, CA 94583
Owner/operator country: Not reported
Owner/operator telephone: 925-842-1000
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 06/12/1990
Owner/Op end date: Not reported

Owner/operator name: CHEVRON PRODUCTS CO
Owner/operator address: P O BOX 6004
SAN RAMON, CA 94583
Owner/operator country: Not reported
Owner/operator telephone: 925-842-5931
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: 134
. Waste name: Aqueous solution with <10% total organic residues

. Waste code: 352
. Waste name: Other organic solids

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

CHEVRON STATION NO 200908 (Continued) **1006805060**

. Waste code: D018
. Waste name: BENZENE

Historical Generators:
Date form received by agency: 05/16/2002
Site name: CHEVRON STATION NO 200908
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D018
. Waste name: BENZENE

Violation Status: No violations found

LUST:
Lead Agency: RIVERSIDE COUNTY LOP
Case Type: LUST Cleanup Site
Geo Track: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606500508
Global Id: T0606500508
Latitude: 33.9107059304108
Longitude: -117.269657428207
Status: Completed - Case Closed
Status Date: 08/21/1998
Case Worker: RIV
RB Case Number: 083303096T
Local Agency: RIVERSIDE COUNTY LOP
File Location: Local Agency Warehouse
Local Case Number: 971155
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

LUST:
Global Id: T0606500508
Contact Type: Local Agency Caseworker
Contact Name: Riverside County LOP
Organization Name: RIVERSIDE COUNTY LOP
Address: 3880 LEMON ST SUITE 200
City: RIVERSIDE
Email: Not reported
Phone Number: 9519558980

Global Id: T0606500508
Contact Type: Regional Board Caseworker
Contact Name: TOM E. MBEKE-EKANEM
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: tmbeke-ekanem@waterboards.ca.gov
Phone Number: 9513202007

CHEVRON STATION NO 200908 (Continued) **1006805060**

LUST:
Global Id: T0606500508
Action Type: ENFORCEMENT
Date: 12/18/2008
Action: Closure/No Further Action Letter - #Site Closure

Global Id: T0606500508
Action Type: Other
Date: 11/17/1997
Action: Leak Discovery

Global Id: T0606500508
Action Type: Other
Date: 11/06/1997
Action: Leak Stopped

Global Id: T0606500508
Action Type: Other
Date: 11/18/1997
Action: Leak Reported

Global Id: T0606500508
Action Type: ENFORCEMENT
Date: 12/17/2008
Action: File review - #RCDEH Upload Site File 8/21/2015

LUST:
Global Id: T0606500508
Status: Open - Case Begin Date
Status Date: 11/06/1997

Global Id: T0606500508
Status: Open - Site Assessment
Status Date: 11/17/1997

Global Id: T0606500508
Status: Completed - Case Closed
Status Date: 08/21/1998

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 971155
Employee: Boltinghous-LOP
Site Closed: Yes
Case Type: Soil only
Facility Status: closed/action completed
Casetype Decode: Soil only is impacted
Fstatus Decode: Closed/Action completed

CHMIRS:
OES Incident Number: 4-0107
OES notification: 01/07/2014
OES Date: Not reported
OES Time: Not reported

CHEVRON STATION NO 200908 (Continued) **1006805060**

Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Service Station
Cleanup By:	No
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Type:	PETROLEUM
Measure:	Gal(s)
Other:	Not reported
Date/Time:	1124
Year:	2014
Agency:	NRC
Incident Date:	1/7/2014
Admin Agency:	Not reported
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Diesel
Quantity Released:	1.5
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	No
#2 Pipeline:	No
#3 Pipeline:	No

CHEVRON STATION NO 200908 (Continued) **1006805060**

#1 Vessel >= 300 Tons:	No
#2 Vessel >= 300 Tons:	No
#3 Vessel >= 300 Tons:	No
Evacs:	No
Injuries:	Human Error
Fatals:	No
Comments:	Not reported
Description:	Copy/Paste from the NRC Report: "CALLER STATED THAT A CUSTOMER OVERFILLED THEIR VEHICLE CAUSING A DISCHARGE OF DIESEL FUEL FROM THEIR VEHICLE." Remedial Actions: "SPILL WAS CONTAINED AND CLEANED."

FINDS:

Registry ID: 110013290438

Environmental Interest/Information System

California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:

Envid:	1006805060
Registry ID:	110013290438
DFR URL:	http://echo.epa.gov/detailed-facility-report?fid=110013290438

HAZNET:

envid:	1006805060
Year:	2016
GEPAID:	CAR000120345
Contact:	KWAME AWUKU
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Other organic solids

CHEVRON STATION NO 200908 (Continued) **1006805060**

Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.0855
Cat Decode:	Other organic solids
Method Decode:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Facility County:	Riverside

envid:	1006805060
Year:	2016
GEPAID:	CAR000120345
Contact:	KWAME AWUKU
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Aqueous solution with total organic residues less than 10 percent
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.18
Cat Decode:	Aqueous solution with total organic residues less than 10 percent
Method Decode:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Facility County:	Riverside

envid:	1006805060
Year:	2015
GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.1875
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805060
Year:	2015
GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835

CHEVRON STATION NO 200908 (Continued) **1006805060**

TSD County:	Los Angeles
Waste Category:	Not reported
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	Not reported
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside
envid:	1006805060
Year:	2015
GEPAID:	CAR000120345
Contact:	KATHY NORRIS-SLUSHER
Telephone:	8773866044
Mailing Name:	Not reported
Mailing Address:	PO BOX 6004
Mailing City,St,Zip:	SAN RAMON, CA 945830000
Gen County:	Riverside
TSD EPA ID:	CAD044429835
TSD County:	Los Angeles
Waste Category:	Aqueous solution with total organic residues less than 10 percent
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.1525
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
37 additional CA_HAZNET: record(s) in the EDR Site Report.

A2 **CHEVRON USA INC** **EDR Hist Auto** **1020874294**
West **22520 CACTUS AVE** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.018 mi.
95 ft. **Site 2 of 6 in cluster A**

Relative: EDR Hist Auto
Higher

Actual:
1552 ft.

Year:	Name:	Type:
2000	CHEVRON USA INC	Gasoline Service Stations
2001	CHEVRON USA INC	Gasoline Service Stations
2002	CHEVRON USA INC	Gasoline Service Stations
2003	CHEVRON USA INC	Gasoline Service Stations
2004	CHEVRON USA INC	Gasoline Service Stations
2005	CHEVRON USA INC	Gasoline Service Stations, NEC
2006	CHEVRON USA INC	Gasoline Service Stations, NEC
2007	CHEVRON USA INC	Gasoline Service Stations, NEC
2008	CHEVRON USA INC	Gasoline Service Stations, NEC
2009	CHEVRON USA INC	Gasoline Service Stations, NEC
2010	CHEVRON USA INC	Gasoline Service Stations, NEC
2011	CHEVRON USA INC	Gasoline Service Stations, NEC

A3 **CHEVRON #200908** **LUST** **S101590159**
West **22520 CACTUS AVE** **SWEEPS UST** **N/A**
< 1/8 **MORENO VALLEY, CA 92388** **CA FID UST**
0.018 mi. **CHMIRS**
95 ft. **Site 3 of 6 in cluster A** **HIST CORTESE**

Relative:
Higher

Actual:
1552 ft.

LUST REG 8:

Region:	8
County:	Riverside
Regional Board:	Santa Ana Region
Facility Status:	Leak being confirmed
Case Number:	083303096T
Local Case Num:	971155
Case Type:	Soil only
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global ID:	T0606500508
How Stopped Date:	Not reported
Enter Date:	12/18/1997
Date Confirmation of Leak Began:	11/17/1997
Date Preliminary Assessment Began:	Not reported
Discover Date:	11/17/1997
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	12/18/1997
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.9102353
Longitude:	-117.2697446
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	TME
Staff Initials:	UNK
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	SAN JACINTO (8-5)
Beneficial:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Summary: Not reported

SWEEPS UST:
Status: Active
Comp Number: 1855
Number: 1
Board Of Equalization: Not reported
Referral Date: 10-27-92
Action Date: 10-27-92
Created Date: 08-26-91
Owner Tank Id: Not reported
SWRCB Tank Id: 33-000-001855-000001
Tank Status: A
Capacity: 10000
Active Date: 10-27-92
Tank Use: M.V. FUEL
STG: P
Content: MID GRADE UN
Number Of Tanks: 4

Status: Active
Comp Number: 1855
Number: 1
Board Of Equalization: Not reported
Referral Date: 10-27-92
Action Date: 10-27-92
Created Date: 08-26-91
Owner Tank Id: Not reported
SWRCB Tank Id: 33-000-001855-000002
Tank Status: A
Capacity: 10000
Active Date: 10-27-92
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: Active
Comp Number: 1855
Number: 1
Board Of Equalization: Not reported
Referral Date: 10-27-92
Action Date: 10-27-92
Created Date: 08-26-91
Owner Tank Id: Not reported
SWRCB Tank Id: 33-000-001855-000003
Tank Status: A
Capacity: 10000
Active Date: 10-27-92
Tank Use: M.V. FUEL
STG: P
Content: REG UNLEADED
Number Of Tanks: Not reported

CHEVRON #200908 (Continued) **S101590159**

Status:	Active
Comp Number:	1855
Number:	1
Board Of Equalization:	Not reported
Referral Date:	10-27-92
Action Date:	10-27-92
Created Date:	08-26-91
Owner Tank Id:	Not reported
SWRCB Tank Id:	33-000-001855-000004
Tank Status:	A
Capacity:	10000
Active Date:	10-27-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

CA FID UST:

Facility ID:	33004997
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7146563161
Mail To:	Not reported
Mailing Address:	P O BOX 2833
Mailing Address 2:	Not reported
Mailing City,St,Zip:	MORENO VALLEY 92388
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

CHMIRS:

OES Incident Number:	13-2669
OES notification:	05/04/2013
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Service Station
Cleanup By:	Contractor
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Qt.(s)
Other:	Not reported
Date/Time:	35
Year:	2013
Agency:	Chevron
Incident Date:	5/4/2013
Admin Agency:	Riverside County Environmental Health
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Oil
Quantity Released:	2
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported
Fatals:	Not reported
Comments:	Not reported
Description:	Caller states substance was released from an auto due to unknown causes. The release was discovered when the vehicle was towed due to the customer leaving it.
OES Incident Number:	13-5930
OES notification:	09/20/2013
OES Date:	Not reported
OES Time:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA DOT PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Merchant/Business
Cleanup By:	On scene Personnel
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Gal(s)
Other:	Not reported
Date/Time:	1240
Year:	2013
Agency:	NRC
Incident Date:	9/20/2013
Admin Agency:	Riverside County Environmental Health
Amount:	Not reported
Contained:	Yes
Site Type:	Not reported
E Date:	Not reported
Substance:	Gasoline
Quantity Released:	2
Unknown:	Not reported
Substance #2:	Not reported
Substance #3:	Not reported
Evacuations:	Not reported
Number of Injuries:	Not reported
Number of Fatalities:	Not reported
#1 Pipeline:	Not reported
#2 Pipeline:	Not reported
#3 Pipeline:	Not reported
#1 Vessel >= 300 Tons:	Not reported
#2 Vessel >= 300 Tons:	Not reported
#3 Vessel >= 300 Tons:	Not reported
Evacs:	Not reported
Injuries:	Not reported

CHEVRON #200908 (Continued) **S101590159**

Fatals: Not reported
Comments: Not reported
Description: Per NRC: "Caller stated that a customer was distracted while fueling vehicle and overfilled the tank with gasoline." Remedial Actions: "Spill was contained and cleaned." Additional Info: Cal OES will be contacted next."

HIST CORTESE:
Region: CORTESE
Facility County Code: 33
Reg By: LTNKA
Reg Id: 083303096T

A4 **CHEVRON STATION #200908** **UST** **U003713600**
West **22520 CACTUS AVE** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.018 mi.
95 ft. **Site 4 of 6 in cluster A**

Relative: **Higher**
Actual: **1552 ft.**

UST:
Facility ID: FA0014084
Permitting Agency: Riverside County Department of Environmental Health
Latitude: Not reported
Longitude: Not reported

Facility ID: 193
Permitting Agency: RIVERSIDE COUNTY
Latitude: 33.9118543
Longitude: -117.2684658

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 4

A5 **TEXACO (SHELL) CACTUS AVE** **LUST** **S105747989**
West **22470 CACTUS AVE** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.041 mi.
217 ft. **Site 5 of 6 in cluster A**

Relative: **Higher**
Actual: **1553 ft.**

LUST:
Lead Agency: RIVERSIDE COUNTY LOP
Case Type: LUST Cleanup Site
Geo Track: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606566676
Global Id: T0606566676
Latitude: 33.910583575
Longitude: -117.270751973
Status: Completed - Case Closed
Status Date: 10/15/2013
Case Worker: Not reported
RB Case Number: Not reported
Local Agency: Not reported
File Location: Local Agency
Local Case Number: 200219022

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminants of Concern: Gasoline
Site History: ***Data prior to 2005 does not appear in GeoTracker. Consult agency files for all site data*** 3 USTs removed October 3, 2002. Up to 1800 ppm TPHg, 61 ppm MTBE and 2.4 ppm TBA was detected. The east end of T1, dispenser D5 and dispenser D2 were overexcavated. 243.97 tons of soil was taken to TPS for recycling. The site was entered into LOP October 22, 2002 4 gw mon wells (MW-1 through MW-4) were installed in April 2003. MW-1, MW-2, MW-3 were screened 20-50 ft bgs and MW-4 from 15-45 ft bgs. GW was not encountered in MW-4 at the time of installation, however, gw was present some time later. Wells MW-1, MW-2, and MW-3 remained dry after installation. MTBE & other constituents were detected in the soil from MW-2 (5 to 50) and in the bottom of MW-4 (35-50). The gw was impacted in MW-4 (2300 ppb TPHg, ND<0.5 ppb B, 3900 ppb MTBE, 450 ppb TBA). 12 CPT soil borings were drilled in February 2004. Soil samples were collected only from CPT1 and CPT9, however, gw samples were collected from all CPT locations and the new wells. Pore pressure dissipation test were conducted in 6 of the CPT borings. TPHg in the groundwater ranged from 84 ppb to 1700 ppb. MTBE ranged from 1.2 to 42 ppb. 3 gw mon wells (MW-5 through MW-7) were installed in August 2004. No TPHg or BTEX were detected in any soil sample. No oxygenates were detected in MW-5 and MW-6. MW-7 had 0.098 ppm at 20. MW-3 was destroyed in September 2004. A Batch Extraction Pilot Test was conducted in February 2006. 1332 gallons of gw and 12.4 lbs of hydrocarbons were extracted during the two events. The pneumatic and hydraulic ROI were interpreted to be <30. 2 monitoring wells (MW-8 and MW-9) were installed in January 2006. No TPHg, BTEX or fuel oxygenates were detected in the soil of MW-9 and MW-9. 1 extraction well MW-2R) was installed in June 2006. MW-2R had MTBE and TBA at 55 and 60. The groundwater extraction system was started October 12, 2006 using MW-2R and MW-7. Soil vapor extraction well SVE-1 was installed in November 2006. Two days of SVE testing were completed December 5 and 6, 2006. TPHg removal rate was 7 lb/day (2 lb were removed during the 7-hr extended test), 0.37 lb/day MTBE (0.11 lb removed) and 0.004 lb/day B (0.001 lb removed). MTBE concentrations increased during the test and the final concentration at the end of the test was 32 ppmV MTBE. 2 monitoring wells (MW-10 and MW-11) were installed in March 2007. A 5-day SVE test was conducted using SVE-1 in March 2007. 21.91 lb TPHg, 1.73 lb MTBE, and 0.021 lb B were removed. The max MTBE vapor concentration was 18 ppmV and decreased to 5.6 ppmV. No further SVE remediation was recommended and RCDEH concurred. 3 confirmation borings (SB-1 through SB-3) were drilled to 60 in July 2007. GW was encountered at 55-55.5 ft bgs. SB-2 and SB-3 were ND for all constituents. SB-1 detections: 0.24 ppm TPHg (15), 0.011 ppm M (25), 0.0093 ppm M (30). BTXE, oxygenates and ethanol were all ND. The groundwater extraction system was shut down Sept. 6, 2007. A total of 182650 gallons of groundwater, 4.546 lbs of TPHg, 15.32 lbs of MTBE and 5.77 lbs of TBA were recovered. MW-12 was installed in April 2008 to replace MW-2R which could not be sampled due to a pump lodged in its casing. Up to 0.69 ppm MTBE and 3.1 ppm TBA was detected in the soil. ~50 gallons of 3% hydrogen peroxide was added to MW-2R on August 12, 19, and 26, 2010 for a total of 165 gallons. Water samples were taken August 19, 2010 during hydrogen peroxide infiltration. Post-infiltration groundwater samples were taken September 10 and October 7, 2010. MW-2R TPHg went from 110 to <50 to 52 to <50 ppb. MTBE went from 8.8 to <1 to 6.1 to 6.5 ppb. TBA went from 1500 to <10 to 770 to 700 ppb.

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Chromium hexavalent went from <10 to 72 to 4.1 to 1.7 ppb 3 wells (MW-13 through MW-15) were installed March 18 and 22, 2011. TPHg was detected in only one soil sample at 222 ppm (MW-13@50). MTBE was detected in all the samples from MW-13 ranging from 1.6J to 203 ppb. TBA was detected from 40-50 in MW-13 ranging from 39.2J to 971 ppb. The RCDEH approved closure in April 2013 and the SARWQCB concurred with closure in May 2013. The 60 day public comment period for comments on site closure ended on August 2013 with no comments. The wells were destroyed September 9-13, 2013. The site was closed October 13, 2013.

LUST:
Global Id: T0606566676
Contact Type: Regional Board Caseworker
Contact Name: CARL BERNHARDT
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: cbernhardt@waterboards.ca.gov
Phone Number: 9517824495

LUST:
Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 09/15/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 091511

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 03/28/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 032811

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/14/2008
Action: File review

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 04/16/2007
Action: Staff Letter - #04162007

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 05/30/2013
Action: Staff Letter - #RCDEH 053013

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 02/23/2011
Action: Staff Letter - #RCDEH 022311

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2011
Action: Monitoring Report - Annually

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 05/26/2009
Action: Staff Letter - #RCDEH 052609

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/17/2013
Action: Notification - Public Notice of Case Closure - #RCDEH 061713

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/08/2010
Action: Pilot Study/ Treatability Report

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/10/2012
Action: Technical Correspondence / Assistance / Other - #RCDEH 071012

Global Id: T0606566676
Action Type: RESPONSE
Date: 05/02/2008
Action: Other Report / Document

Global Id: T0606566676
Action Type: ENFORCEMENT

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Date: 05/01/2012
Action: Meeting

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/06/2007
Action: Staff Letter - #RCDEH 060607

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/01/2010
Action: Letter - Notice - #RCDEH 110110

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 02/23/2011
Action: Meeting

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: REMEDIATION
Date: 11/01/2011
Action: In Situ Physical/Chemical Treatment (other than SVE)

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2013
Action: Monitoring Report - Annually

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/04/2013
Action: Well Destruction Report

Global Id: T0606566676
Action Type: REMEDIATION
Date: 03/13/2007
Action: Soil Vapor Extraction (SVE)

Global Id: T0606566676
Action Type: REMEDIATION
Date: 10/03/2002
Action: Excavation

Global Id: T0606566676
Action Type: RESPONSE
Date: 06/21/2013
Action: Other Report / Document

Global Id: T0606566676
Action Type: RESPONSE
Date: 08/19/2013
Action: Verbal Communication

Global Id: T0606566676
Action Type: REMEDIATION
Date: 12/05/2006
Action: Soil Vapor Extraction (SVE)

Global Id: T0606566676
Action Type: REMEDIATION
Date: 10/12/2006
Action: Pump & Treat (P&T) Groundwater

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/10/2012
Action: Technical Correspondence / Assistance / Other - #RCDEH 071012

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/15/2013
Action: Closure/No Further Action Letter - #RCDEH Closure Documents

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 04/25/2013
Action: LOP Case Closure Summary to RB

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/07/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Date: 07/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2012
Action: Monitoring Report - Annually

Global Id: T0606566676
Action Type: Other
Date: 10/03/2002
Action: Leak Stopped

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 07/20/2010
Action: Staff Letter - #RCDEH 072010

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 03/03/2008
Action: Staff Letter - #RCDEH030308

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/21/2011
Action: Well Installation Report

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: Other
Date: 10/23/2002
Action: Leak Reported

Global Id: T0606566676
Action Type: REMEDIATION
Date: 08/12/2010
Action: In Situ Physical/Chemical Treatment (other than SVE)

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 11/01/2007
Action: File review - #RCDEH110107

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 04/15/2008
Action: Monitoring Report - Quarterly

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 06/05/2008
Action: Staff Letter - #RCDEH060508

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/02/2008
Action: File review

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 08/13/2009
Action: Staff Letter - #RCDEH081309

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2009
Action: Other Report / Document

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 10/14/2013
Action: Other Report - #UST Sample Analytical Report

Global Id: T0606566676
Action Type: RESPONSE
Date: 05/18/2007
Action: Other Workplan

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 10/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 01/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606566676
Action Type: ENFORCEMENT
Date: 09/21/2011
Action: Meeting

Global Id: T0606566676
Action Type: Other

TEXACO (SHELL) CACTUS AVE (Continued) **S105747989**

Date: 10/21/2002
Action: Leak Discovery

Global Id: T0606566676
Action Type: RESPONSE
Date: 07/31/2007
Action: Other Report / Document

LUST:
Global Id: T0606566676
Status: Open - Case Begin Date
Status Date: 10/03/2002

Global Id: T0606566676
Status: Open - Site Assessment
Status Date: 10/22/2002

Global Id: T0606566676
Status: Open - Remediation
Status Date: 10/12/2006

Global Id: T0606566676
Status: Open - Verification Monitoring
Status Date: 09/06/2007

Global Id: T0606566676
Status: Open - Remediation
Status Date: 07/20/2010

Global Id: T0606566676
Status: Open - Eligible for Closure
Status Date: 05/30/2013

Global Id: T0606566676
Status: Completed - Case Closed
Status Date: 10/15/2013

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 200219022
Employee: Shurlow-LOP
Site Closed: Yes
Case Type: Drinking Water Aquifer affected
Facility Status: closed/action completed
Casetype Decode: An Aquifer used for Drinking Water supply has been contaminated.
Fstatus Decode: Closed/Action completed

A6
West
< 1/8
0.041 mi.
217 ft.

MORENO VALLEY UNOCAL
22470 CACTUS AVE
MORENO VALLEY, CA 92553

Site 6 of 6 in cluster A

RCRA-LQG
UST
FINDS
ECHO
HAZNET

1006805485
CAR000128314

Relative:
Higher

Actual:
1553 ft.

RCRA-LQG:

Date form received by agency:	03/01/2014
Facility name:	TEXACO SERVICE STATION
Facility address:	22470 CACTUS AVE MORENO VALLEY, CA 92553
EPA ID:	CAR000128314
Mailing address:	PO BOX 2099 PO BOX 2099 HOUSTON, TX 77252
Contact:	MARVIN KATZ
Contact address:	PO BOX 2099 HOUSTON, TX 77252
Contact country:	Not reported
Contact telephone:	310-550-5846
Contact email:	MARVIN.KATZ@SHELL.COM
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	VAHID (DAVID) DELRAHIM
Owner/operator address:	VICCASA DR CALABASAS, CA 92553
Owner/operator country:	Not reported
Owner/operator telephone:	818-535-9322
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	04/01/2004
Owner/Op end date:	Not reported

Owner/operator name:	EQUILON ENTERPRISES LLC DBA
Owner/operator address:	P O BOX 2648 HOUSTON, TX 77252
Owner/operator country:	Not reported
Owner/operator telephone:	281-353-2069
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private

MORENO VALLEY UNOCAL (Continued) **1006805485**

Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: VAHID (DAVID) DELRAHIM
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 04/01/2004
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Historical Generators:
Date form received by agency: 09/16/2002
Site name: TEXACO SERVICE STATION
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

MORENO VALLEY UNOCAL (Continued) **1006805485**

. Waste code: D018
. Waste name: BENZENE

Violation Status: No violations found

UST:
Facility ID: FA0048257
Permitting Agency: Riverside County Department of Environmental Health
Latitude: Not reported
Longitude: Not reported

Facility ID: 750
Permitting Agency: RIVERSIDE COUNTY
Latitude: 33.911893
Longitude: -117.269386

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 3

FINDS:

Registry ID: 110013305191

Environmental Interest/Information System
California Hazardous Waste Tracking System - Datamart (HWTS-DATAMART) provides California with information on hazardous waste shipments for generators, transporters, and treatment, storage, and disposal facilities.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

Registry ID: 110057123367

Environmental Interest/Information System
STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:
Envid: 1006805485
Registry ID: 110013305191
DFR URL: http://echo.epa.gov/detailed-facility-report?fid=110013305191

HAZNET:
envid: 1006805485
Year: 2013

MORENO VALLEY UNOCAL (Continued) **1006805485**

GEPAID:	CAR000128314
Contact:	Adam Estes
Telephone:	3172917007
Mailing Name:	Not reported
Mailing Address:	PO BOX 3127
Mailing City,St,Zip:	HOUSTON, TX 772530000
Gen County:	Riverside
TSD EPA ID:	CAT080013352
TSD County:	Los Angeles
Waste Category:	Not reported
Disposal Method:	Other Recovery Of Reclamation For Reuse Including Acid Regeneration, Organics Recovery Ect
Tons:	1.14675
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Not reported

envid:	1006805485
Year:	2009
GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Other organic solids
Disposal Method:	Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons:	0.05
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805485
Year:	2009
GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAD028409019
TSD County:	Not reported
Waste Category:	Tank bottom waste
Disposal Method:	Discharge To Sewer/Potw Or Npdes(With Prior Storage--With Or Without Treatment)
Tons:	0.10425
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805485
Year:	2007

MORENO VALLEY UNOCAL (Continued) **1006805485**

GEPAID:	CAR000128314
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	Not reported
TSD EPA ID:	CAT080013352
TSD County:	Not reported
Waste Category:	Unspecified oil-containing waste
Disposal Method:	Discharge To Sewer/Potw Or Npdes(With Prior Storage--With Or Without Treatment)
Tons:	0.2
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

envid:	1006805485
Year:	2005
GEPAID:	CAR000128314
Contact:	N CORTEZ/ENVT'L DATA ANALYST
Telephone:	2818742224
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DRIVE MFT 240-G
Mailing City,St,Zip:	Houston, TX 770672508
Gen County:	Not reported
TSD EPA ID:	CAT080033681
TSD County:	Not reported
Waste Category:	Unspecified aqueous solution
Disposal Method:	Disposal, Land Fill
Tons:	0.16
Cat Decode:	Not reported
Method Decode:	Not reported
Facility County:	Riverside

Click this hyperlink while viewing on your computer to access
3 additional CA_HAZNET: record(s) in the EDR Site Report.

7
East
< 1/8
0.041 mi.
219 ft.

EASTERN MUNICIPAL WATER DISTRICT **SWEEPS UST** **S101590293**
14510 HEACOCK ST **CA FID UST** **N/A**
MORENO VALLEY, CA 92388 **EMI**

Relative:
Lower

Actual:
1545 ft.

SWEEPS UST:

Status:	Active
Comp Number:	30886
Number:	4
Board Of Equalization:	44-018137
Referral Date:	12-27-93
Action Date:	05-13-94
Created Date:	02-29-88
Owner Tank Id:	000430
SWRCB Tank Id:	33-000-030886-000001
Tank Status:	A
Capacity:	250
Active Date:	12-27-93
Tank Use:	OIL

EASTERN MUNICIPAL WATER DISTRICT (Continued) **S101590293**

STG: P
Content: FRESH OIL
Number Of Tanks: 2

Status: Active
Comp Number: 30886
Number: 4
Board Of Equalization: 44-018137
Referral Date: 12-27-93
Action Date: 05-13-94
Created Date: 02-29-88
Owner Tank Id: 000430
SWRCB Tank Id: 33-000-030886-000002
Tank Status: A
Capacity: 250
Active Date: 12-27-93
Tank Use: OIL
STG: W
Content: WASTE OIL
Number Of Tanks: Not reported

CA FID UST:
Facility ID: 33006973
Regulated By: UTNKA
Regulated ID: 00030886
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: Not reported
Mail To: Not reported
Mailing Address: 24550 SAN JACINTO ST
Mailing Address 2: Not reported
Mailing City,St,Zip: MORENO VALLEY 92388
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

EMI:
Year: 2002
County Code: 33
Air Basin: SC
Facility ID: 70300
Air District Name: SC
SIC Code: 4941
Air District Name: SOUTH COAST AQMD
Community Health Air Pollution Info System: Not reported
Consolidated Emission Reporting Rule: Not reported
Total Organic Hydrocarbon Gases Tons/Yr: 18
Reactive Organic Gases Tons/Yr: 2
Carbon Monoxide Emissions Tons/Yr: 4
NOX - Oxides of Nitrogen Tons/Yr: 3
SOX - Oxides of Sulphur Tons/Yr: 0
Particulate Matter Tons/Yr: 0

EASTERN MUNICIPAL WATER DISTRICT (Continued) **S101590293**

Part. Matter 10 Micrometers and Smllr Tons/Yr:0

Year:	2003
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	18
Reactive Organic Gases Tons/Yr:	2
Carbon Monoxide Emissions Tons/Yr:	4
NOX - Oxides of Nitrogen Tons/Yr:	3
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2004
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	18.45
Reactive Organic Gases Tons/Yr:	1.69
Carbon Monoxide Emissions Tons/Yr:	4.195
NOX - Oxides of Nitrogen Tons/Yr:	2.519
SOX - Oxides of Sulphur Tons/Yr:	0.004655
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0

Year:	2005
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	.3019
Reactive Organic Gases Tons/Yr:	.02759366
Carbon Monoxide Emissions Tons/Yr:	1.2065
NOX - Oxides of Nitrogen Tons/Yr:	.3019
SOX - Oxides of Sulphur Tons/Yr:	.00556
Particulate Matter Tons/Yr:	.09295
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0923923

Year:	2006
County Code:	33
Air Basin:	SC
Facility ID:	70300

EASTERN MUNICIPAL WATER DISTRICT (Continued) **S101590293**

Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4.824945295404814004
Reactive Organic Gases Tons/Yr:	.441
Carbon Monoxide Emissions Tons/Yr:	1.766
NOX - Oxides of Nitrogen Tons/Yr:	.441
SOX - Oxides of Sulphur Tons/Yr:	.008
Particulate Matter Tons/Yr:	.137
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.136178

Year:	2007
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	4.824945295404814004
Reactive Organic Gases Tons/Yr:	.441
Carbon Monoxide Emissions Tons/Yr:	1.766
NOX - Oxides of Nitrogen Tons/Yr:	.441
SOX - Oxides of Sulphur Tons/Yr:	.008
Particulate Matter Tons/Yr:	.137
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.136178

Year:	2008
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.954048140043763676
Reactive Organic Gases Tons/Yr:	.27
Carbon Monoxide Emissions Tons/Yr:	1.14
NOX - Oxides of Nitrogen Tons/Yr:	.27
SOX - Oxides of Sulphur Tons/Yr:	.005352
Particulate Matter Tons/Yr:	.08465
Part. Matter 10 Micrometers and Smllr Tons/Yr:	.0841421

Year:	2012
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	3.1100656455

EASTERN MUNICIPAL WATER DISTRICT (Continued) **S101590293**

Reactive Organic Gases Tons/Yr:	0.28426
Carbon Monoxide Emissions Tons/Yr:	3.46238
NOX - Oxides of Nitrogen Tons/Yr:	0.29679
SOX - Oxides of Sulphur Tons/Yr:	0.0042
Particulate Matter Tons/Yr:	0.07035
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.0699279

Year:	2013
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	2.6171772429
Reactive Organic Gases Tons/Yr:	0.23921
Carbon Monoxide Emissions Tons/Yr:	2.66286
NOX - Oxides of Nitrogen Tons/Yr:	0.25141
SOX - Oxides of Sulphur Tons/Yr:	0.00354
Particulate Matter Tons/Yr:	0.0592
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.0588448

Year:	2015
County Code:	33
Air Basin:	SC
Facility ID:	70300
Air District Name:	SC
SIC Code:	4941
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	0.29619435642
Reactive Organic Gases Tons/Yr:	0.14563678
Carbon Monoxide Emissions Tons/Yr:	0.69697343
NOX - Oxides of Nitrogen Tons/Yr:	0.056644
SOX - Oxides of Sulphur Tons/Yr:	0.003396
Particulate Matter Tons/Yr:	0.0566
Part. Matter 10 Micrometers and Smllr Tons/Yr:	0.0562604

B8 **ALPER CLEANERS, HERMILA CHOMSINSUB DBA** **DRYCLEANERS** **S121695366**
West **14420 ELSWORTH ST SUITE 114** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.080 mi.
424 ft. **Site 1 of 5 in cluster B**

Relative: **Higher**

Actual: **1553 ft.**

DRYCLEAN SOUTH COAST:

Facility ID:	138949
Application Number:	423429
Permit Number:	F65636
Status:	A
Representative Name:	HERMILA CHOMSINSUB
Representative Telephone:	951 6534244
Permit Status:	INACTIVE
BCAT Number:	000234
BCAT Description:	DRY CLEANING EQUIP PERCHLOROETHYLENE
UTM East:	475.02398682

ALPER CLEANERS, HERMILA CHOMSINSUB DBA (Continued) **S121695366**

UTM North: 3752.1721191

Facility ID: 138949
Application Number: 433912
Permit Number: F70697
Status: A
Representative Name: HERMILA CHOMSINSUB
Representative Telephone: 951 6534244
Permit Status: ACTIVE
BCAT Number: 000233
BCAT Description: DRY CLEANING EQUIP PETROLEUM SOLVENT
UTM East: 475.02398682
UTM North: 3752.1721191

B9 **ALPER CLEANERS** **ENVIROSTOR** **S106797644**
West **14420 ELSWORTH ST., SUITE 114** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.080 mi.
424 ft. **Site 2 of 5 in cluster B**

Relative: **Higher**
Actual: **1553 ft.**

ENVIROSTOR:
Facility ID: 33720002
Status: Refer: 1248 Local Agency
Status Date: 06/07/2004
Site Code: Not reported
Site Type: Evaluation
Site Type Detailed: Evaluation
Acres: 0
NPL: NO
Regulatory Agencies: RIVERSIDE COUNTY
Lead Agency: RIVERSIDE COUNTY
Program Manager: Not reported
Supervisor: Referred - Not Assigned
Division Branch: Cleanup Cypress
Assembly: 61
Senate: 31
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: Not Applicable
Latitude: 33.91112
Longitude: -117.2692
APN: 297140026, 297150012
Past Use: NONE SPECIFIED
Potential COC: NONE SPECIFIED
Confirmed COC: NONE SPECIFIED
Potential Description: NONE SPECIFIED
Alias Name: 297140026
Alias Type: APN
Alias Name: 297150012
Alias Type: APN
Alias Name: 33720002
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: Not reported
Completed Sub Area Name: Not reported
Completed Document Type: Not reported

ALPER CLEANERS (Continued) **S106797644**

Completed Date:	Not reported
Comments:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

B10 **ALPER CLEANERS INC** **DRYCLEANERS** **S121699956**
West **14420 ELLSWORTH ST STE 114** **N/A**
< 1/8 **MORENO VALLEY, CA 92388**
0.080 mi.
424 ft. **Site 3 of 5 in cluster B**

Relative: DRYCLEAN SOUTH COAST:
Higher

Facility ID:	85440
Application Number:	248303
Permit Number:	D39399
Status:	O
Representative Name:	BARRY ALPER
Representative Telephone:	213 4531337
Permit Status:	EXPIRED
BCAT Number:	000234
BCAT Description:	DRY CLEANING EQUIP PERCHLOROETHYLENE
UTM East:	0
UTM North:	0

Actual:
1553 ft.

B11 **ALPER CLEANERS** **DRYCLEANERS** **S121700645**
West **14420 ELLSWORTH ST SUITE 114** **N/A**
< 1/8 **MORENO VALLEY, CA 92553**
0.080 mi.
424 ft. **Site 4 of 5 in cluster B**

Relative: DRYCLEAN SOUTH COAST:
Higher

Facility ID:	99343
Application Number:	286589
Permit Number:	D78339
Status:	S
Representative Name:	ANUP DESAI
Representative Telephone:	951 6534244
Permit Status:	INACTIVE
BCAT Number:	000234
BCAT Description:	DRY CLEANING EQUIP PERCHLOROETHYLENE
UTM East:	475.02398682
UTM North:	3752.1721191

Actual:
1553 ft.

B12
West
< 1/8
0.080 mi.
424 ft.

ALPER CLEANERS
14420 ELSWORTH ST
MORENO VALLEY, CA 92553

Site 5 of 5 in cluster B

EDR Hist Cleaner | **1019924194** / **N/A**

Relative:
Higher

Actual:
1553 ft.

EDR Hist Cleaner

Year:	Name:	Type:
1993	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2002	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2003	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2004	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2005	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2006	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2007	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2008	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2009	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2010	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2011	ALPER CLEANERS	Drycleaning Plants, Except Rugs
2014	ALPER CLEANERS	Drycleaning Plants, Except Rugs

13
WNW
< 1/8
0.123 mi.
651 ft.

ULTRALIFE ENERGY SERVICES CORP
14419 VETERANS WAY
MORENO VALLEY, CA 92553

RCRA-SQG | **1010314322** / **CAR000184978**

Relative:
Higher

Actual:
1554 ft.

RCRA-SQG:

Date form received by agency:	06/02/2010
Facility name:	ULTRALIFE ENERGY SERVICES CORP
Facility address:	14419 VETERANS WAY BLDG 1 MORENO VALLEY, CA 92553
EPA ID:	CAR000184978
Mailing address:	2000 TECHNOLOGY PARKWAY NEWARK, NY 14513
Contact:	JOHN S DIGGORY
Contact address:	2000 TECHNOLOGY PARKWAY NEWARK, NY 14513
Contact country:	US
Contact telephone:	315-359-6329
Contact email:	JDIGGORY@ULTRALIFECORP.COM
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	PEN GROUP LLC
Owner/operator address:	4101 BIRCH ST STE 150 NEWPORT BEACH, CA 92660
Owner/operator country:	US
Owner/operator telephone:	949-222-0822
Owner/operator email:	Not reported
Owner/operator fax:	Not reported

ULTRALIFE ENERGY SERVICES CORP (Continued) **1010314322**

Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 09/13/2005
Owner/Op end date: Not reported

Owner/operator name: ULTRALIFE ENERGY SERVICES CORP
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Owner/operator email: Not reported
Owner/operator fax: Not reported
Owner/operator extension: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 11/10/2008
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: Yes
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: Yes

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Pesticides
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

. Waste code: 221
. Waste name: Waste oil and mixed oil

ULTRALIFE ENERGY SERVICES CORP (Continued) **1010314322**

. Waste code: 352
. Waste name: Other organic solids

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D008
. Waste name: LEAD

Historical Generators:
Date form received by agency: 07/23/2009
Site name: STATIONARY POWER SERVICES INC DBA US ENERGY
Classification: Small Quantity Generator

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D008
. Waste name: LEAD

Date form received by agency: 06/13/2007
Site name: US POWER SERVICES INCORPORATED
Classification: Not a generator, verified

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D006
. Waste name: CADMIUM

. Waste code: D008
. Waste name: LEAD

Violation Status: No violations found

14
NE
1/8-1/4
0.135 mi.
715 ft.

HARBOR FREIGHT TOOLS DISTRIBUTION
23400 CACTUS AVE
MORENO VALLEY, CA 92553

RCRA-SQG **1016168229**
FINDS **CAR000241489**
ECHO

Relative:
Higher

Actual:
1555 ft.

RCRA-SQG:

Date form received by agency:	11/04/2013
Facility name:	HARBOR FREIGHT TOOLS DISTRIBUTION
Facility address:	23400 CACTUS AVE MORENO VALLEY, CA 92553
EPA ID:	CAR000241489
Mailing address:	26541 AGOURA RD CALABASAS, CA 91302
Contact:	BRIAN ADSIT
Contact address:	23400 CACTUS AVE MORENO VALLEY, CA 92553
Contact country:	US
Contact telephone:	951-214-7902
Contact email:	BADSIT@HARBORFREIGHT.COM
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	IIT INLAND EMPIRE LOGISTICS CTR
Owner/operator address:	518 17TH ST STE 1700 CARE OF INDUSTRIAL INCOME DENVER, CO 80202
Owner/operator country:	US
Owner/operator telephone:	303-226-4852
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	09/26/2011
Owner/Op end date:	Not reported

Owner/operator name:	HARBOR FREIGHT TOOLS DISTRIBUTION
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	06/01/2011
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No

HARBOR FREIGHT TOOLS DISTRIBUTION (Continued) **1016168229**

Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D005
. Waste name: BARIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D016
. Waste name: 2,4-D

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

. Waste code: D040

HARBOR FREIGHT TOOLS DISTRIBUTION (Continued) **1016168229**

. Waste name: TRICHLOROETHYLENE

Historical Generators:
Date form received by agency: 08/14/2013
Site name: HARBOR FREIGHT TOOLS USA INC MORENO VALLEY
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D005
. Waste name: BARIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D009
. Waste name: MERCURY

. Waste code: D016
. Waste name: 2,4-D

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

. Waste code: D040
. Waste name: TRICHLOROETHYLENE

Violation Status: No violations found

FINDS:

Registry ID: 110055926119

HARBOR FREIGHT TOOLS DISTRIBUTION (Continued) **1016168229**

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

Click this hyperlink while viewing on your computer to access additional FINDS: detail in the EDR Site Report.

ECHO:

Envid:	1016168229
Registry ID:	110055926119
DFR URL:	http://echo.epa.gov/detailed-facility-report?fid=110055926119

15
West
1/8-1/4
0.168 mi.
886 ft.

MENLO RECYCLING CENTER **SWRCY** **S118822782**
22405 GOLDEN CREST DR BLDG A **N/A**
MORENO VALLEY, CA 92553

Relative:
Higher

Actual:
1555 ft.

SWRCY:

Reg Id:	248793
Cert Id:	RC248793.001
Mailing Address:	23325 Westwood St
Mailing City:	Grand Terrace
Mailing State:	CA
Mailing Zip Code:	92313-5314
Website:	Not reported
Email:	dnmenlo@yahoo.com
Phone Number:	(951) 653-5565
Grand Father:	N
Rural:	N
Operation Begin Date:	08/03/2016
Aluminium:	Y
Glass:	Y
Plastic:	Y
Bimetal:	Y
Agency:	N/A
Monday Hours Of Operation:	8:00 am - 5:00 pm
Tuesday Hours Of Operation:	8:00 am - 5:00 pm
Wednesday Hours Of Operation:	8:00 am - 5:00 pm
Thursday Hours Of Operation:	8:00 am - 5:00 pm
Friday Hours Of Operation:	8:00 am - 5:00 pm
Saturday Hours Of Operation:	8:00 am - 3:00 pm
Sunday Hours Of Operation:	CLOSED
Organization ID:	225956
Organization Name:	D & N Menlo National Corporation

16 ESE 1/8-1/4 0.170 mi. 899 ft. — **NAVY OPERATIONAL SUPPORT CENTER (NOSC) MORENO VALL** — **RCRA-SQG** — **1014387258 / CAR000207373**

23570 Z STREET
RIVERSIDE, CA 92518

Relative: Lower

Actual: 1543 ft.

RCRA-SQG:

Date form received by agency:	04/05/2010
Facility name:	NAVY OPERATIONAL SUPPORT CENTER (NOSC) MORENO VALLEY
Facility address:	23570 Z STREET RIVERSIDE, CA 92518
EPA ID:	CAR000207373
Contact:	JOEY M ULLEGUE
Contact address:	23570 Z STREET RIVERSIDE, CA 92518
Contact country:	US
Contact telephone:	951-656-6547
Contact email:	JOEY.ULLEGUE@NAVY.MIL
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	NOSC MORENO VALLEY
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Federal
Owner/Operator Type:	Operator
Owner/Op start date:	08/31/1996
Owner/Op end date:	Not reported

Owner/operator name:	NOSC MORENO VALLEY
Owner/operator address:	23570 Z STREET RIVERSIDE, CA 92158
Owner/operator country:	US
Owner/operator telephone:	951-656-7676
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Federal
Owner/Operator Type:	Owner
Owner/Op start date:	08/31/1996
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No

NAVY OPERATIONAL SUPPORT CENTER (NOSC) MORENO VALLEY (Continued) **1014387258**

Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Pesticides
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

. Waste code: 141
. Waste name: Off-specification, aged, or surplus inorganics

. Waste code: 151
. Waste name: Asbestos-containing waste

. Waste code: 281
. Waste name: Adhesives

. Waste code: 291
. Waste name: Latex waste

. Waste code: 331
. Waste name: Off-specification, aged, or surplus organics

. Waste code: 512
. Waste name: Other empty containers 30 gallons or more

. Waste code: 513
. Waste name: Empty containers less than 30 gallons

. Waste code: 561
. Waste name: Detergent and soap

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE

NAVY OPERATIONAL SUPPORT CENTER (NOSC) MORENO VALLEY (Continued) **1014387258**

FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: D002
. Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

. Waste code: D003
. Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

. Waste code: D005
. Waste name: BARIUM

. Waste code: D007
. Waste name: CHROMIUM

. Waste code: D008
. Waste name: LEAD

. Waste code: D018
. Waste name: BENZENE

. Waste code: D035
. Waste name: METHYL ETHYL KETONE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

NAVY OPERATIONAL SUPPORT CENTER (NOSC) MORENO VALLEY (Continued) **1014387258**

Violation Status: No violations found

17
NE
1/8-1/4
0.182 mi.
959 ft.

FRAZEE PAINT
14300 GRAHAM ST
MORENO VALLEY, CA 92553

RCRA-SQG
HAZNET
NPDES
CIWQS

1014387395
CAR000209171

Relative:
Higher

Actual:
1558 ft.

RCRA-SQG:

Date form received by agency:	06/29/2010
Facility name:	FRAZEE PAINT
Facility address:	14300 GRAHAM ST MORENO VALLEY, CA 92553
EPA ID:	CAR000209171
Mailing address:	6625 MIRAMAR RD SAN DIEGO, CA 92121
Contact:	STEVE EATON
Contact address:	6625 MIRAMAR RD SAN DIEGO, CA 92121
Contact country:	US
Contact telephone:	858-626-3383
Contact email:	SEATON@FRAZEE.COM
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	RICH MORENO VALLEY LLC
Owner/operator address:	201 COVINA AVE STE 8 LONG BEACH, CA 90803
Owner/operator country:	US
Owner/operator telephone:	562-856-3819
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/2007
Owner/Op end date:	Not reported

Owner/operator name:	FRAZEE PAINT
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	06/16/2010
Owner/Op end date:	Not reported

FRAZEE PAINT (Continued) **1014387395**

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Universal Waste Summary:
Waste type: Batteries
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Lamps
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Pesticides
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

Waste type: Thermostats
Accumulated waste on-site: Yes
Generated waste on-site: Not reported

. Waste code: 214
. Waste name: Unspecified solvent mixture

. Waste code: D001
. Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT

FRAZEE PAINT (Continued) **1014387395**

MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

HAZNET:

envid: 1014387395
Year: 2016
GEPAID: CAR000209171
Contact: BECKY LEONE
Telephone: 5102747547
Mailing Name: Not reported
Mailing Address: 101 W PROSPECT AVE
Mailing City,St,Zip: CLEVELAND, OH 441151027
Gen County: Riverside
TSD EPA ID: KSD980633259
TSD County: 99
Waste Category: Other organic solids
Disposal Method: Fuel Blending Prior To Energy Recovery At Another Site
Tons: 0.03
Cat Decode: Other organic solids
Method Decode: Fuel Blending Prior To Energy Recovery At Another Site
Facility County: Riverside

envid: 1014387395
Year: 2015
GEPAID: CAR000209171
Contact: SHAY ROSEMAN
Telephone: 2165661710
Mailing Name: Not reported
Mailing Address: 101 W PROSPECT AVE
Mailing City,St,Zip: CLEVELAND, OH 441151027
Gen County: Riverside
TSD EPA ID: KSD980633259
TSD County: 99
Waste Category: Unspecified solvent mixture
Disposal Method: Fuel Blending Prior To Energy Recovery At Another Site
Tons: 0.234
Cat Decode: Not reported
Method Decode: Not reported
Facility County: Riverside

envid: 1014387395
Year: 2015
GEPAID: CAR000209171
Contact: SHAY ROSEMAN
Telephone: 2165661710
Mailing Name: Not reported
Mailing Address: 101 W PROSPECT AVE
Mailing City,St,Zip: CLEVELAND, OH 441151027

FRAZEE PAINT (Continued) **1014387395**

Gen County: Riverside
TSD EPA ID: KSD980633259
TSD County: 99
Waste Category: Other organic solids
Disposal Method: Fuel Blending Prior To Energy Recovery At Another Site
Tons: 0.05
Cat Decode: Not reported
Method Decode: Not reported
Facility County: Riverside

envid: 1014387395
Year: 2015
GEPAID: CAR000209171
Contact: SHAY ROSEMAN
Telephone: 2165661710
Mailing Name: Not reported
Mailing Address: 101 W PROSPECT AVE
Mailing City,St,Zip: CLEVELAND, OH 441151027
Gen County: Riverside
TSD EPA ID: KSD980633259
TSD County: 99
Waste Category: Other organic solids
Disposal Method: Storage, Bulking, And/Or Transfer Off Site--No Treatment/Reovery (H010-H129) Or (H131-H135)
Tons: 0.075
Cat Decode: Not reported
Method Decode: Not reported
Facility County: Riverside

envid: 1014387395
Year: 2014
GEPAID: CAR000209171
Contact: SHAY ROSEMAN
Telephone: 2165661710
Mailing Name: Not reported
Mailing Address: 101 W PROSPECT AVE
Mailing City,St,Zip: CLEVELAND, OH 441151027
Gen County: Riverside
TSD EPA ID: NVT330010000
TSD County: 99
Waste Category: Unspecified organic liquid mixture
Disposal Method: Other Recovery Of Reclamation For Reuse Including Acid Regeneration, Organics Recovery Ect
Tons: 0.145
Cat Decode: Not reported
Method Decode: Not reported
Facility County: Riverside

Click this hyperlink while viewing on your computer to access
16 additional CA_HAZNET: record(s) in the EDR Site Report.

NPDES:
Facility Status: Active
NPDES Number: CAS000001
Region: 8
Agency Number: 0
Regulatory Measure ID: 458214

FRAZEE PAINT (Continued) **1014387395**

Place ID:	Not reported
Order Number:	97-03-DWQ
WDID:	8 33NEC000379
Regulatory Measure Type:	Enrollee
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	08/17/2015
Termination Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Discharge Address:	14300 Graham Street
Discharge Name:	Sherwin Williams
Discharge City:	Moreno Valley
Discharge State:	California
Discharge Zip:	92553
Status:	Not reported
Status Date:	Not reported
Operator Name:	Not reported
Operator Address:	Not reported
Operator City:	Not reported
Operator State:	Not reported
Operator Zip:	Not reported

NPDES as of 03/2018:

NPDES Number:	Not reported
Status:	Not reported
Agency Number:	Not reported
Region:	8
Regulatory Measure ID:	458214
Order Number:	Not reported
Regulatory Measure Type:	Industrial
Place ID:	Not reported
WDID:	8 33NEC000379
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Received Date:	07/24/2015
Processed Date:	08/17/2015
Status:	Active
Status Date:	08/17/2015
Place Size:	8.78
Place Size Unit:	Acres
Contact:	Darrell Schmittler
Contact Title:	Manager
Contact Phone:	951-571-3698
Contact Phone Ext:	Not reported
Contact Email:	dschmittler@sherwin.com
Operator Name:	Sherwin Williams
Operator Address:	14300 Graham Street
Operator City:	Moreno Valley
Operator State:	California
Operator Zip:	92553

FRAZEE PAINT (Continued) **1014387395**

Operator Contact:	Darrell Schmittler
Operator Contact Title:	Ops. Manager
Operator Contact Phone:	951-571-3698
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	dschmittler@sherwin.com
Operator Type:	Private Business
Developer:	Not reported
Developer Address:	Not reported
Developer City:	Not reported
Developer State:	California
Developer Zip:	Not reported
Developer Contact:	Not reported
Developer Contact Title:	Not reported
Constype Linear Utility Ind:	Not reported
Emergency Phone:	Not reported
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	Not reported
Constype Below Ground Ind:	Not reported
Constype Cable Line Ind:	Not reported
Constype Comm Line Ind:	Not reported
Constype Commertial Ind:	Not reported
Constype Electrical Line Ind:	Not reported
Constype Gas Line Ind:	Not reported
Constype Industrial Ind:	Not reported
Constype Other Description:	Not reported
Constype Other Ind:	Not reported
Constype Recons Ind:	Not reported
Constype Residential Ind:	Not reported
Constype Transport Ind:	Not reported
Constype Utility Description:	Not reported
Constype Utility Ind:	Not reported
Constype Water Sewer Ind:	Not reported
Dir Discharge Uswater Ind:	Not reported
Receiving Water Name:	Not reported
Certifier:	Darrell Schmittler
Certifier Title:	Operations Manager
Certification Date:	20-SEP-16
Primary Sic:	4225-General Warehousing and Storage
Secondary Sic:	Not reported
Tertiary Sic:	Not reported
NPDES Number:	CAS000001
Status:	Active
Agency Number:	0
Region:	8
Regulatory Measure ID:	458214
Order Number:	97-03-DWQ
Regulatory Measure Type:	Enrollee
Place ID:	Not reported
WDID:	8 33NEC000379
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	08/17/2015
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Sherwin Williams
Discharge Address:	14300 Graham Street

FRAZEE PAINT (Continued) **1014387395**

Discharge City:	Moreno Valley
Discharge State:	California
Discharge Zip:	92553
Received Date:	Not reported
Processed Date:	Not reported
Status:	Not reported
Status Date:	Not reported
Place Size:	Not reported
Place Size Unit:	Not reported
Contact:	Not reported
Contact Title:	Not reported
Contact Phone:	Not reported
Contact Phone Ext:	Not reported
Contact Email:	Not reported
Operator Name:	Not reported
Operator Address:	Not reported
Operator City:	Not reported
Operator State:	Not reported
Operator Zip:	Not reported
Operator Contact:	Not reported
Operator Contact Title:	Not reported
Operator Contact Phone:	Not reported
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	Not reported
Operator Type:	Not reported
Developer:	Not reported
Developer Address:	Not reported
Developer City:	Not reported
Developer State:	Not reported
Developer Zip:	Not reported
Developer Contact:	Not reported
Developer Contact Title:	Not reported
Constype Linear Utility Ind:	Not reported
Emergency Phone:	Not reported
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	Not reported
Constype Below Ground Ind:	Not reported
Constype Cable Line Ind:	Not reported
Constype Comm Line Ind:	Not reported
Constype Commertial Ind:	Not reported
Constype Electrical Line Ind:	Not reported
Constype Gas Line Ind:	Not reported
Constype Industrial Ind:	Not reported
Constype Other Description:	Not reported
Constype Other Ind:	Not reported
Constype Recons Ind:	Not reported
Constype Residential Ind:	Not reported
Constype Transport Ind:	Not reported
Constype Utility Description:	Not reported
Constype Utility Ind:	Not reported
Constype Water Sewer Ind:	Not reported
Dir Discharge Uswater Ind:	Not reported
Receiving Water Name:	Not reported
Certifier:	Not reported
Certifier Title:	Not reported
Certification Date:	Not reported
Primary Sic:	Not reported

FRAZEE PAINT (Continued) **1014387395**

Secondary Sic:	Not reported
Tertiary Sic:	Not reported
Facility Status:	Not reported
NPDES Number:	Not reported
Region:	Not reported
Agency Number:	Not reported
Regulatory Measure ID:	Not reported
Place ID:	Not reported
Order Number:	Not reported
WDID:	8 33NEC000379
Regulatory Measure Type:	Industrial
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Discharge Address:	Not reported
Discharge Name:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Status:	Active
Status Date:	08/17/2015
Operator Name:	Sherwin Williams
Operator Address:	14300 Graham Street
Operator City:	Moreno Valley
Operator State:	California
Operator Zip:	92553

NPDES as of 03/2018:

NPDES Number:	Not reported
Status:	Not reported
Agency Number:	Not reported
Region:	8
Regulatory Measure ID:	458214
Order Number:	Not reported
Regulatory Measure Type:	Industrial
Place ID:	Not reported
WDID:	8 33NEC000379
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Not reported
Discharge Address:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Received Date:	07/24/2015
Processed Date:	08/17/2015
Status:	Active
Status Date:	08/17/2015
Place Size:	8.78
Place Size Unit:	Acres
Contact:	Darrell Schmittler

FRAZEE PAINT (Continued) **1014387395**

Contact Title:	Manager
Contact Phone:	951-571-3698
Contact Phone Ext:	Not reported
Contact Email:	dschmittler@sherwin.com
Operator Name:	Sherwin Williams
Operator Address:	14300 Graham Street
Operator City:	Moreno Valley
Operator State:	California
Operator Zip:	92553
Operator Contact:	Darrell Schmittler
Operator Contact Title:	Ops. Manager
Operator Contact Phone:	951-571-3698
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	dschmittler@sherwin.com
Operator Type:	Private Business
Developer:	Not reported
Developer Address:	Not reported
Developer City:	Not reported
Developer State:	California
Developer Zip:	Not reported
Developer Contact:	Not reported
Developer Contact Title:	Not reported
Constype Linear Utility Ind:	Not reported
Emergency Phone:	Not reported
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	Not reported
Constype Below Ground Ind:	Not reported
Constype Cable Line Ind:	Not reported
Constype Comm Line Ind:	Not reported
Constype Commertial Ind:	Not reported
Constype Electrical Line Ind:	Not reported
Constype Gas Line Ind:	Not reported
Constype Industrial Ind:	Not reported
Constype Other Description:	Not reported
Constype Other Ind:	Not reported
Constype Recons Ind:	Not reported
Constype Residential Ind:	Not reported
Constype Transport Ind:	Not reported
Constype Utility Description:	Not reported
Constype Utility Ind:	Not reported
Constype Water Sewer Ind:	Not reported
Dir Discharge Uswater Ind:	Not reported
Receiving Water Name:	Not reported
Certifier:	Darrell Schmittler
Certifier Title:	Operations Manager
Certification Date:	20-SEP-16
Primary Sic:	4225-General Warehousing and Storage
Secondary Sic:	Not reported
Tertiary Sic:	Not reported
NPDES Number:	CAS000001
Status:	Active
Agency Number:	0
Region:	8
Regulatory Measure ID:	458214
Order Number:	97-03-DWQ
Regulatory Measure Type:	Enrollee

FRAZEE PAINT (Continued) **1014387395**

Place ID:	Not reported
WDID:	8 33NEC000379
Program Type:	Industrial
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	08/17/2015
Expiration Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Discharge Name:	Sherwin Williams
Discharge Address:	14300 Graham Street
Discharge City:	Moreno Valley
Discharge State:	California
Discharge Zip:	92553
Received Date:	Not reported
Processed Date:	Not reported
Status:	Not reported
Status Date:	Not reported
Place Size:	Not reported
Place Size Unit:	Not reported
Contact:	Not reported
Contact Title:	Not reported
Contact Phone:	Not reported
Contact Phone Ext:	Not reported
Contact Email:	Not reported
Operator Name:	Not reported
Operator Address:	Not reported
Operator City:	Not reported
Operator State:	Not reported
Operator Zip:	Not reported
Operator Contact:	Not reported
Operator Contact Title:	Not reported
Operator Contact Phone:	Not reported
Operator Contact Phone Ext:	Not reported
Operator Contact Email:	Not reported
Operator Type:	Not reported
Developer:	Not reported
Developer Address:	Not reported
Developer City:	Not reported
Developer State:	Not reported
Developer Zip:	Not reported
Developer Contact:	Not reported
Developer Contact Title:	Not reported
Constype Linear Utility Ind:	Not reported
Emergency Phone:	Not reported
Emergency Phone Ext:	Not reported
Constype Above Ground Ind:	Not reported
Constype Below Ground Ind:	Not reported
Constype Cable Line Ind:	Not reported
Constype Comm Line Ind:	Not reported
Constype Commertial Ind:	Not reported
Constype Electrical Line Ind:	Not reported
Constype Gas Line Ind:	Not reported
Constype Industrial Ind:	Not reported
Constype Other Description:	Not reported
Constype Other Ind:	Not reported
Constype Recons Ind:	Not reported
Constype Residential Ind:	Not reported
Constype Transport Ind:	Not reported

FRAZEE PAINT (Continued) **1014387395**

Constype Utility Description:	Not reported
Constype Utility Ind:	Not reported
Constype Water Sewer Ind:	Not reported
Dir Discharge Uswater Ind:	Not reported
Receiving Water Name:	Not reported
Certifier:	Not reported
Certifier Title:	Not reported
Certification Date:	Not reported
Primary Sic:	Not reported
Secondary Sic:	Not reported
Tertiary Sic:	Not reported

CIWQS:

Agency:	Sherwin Williams
Agency Address:	14300 Graham Street, Moreno Valley, CA 92553
Place/Project Type:	Industrial - General Warehousing and Storage
SIC/NAICS:	4225
Region:	8
Program:	INDSTW
Regulatory Measure Status:	Active
Regulatory Measure Type:	Storm water industrial
Order Number:	2014-0057-DWQ
WDID:	8 33NEC000379
NPDES Number:	CAS000001
Adoption Date:	Not reported
Effective Date:	08/17/2015
Termination Date:	Not reported
Expiration/Review Date:	Not reported
Design Flow:	Not reported
Major/Minor:	Not reported
Complexity:	Not reported
TTWQ:	Not reported
Enforcement Actions within 5 years:	0
Violations within 5 years:	0
Latitude:	33.91268
Longitude:	-117.25126

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18 **DEPARTMENT OF DEFENSE , MEDIA CENTER AFRTS-BC** **AST** **A100323577**
ESE **23755 Z STREET** **N/A**
1/8-1/4 **RIVERSIDE, CA**
0.189 mi.
997 ft.

Relative:
Lower

Actual:
1540 ft.

AST:

Certified Unified Program Agencies:	Riverside
Owner:	DEPARTMENT OF DEFENSE
Total Gallons:	2,050
CERSID:	Not reported
Facility ID:	Not reported
Business Name:	Not reported
Phone:	Not reported
Fax:	Not reported
Mailing Address:	Not reported
Mailing Address City:	Not reported
Mailing Address State:	Not reported
Mailing Address Zip Code:	Not reported

DEPARTMENT OF DEFENSE , MEDIA CENTER AFRTS-BC (Continued) **A100323577**

Operator Name:	Not reported
Operator Phone:	Not reported
Owner Phone:	Not reported
Owner Mail Address:	Not reported
Owner State:	Not reported
Owner Zip Code:	Not reported
Owner Country:	Not reported
Property Owner Name:	Not reported
Property Owner Phone:	Not reported
Property Owner Mailing Address:	Not reported
Property Owner City:	Not reported
Property Owner Stat :	Not reported
Property Owner Zip Code:	Not reported
Property Owner Country:	Not reported
EPAID:	Not reported

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19 **MARCH FIELD SKEET RANGE** **UXO** **1018150389**
NW **N/A**
1/4-1/2 **MARCH AIR FORCE BASE, CA**
0.260 mi.
1373 ft.

Relative:
Higher

Actual:
1563 ft.

UXO:

DoD Component:	FUDS
Installation Name:	MARCH FIELD
Facility Address 2:	Not reported
Site ID:	01OEW
Site Type:	Trap and Skeet Range
Latitude:	33.913799
Longitude:	-117.262001

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20 **MARCH FIELD** **ENVIROSTOR** **S109348567**
NW **14310 FREDERICK STREET** **HWT** **N/A**
1/4-1/2 **MORENO VALLEY, CA 92533**
0.308 mi.
1625 ft.

Relative:
Higher

Actual:
1564 ft.

ENVIROSTOR:

Facility ID:	80000870
Status:	Inactive - Action Required
Status Date:	11/30/2010
Site Code:	401438
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	53.3
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Daniel Cordero
Supervisor:	Manny Alonzo
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED

MARCH FIELD (Continued) **S109348567**

Funding: DERA
Latitude: 33.89166
Longitude: -117.2597
APN: NONE SPECIFIED
Past Use: FIRING RANGE - SMALL ARMS ETC...
Potential COC: Explosives (UXO, MEC Munitions Debris (MD
Confirmed COC: 30011-NO 32000-NO
Potential Description: SOIL
Alias Name: CA99799F999100
Alias Type: Federal Facility ID
Alias Name: J09CA7168
Alias Type: INPR
Alias Name: 401438
Alias Type: Project Code (Site Code)
Alias Name: 80000870
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Tech Memo
Completed Date: 03/02/2009
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 07/02/2009
Comments: Final site specific work plan received.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Assessment/Site Inspection Report (PA/SI)
Completed Date: 07/22/2009
Comments: Comments included the SI phase of this project is done.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Correspondence
Completed Date: 09/14/1998
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

HWT:
Reg Num: 3450
Expiration Date: 06/30/2018

C21
NNE
1/4-1/2
0.459 mi.
2423 ft.

ARCO AM/PM MINI MARKET #5128
23501 ALESSANDRO BLVD
MORENO VALLEY, CA 92388

Site 1 of 2 in cluster C

SWEEPS UST **S101590125**
CA FID UST **N/A**
HIST CORTESE

Relative:
Higher

Actual:
1572 ft.

SWEEPS UST:

Status:	Active
Comp Number:	17
Number:	1
Board Of Equalization:	44-000506
Referral Date:	10-21-92
Action Date:	10-21-92
Created Date:	09-14-88
Owner Tank Id:	000077
SWRCB Tank Id:	33-000-000017-000001
Tank Status:	A
Capacity:	12000
Active Date:	10-21-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	3

Status:	Active
Comp Number:	17
Number:	1
Board Of Equalization:	44-000506
Referral Date:	10-21-92
Action Date:	10-21-92
Created Date:	09-14-88
Owner Tank Id:	000077
SWRCB Tank Id:	33-000-000017-000002
Tank Status:	A
Capacity:	12000
Active Date:	10-21-92
Tank Use:	M.V. FUEL
STG:	P
Content:	LEADED
Number Of Tanks:	Not reported

Status:	Active
Comp Number:	17
Number:	1
Board Of Equalization:	44-000506
Referral Date:	10-21-92
Action Date:	10-21-92
Created Date:	09-14-88
Owner Tank Id:	000077
SWRCB Tank Id:	33-000-000017-000003
Tank Status:	A
Capacity:	12000
Active Date:	10-21-92
Tank Use:	M.V. FUEL
STG:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

ARCO AM/PM MINI MARKET #5128 (Continued) **S101590125**

CA FID UST:
Facility ID: 33004554
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: Not reported
Mail To: Not reported
Mailing Address: 17315 STUDEBAKER RD
Mailing Address 2: Not reported
Mailing City,St,Zip: MORENO VALLEY 92388
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

HIST CORTESE:
Region: CORTESE
Facility County Code: 33
Reg By: LTNKA
Reg Id: 083303648T

C22 **ALESSANDRO ARCO AM/PM** **LUST U002244640**
NNE **23501 ALESSANDRO BLVD** **UST N/A**
1/4-1/2 **MORENO VALLEY, CA 92553**
0.459 mi.
2423 ft. **Site 2 of 2 in cluster C**

Relative:
Higher

Actual:
1572 ft.

LUST:
Lead Agency: RIVERSIDE COUNTY LOP
Case Type: LUST Cleanup Site
Geo Track: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606500632
Global Id: T0606500632
Latitude: 33.916901618079
Longitude: -117.251977458826
Status: Completed - Case Closed
Status Date: 07/11/2001
Case Worker: RIV
RB Case Number: 083303648T
Local Agency: RIVERSIDE COUNTY LOP
File Location: Local Agency Warehouse
Local Case Number: 200016218
Potential Media Affect: Soil
Potential Contaminants of Concern: Gasoline
Site History: Not reported

LUST:
Global Id: T0606500632
Contact Type: Regional Board Caseworker
Contact Name: VALERIE JAHN-BULL
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: valerie.jahn-bull@waterboards.ca.gov

ALESSANDRO ARCO AM/PM (Continued) **U002244640**

Phone Number: 9517824903

LUST:
Global Id: T0606500632
Action Type: ENFORCEMENT
Date: 04/02/2009
Action: Closure/No Further Action Letter - #Site Closure

Global Id: T0606500632
Action Type: ENFORCEMENT
Date: 04/01/2009
Action: File review - #RCDEH upload site file 5/29/2015

Global Id: T0606500632
Action Type: Other
Date: 09/26/1998
Action: Leak Stopped

Global Id: T0606500632
Action Type: Other
Date: 09/25/1998
Action: Leak Discovery

Global Id: T0606500632
Action Type: Other
Date: 04/12/2000
Action: Leak Reported

LUST:
Global Id: T0606500632
Status: Open - Case Begin Date
Status Date: 09/25/1998

Global Id: T0606500632
Status: Open - Site Assessment
Status Date: 09/25/1998

Global Id: T0606500632
Status: Completed - Case Closed
Status Date: 07/11/2001

LUST REG 8:
Region: 8
County: Riverside
Regional Board: Santa Ana Region
Facility Status: Case Closed
Case Number: 083303648T
Local Case Num: Not reported
Case Type: Soil only
Substance: Gasoline
Qty Leaked: Not reported
Abate Method: Not reported
Cross Street: GRAHAM
Enf Type: Not reported
Funding: Not reported

ALESSANDRO ARCO AM/PM (Continued) **U002244640**

How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0606500632
How Stopped Date:	9/26/1998
Enter Date:	3/9/2000
Date Confirmation of Leak Began:	Not reported
Date Preliminary Assessment Began:	9/25/1998
Discover Date:	9/25/1998
Enforcement Date:	Not reported
Close Date:	7/11/2001
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	3/9/2000
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	33.916963
Longitude:	-117.252416
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0
Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	VJJ
Staff Initials:	BER
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	SAN JACINTO (8-5)
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	No

Summary: Not reported

RIVERSIDE CO. LUST:

Region:	RIVERSIDE
Facility ID:	200016218
Employee:	Boltinghous-LOP
Site Closed:	Yes
Case Type:	Soil only
Facility Status:	closed/action completed
Casetype Decode:	Soil only is impacted
Fstatus Decode:	Closed/Action completed

UST:

Facility ID:	PR24412

ALESSANDRO ARCO AM/PM (Continued) **U002244640**

Permitting Agency: Riverside County Department of Environme
Latitude: 33.91713
Longitude: -117.25226

RIVERSIDE CO. UST:
Region: RIVERSIDE
Total Tanks: 3

D23 **CIRCLE K #1775** **LUST** **S106487565**
ESE **24051 JOHN F. KENNEDY DRIVE** **N/A**
1/4-1/2 **MORENO VALLEY, CA 92553**
0.494 mi.
2609 ft. **Site 1 of 2 in cluster D**

Relative:
Lower

Actual:
1530 ft.

LUST REG 8:

Region:	8
County:	Riverside
Regional Board:	Santa Ana Region
Facility Status:	Leak being confirmed
Case Number:	Not reported
Local Case Num:	200420759
Case Type:	Undefined
Substance:	Gasoline
Qty Leaked:	Not reported
Abate Method:	Not reported
Cross Street:	HEACOCK
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Subsurface Monitoring
How Stopped:	Other Means
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0606502742
How Stopped Date:	7/14/2004
Enter Date:	Not reported
Date Confirmation of Leak Began:	7/14/2004
Date Preliminary Assessment Began:	Not reported
Discover Date:	5/17/2004
Enforcement Date:	Not reported
Close Date:	Not reported
Date Prelim Assessment Workplan Submitted:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring:	Not reported
Enter Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Operator:	Not reported
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	Not reported
Latitude:	0
Longitude:	0
MTBE Date:	Not reported
Max MTBE GW:	Not reported
MTBE Concentration:	0

CIRCLE K #1775 (Continued) **S106487565**

Max MTBE Soil:	Not reported
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
MTBE Class:	*
Staff:	NOM
Staff Initials:	SCB
Lead Agency:	Local Agency
Local Agency:	33000L
Hydr Basin #:	Not reported
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Summary:	SOIL IMPACTED BY PETROLEUM HYDROCARBONS DETECTED DURING DUE DILIGENCE SAMPLING NEAR USTS & DISPENSERS

D24 **CIRCLE K #1775** **LUST** **S108201629**
ESE **24051 JOHN F. KENNEDY DRIVE** **N/A**
1/4-1/2 **MORENO VALLEY, CA 92551**
0.494 mi.
2609 ft. **Site 2 of 2 in cluster D**

Relative: LUST:
Lower

Actual: Lead Agency:	RIVERSIDE COUNTY LOP
1530 ft. Case Type:	LUST Cleanup Site
Geo Track:	http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0606502742
Global Id:	T0606502742
Latitude:	33.902544065
Longitude:	-117.242992554
Status:	Completed - Case Closed
Status Date:	12/23/2014
Case Worker:	Not reported
RB Case Number:	Not reported
Local Agency:	Not reported
File Location:	Local Agency
Local Case Number:	200420759
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminants of Concern:	Gasoline
Site History:	***Data prior to 2005 does not appear in GeoTracker. Consult agency file for all site data*** May 17, 2004-- Six soil borings (B1 through B6) were drilled using a Geoprobe unit for due diligence assessment purposes. A total of three samples were analyzed from the six borings, the 21 feet bgs samples from borings B2 and B3 and the soil sample collected from 11 feet bgs from boring B6. The B2 and B3 samples detected TPHg (2.5 ppm), E (0.19 ppm), X (1.0 ppm), MTBE (0.77 ppm), and TBA (0.36 ppm). The site was placed into LOP on July 14, 2004. April 2005--three soil borings (SB1 through SB3) were drilled and hydropunch groundwater sampling was conducted. Up to 8200 ppm TPHg (SB3@30), 74 ppm benzene (SB3@30), 2000 ppm MTBE(SB3@30) and 10,000 ppm TBA (SB3@30) were detected in the soil. Groundwater was encountered at approx 35 ft bgs. All three hydropunch samples had TPHg with the highest in SB3 at 430,000 ppb. SB3 also had 48000 ppb benzene and 56000 ppb MTBE. The soil and groundwater impact was not delineated. June 2006-- four groundwater monitoring wells (MW-1 through MW-4) were installed. Wells MW-1, MW-2, and MW-4 were screened from 25 to 45 feet and MW-3 from 20 to 45 feet. GW was encountered at 35 ft bgs and stabilized at 19.15 to 20.02 ft bgs, above the top of the screens. Groundwater samples were taken and the

CIRCLE K #1775 (Continued) **S108201629**

highest hydrocarbon concentrations were observed in well MW-1 which contained TPHg, benzene, ethylbenzene, total xylenes, MTBE, and TBA at concentrations of 22,000 ppb, 7,000 ppb, 1,100 ppb, 320 ppb, 120 ppb, and 45,000 ppb, respectively. 1,2,4-trimethylbenzne and naphthalene were reported in two wells (MW-1 and MW-4) at the site at maximum concentrations of 310 "g /L (MW-1) and 110 ppb (MW-1), respectively. April 9 and 10, 2007-- three air sparge wells (AS-1 through AS-3) and three soil vapor extraction (SVE) wells (VE-1 through VE-3) were installed. Up to 0.47 ppm MTBE (VE3@20) and 4.6 ppm TBA (AS1@35) was detected in the soil. Groundwater was encountered at ~30 feet and rose to ~21 feet bgs. The air sparge wells were screened from 33 to 38 feet and the vapor wells were screened from 15 to 25 feet. November 2007--monitoring wells MW-1 to MW-4 were destroyed by over-drilling as it was thought they may have been installed with screen intervals that intersected a confining layer. Additionally, groundwater was extracted from SVE wells VE-1 through VE-3. June 10 through 21, 2008-- five dual-completion monitoring wells (MW-8S/MW-8D through MW-12S/MW-12D) were installed. The wells were screen from ~15-25 and from ~31-37. Groundwater was encountered between 28 and 32. No TRPH, BTEX or MTBE detected in the soil. TBA was detected at up to 1.5 ppm. Groundwater was sampled and up to 59000 ppb TPHg, 2800 ppb B, 4000 ppb T, 1800 ppb E, 8400 ppb X, 20000 ppb MTBE, 31000 ppb TBA, 270 ppb TAME was detected in the wells with MW-11S showing the highest hits. June 19, 2008six soil gas samples were taken using soil gas probes. Benzene ranged from <5 to 29 a%g/m%, toluene ranged from <5 to 87 a%g/m%, ethylbenzene ranged from <5 to 140 a%g/m%, xylenes ranged from 7 to 860 a%g/m%, MTBE was <5, All levels were below the residential CHHSLs. 1,2,4-TMB ranged from 7.4 to 530 a%g/m%, 1,3,5 TMB ranged from 5.9 to 450 a%g/m%. No CHHSLs have been set for these. September 2008--four individual dual phase extraction feasibility tests were conducted. The cumulative mass of TPHg, benzene, and MTBE removed from soil vapor during the test was estimated to be approximately 31.5 pounds, 0.05 pound, and 0.04 pound, respectively. The radius of influences (ROIs) ranged between 38 and 144 feet. SVE appeared to be a feasible remedial technology for use at the site, however, DPE did not. December 16, 2008 through April 27, 2009--interim weekly vacuum truck extraction of groundwater was conducted. A total of 18 batch extraction events were conducting resulting in the removal of 6472 gallons of groundwater.March 2009-- two dual-completion monitoring wells (MW-13S/MW-13D and MW-14S/MW-14D) and two groundwater extraction wells (E-1 and E-2) were installed. MW-13 and MW-14 were screened from 15 to 25 and 30 to 37. E-1 was screened from 15 to 15. E-2 was screened from 35-45. Soil samples from MW-14 showed 0.19 ppm TBA at 19. Up to 0.23 ppm TPHg, 0.083 ppm MTBE and 0.14 ppm TBA was detected in E-1. E-2 had up to 0.66 ppm TPHg, 0.2 ppm MTBE, and 1.1 ppm TBA. July 22, 2009-- An Air Sparge test was conducted. Wells AS-1 and AS-2 were tested. Wells 3 and 4 would not take air flow and the test was not completed. Based on the results of AS-1 and AS-2, air or ozone sparing appeared to be feasible. Aquifer testing was completed using E-1 and 2. The capture zone was calculated to be 60 and groundwater extraction appeared to be feasible. September 2009-- three off-site dual-completion monitoring wells (MW-5S/MW-5D, MW-6S/MW-6D, and MW-7S/MW-7D) were installed in the adjacent mobile home park. Up to 0.093 ppm MTBE and 1.1 ppm TBA was detected in the soil. Up to 360 ppb TPHg, 1100 ppb MTBE, and 11000 ppb TBA was detected in the groundwater of the three off-site wells. April 2010-- four off-site

CIRCLE K #1775 (Continued) **S108201629**

dual-completion monitoring wells (MW-15S/MW-15D through MW-18S/MW-18D) were installed in the adjacent mobile home park. Soil samples were taken every 5 beginning at the capillary fringe to the depth of the well. No TPHg, BTEX or oxygenates were detected in the soil. Carbon tetrachloride was detected in the groundwater in MW-15S at 0.75 ppb. TCE was detected in the groundwater in MW16S and MW16D at 0.76 and 1 ppb. Chloroform was detected in the groundwater in MW-18S and MW-18D at 25 and 2.8 ppb. These chemicals were not believed to have originated from the Circle K site. February 2011-- two on-site single completion sparge wells (AS-5 and AS-7), one on-site dual-completion sparge well (AS-6S/D), one off-site vapor extraction well (VE-4), and nine off-site injection wells (IP-1 through IP-9) were installed. Additionally, AS-3 was destroyed by pressure grouting. The two on-site air sparge wells (AS-5 and AS-7) were drilled to 26 and screened from 23 to 26. The one-site dual completion air sparge well (AS-6S/D) was drilled to 38. One well was screened from 23 to 26 and the other from 33 to 38. The off-site SVE well (VE-4) was drilled to 25 and screened from 15 to 25. The injection wells (IP-1 through IP9) were drilled to 38 and screened from 33 to 38. July 1 2011 through December 13, 2012--mobile oxygen injection events and mobile SVE events commenced. The system was connected to SVE-1 through SVE-4. 150 cubic feet of oxygen was injected into each sparge well during each event. October 3 through 6, 2011-- A three day SVE event was conducted. Individual well head samples were taken upon initiation and just prior to the conclusion of the SVE event. Influent vapor samples were taken daily. 112 lbs of TPHg, 1.1 lbs of benzene, and 0.17 lbs of MTBE were removed. Influent TPHg went from 280 to 390 ppmV. Benzene went from 2.8 to 3.8 ppmV. MTBE went from 1.1 to 0.26 ppmV. March 5 through 7, 2012--a hydrogen peroxide injection event was performed at the site. Due to low injection rates and increasing backpressure, the hydrogen peroxide injection event was terminated after three days.. A review of pre- and post-injection groundwater monitoring data suggested the hydrogen peroxide injection event had no clear impact on dissolved-phase petroleum hydrocarbon concentrations or groundwater chemistry in samples collected from the off-site groundwater monitoring wells. March 12, 2012 through March 16, 2012a mobile SVE event commenced. The system was connected to vapor extraction wells SVE-1 through SVE-4. Individual well-head vapor sample concentrations were collected upon initiation and just prior to conclusion of the SVE event. Petroleum hydrocarbon concentrations were generally observed to decrease over the course of the SVE event, both in samples collected from the combined influent stream and from the individual wellheads; the one exception being TPHg and xylenes concentrations in VE-3 were higher at the conclusion of the SVE event than at the beginning. Maximum beginning vapor levels were 600 ppmV TPHg, 10 ppmV benzene, 95 ppmV toluene, 4.9 ppmV ethylbenzene, and 28 ppmV xylenes in VE-1. Maximum ending vapor levels were 530 ppmV in VE-3, 2.4 ppmV benzene, 25 ppmV toluene, and 2.2 ppmV ethylbenzene in VE-1 and 56 ppmV xylenes in VE-3. Cumulatively, the mobile SVE events removed approximately 363 pounds of TPHg, 4.3 pounds of benzene, and 1.3 pounds of MTBE from the subsurface. 3780 cubic feet of oxygen was injected. 1443 gallons of 4% hydrogen peroxide solution was injected. Residual Mass in Soil: 987 lb TPHg, 63 lb B, 141 lb T, 141 lb X, 270 lb E, 273 lb MTBE, 1875 lb TBA. GW monitoring has been conducted from June 2006 to October 2013. Water levels have fluctuated from 14.42 to 23.39 ft bg with flow directions predominantly to the east with a

CIRCLE K #1775 (Continued) **S108201629**

southeast component. Existing monitoring wells are dual-cased with screens across two water bearing zones, which appear to be in communication. The hydrogeologic conditions indicate a leaky aquifer exists where sandy clay lenses preclude water transmission. The historical maximum dissolved concentrations have been reduced as follows: TPHg 69000 ppb (MW-11S) 5/2009 1800 ppb (MW-11S) 10/2013 Benzene 7400 ppb (MW-1) 8/2006 170 ppb (MW-11S) 10/2013 Toluene 7200 ppb (MW-11S) 8/2008 <0.5 ppb (All wells) 10/2013 Ethylbenzene 4200 ppb (MW-11S) 8/2008 24 ppb (MW-11S) 10/2013 Xylenes 16000 ppb (MW-11S) 8/2008 110 ppb (MW-11S) 10/2013 MTBE 34000 ppb (MW-11S) 8/2008 440 ppb (MW-10D) 10/2013 TBA 74000 ppb (AS-1) 5/2008 1200 ppb (MW-10D) 10/2013 These maximum concentrations were detected in wells located southeast of the tank pit. The case was determined to eligible for closure in April 2014 once a public comment period was over and the wells were destroyed. Between September 24 and 30, 2014, monitoring wells MW-5S through MW-18S, vapor wells VE-1 through VE-4 and gw extraction well E-1 were destroyed by overdrilling and backfilling with cement grout. Between September 22 and October 1, 2014, wells MW-5D through MW-18D, air sparge wells AS-1, AS-2, AS-5, AS-6S/D and AS-7, extraction well E-2 and injection wells IP-2 through IP-9 were destroyed by pressure grouting. IP-1 could not be located and therefore was not destroyed. During the destruction activities, approximately 7.12 tons of soil and 100 gallons of rinse water were generated. The soil cuttings were transported to American Integrated Services in Adelanto and the waste water was transported to Crosby & Overton in Long Beach. 11/21/2014 RCDEH issued NFA/closure letter

LUST:
Global Id: T0606502742
Contact Type: Regional Board Caseworker
Contact Name: NANCY OLSON-MARTIN
Organization Name: SANTA ANA RWQCB (REGION 8)
Address: 3737 MAIN STREET, SUITE 500
City: RIVERSIDE
Email: nolson-martin@waterboards.ca.gov
Phone Number: Not reported

LUST:
Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 09/13/2010
Action: Technical Correspondence / Assistance / Other - #RCDEH 091310

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 09/16/2010
Action: Staff Letter - #RCDEH 091610

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 06/05/2009
Action: File review

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/20/2011

CIRCLE K #1775 (Continued) **S108201629**

Action: Well Installation Report

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 04/11/2014
Action: Notification - Public Notice of Case Closure - #RCDEH public notice

Global Id: T0606502742
Action Type: RESPONSE
Date: 02/17/2011
Action: Remedial Progress Report

Global Id: T0606502742
Action Type: REMEDIATION
Date: 07/05/2011
Action: Soil Vapor Extraction (SVE)

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 06/08/2010
Action: Meeting

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/21/2010
Action: Other Workplan

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2009
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2010
Action: Monitoring Report - Annually

Global Id: T0606502742
Action Type: RESPONSE
Date: 07/15/2010
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2010
Action: Monitoring Report - Quarterly

CIRCLE K #1775 (Continued) **S108201629**

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 01/20/2009
Action: File review

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 11/24/2010
Action: Staff Letter - #RCDEH 112410

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2011
Action: Monitoring Report - Annually

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2011
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 03/31/2009
Action: File review

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 11/21/2014
Action: Closure/No Further Action Letter - #RCDEH closure docs

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2008
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/14/2008
Action: CAP/RAP - Feasibility Study Report

Global Id: T0606502742
Action Type: ENFORCEMENT

CIRCLE K #1775 (Continued) **S108201629**

Date: 08/06/2012
Action: Technical Correspondence / Assistance / Other - #RCDEH 080612

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 03/01/2012
Action: Meeting

Global Id: T0606502742
Action Type: RESPONSE
Date: 07/17/2011
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/20/2012
Action: Remedial Progress Report

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2013
Action: Monitoring Report - Annually

Global Id: T0606502742
Action Type: REMEDIATION
Date: 12/16/2008
Action: Other (Use Description Field)

Global Id: T0606502742
Action Type: RESPONSE
Date: 07/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2013
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 05/05/2014
Action: Other Report / Document

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2014
Action: Request for Closure - Regulator Responded

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 06/27/2011
Action: Meeting

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 06/22/2009
Action: Staff Letter - #Riv Co 062209

CIRCLE K #1775 (Continued) **S108201629**

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 04/04/2008
Action: File review

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 08/31/2009
Action: Staff Letter - #Riv Co 083109

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 03/04/2014
Action: LOP Case Closure Summary to RB

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/21/2009
Action: Site Assessment Report

Global Id: T0606502742
Action Type: RESPONSE
Date: 06/25/2014
Action: Verbal Communication

Global Id: T0606502742
Action Type: RESPONSE
Date: 01/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/11/2014
Action: Well Destruction Report - Regulator Responded

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 09/30/2009
Action: Meeting

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 01/21/2010
Action: Staff Letter - #RCDEH 012110

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 12/04/2008
Action: Staff Letter - #RCDEH120408

Global Id: T0606502742
Action Type: Other
Date: 08/19/2004
Action: Leak Stopped

Global Id: T0606502742
Action Type: RESPONSE

CIRCLE K #1775 (Continued) **S108201629**

Date: 12/14/2007
Action: Other Report / Document

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 04/05/2011
Action: Technical Correspondence / Assistance / Other - #RCDEH 040511

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 02/19/2008
Action: Technical Correspondence / Assistance / Other - #021908

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 05/02/2008
Action: Staff Letter - #050208

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 11/20/2014
Action: File review - #RCDEH site file

Global Id: T0606502742
Action Type: RESPONSE
Date: 06/19/2010
Action: Site Assessment Report

Global Id: T0606502742
Action Type: Other
Date: 07/14/2004
Action: Leak Reported

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 07/15/2012
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 05/23/2007
Action: File review

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 09/17/2007
Action: Staff Letter - #RCDEH 091708

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 01/18/2012
Action: Staff Letter - #RCDEH 011812

CIRCLE K #1775 (Continued) **S108201629**

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 04/11/2014
Action: Staff Letter - #RCDEH 041114

Global Id: T0606502742
Action Type: ENFORCEMENT
Date: 10/14/2008
Action: File review

Global Id: T0606502742
Action Type: RESPONSE
Date: 05/07/2009
Action: Well Installation Report

Global Id: T0606502742
Action Type: Other
Date: 05/17/2004
Action: Leak Discovery

Global Id: T0606502742
Action Type: RESPONSE
Date: 04/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 07/15/2007
Action: Monitoring Report - Quarterly

Global Id: T0606502742
Action Type: RESPONSE
Date: 10/15/2007
Action: Monitoring Report - Quarterly

LUST:
Global Id: T0606502742
Status: Open - Case Begin Date
Status Date: 05/17/2004

Global Id: T0606502742
Status: Open - Site Assessment
Status Date: 05/17/2004

Global Id: T0606502742
Status: Open - Site Assessment
Status Date: 07/14/2004

Global Id: T0606502742
Status: Open - Remediation
Status Date: 12/16/2008

Global Id: T0606502742
Status: Open - Eligible for Closure
Status Date: 04/11/2014

Global Id: T0606502742

CIRCLE K #1775 (Continued) **S108201629**

Status: Completed - Case Closed
Status Date: 11/21/2014

Global Id: T0606502742
Status: Completed - Case Closed
Status Date: 11/21/2014

Global Id: T0606502742
Status: Completed - Case Closed
Status Date: 12/23/2014

RIVERSIDE CO. LUST:
Region: RIVERSIDE
Facility ID: 200420759
Employee: Shurlow-LOP
Site Closed: Yes
Case Type: Drinking Water Aquifer affected
Facility Status: closed/action completed
Casetype Decode: An Aquifer used for Drinking Water supply has been contaminated.
Fstatus Decode: Closed/Action completed

25
East
1/2-1
0.553 mi.
2921 ft.

PROPOSED ALTERNATIVE SCHOOL SITE **ENVIROSTOR** **S108407566**
SEC CACTUS AVENUE AND INDIAN STREET **SCH** **N/A**
MORENO VALLEY, CA 92553

Relative:
Higher

Actual:
1553 ft.

ENVIROSTOR:
Facility ID: 60000563
Status: No Further Action
Status Date: 12/04/2007
Site Code: 404735
Site Type: School Investigation
Site Type Detailed: School
Acres: 8.19
NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Aslam Shareef
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 61
Senate: 31
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.9094
Longitude: -117.2342
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS, ENGINE TESTING/REPAIR, EQUIPMENT/INSTRUMENT REPAIR, MACHINE SHOP
Potential COC: Arsenic Benzene Chlordane DDD DDE DDT Lead TPH-diesel TPH-gas TPH-JET FUEL TPH-MOTOR OIL Cobalt Nickel Toluene Xylenes
Confirmed COC: 30550-NO 30024-NO 30025-NO 30154-NO 30407-NO 30001-NO 30003-NO 30004-NO 30006-NO 30007-NO 30008-NO 30013-NO 3002501-NO 3002502-NO

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

30593-NO
Potential Description: SOIL, SV
Alias Name: 404735
Alias Type: Project Code (Site Code)
Alias Name: 60000563
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 12/04/2007
Comments: Project close out Cost Recovery Unit Memorandum .

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Workplan
Completed Date: 06/21/2007
Comments: PEA Workplan approval sent to the district on June 21, 2007

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/08/2007
Comments: Received Phase I report as background information for upcoming PEA.

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 12/04/2007
Comments: PEA approval sent to the RP

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 03/15/2007
Comments: Signed Agreement sent (FedEx) to District.

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 60000563
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 8.19
National Priorities List: NO
Cleanup Oversight Agencies: SMBRP

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Aslam Shareef
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404735
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	12/04/2007
Restricted Use:	NO
Funding:	School District
Latitude:	33.9094
Longitude:	-117.2342
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, ENGINE TESTING/REPAIR, EQUIPMENT/INSTRUMENT REPAIR, MACHINE SHOP
Potential COC:	Arsenic, Benzene, Chlordane, DDD, DDE, DDT, Lead, TPH-diesel, TPH-gas, TPH-JET FUEL, TPH-MOTOR OIL, Cobalt, Nickel, Toluene, Xylenes Not reported
Confirmed COC:	30550-NO, 30024-NO, 30025-NO, 30154-NO, 30407-NO, 30001-NO, 30003-NO, 30004-NO, 30006-NO, 30007-NO, 30008-NO, 30013-NO, 3002501-NO, 3002502-NO, 30593-NO
Potential Description:	SOIL, SV
Alias Name:	404735
Alias Type:	Project Code (Site Code)
Alias Name:	60000563
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	12/04/2007
Comments:	Project close out Cost Recovery Unit Memorandum .
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Workplan
Completed Date:	06/21/2007
Comments:	PEA Workplan approval sent to the district on June 21, 2007
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Phase 1
Completed Date:	03/08/2007
Comments:	Received Phase I report as background information for upcoming PEA.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	12/04/2007
Comments:	PEA approval sent to the RP
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Environmental Oversight Agreement

PROPOSED ALTERNATIVE SCHOOL SITE (Continued) **S108407566**

Completed Date:	03/15/2007
Comments:	Signed Agreement sent (FedEx) to District.
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

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26 **MARCH MIL AIRFIELD** **ENVIROSTOR** **S107736675**
SSE **N/A**
1/2-1 **RIVERSIDE, CA**
0.627 mi.
3311 ft.

Relative:
Lower

Actual:
1527 ft.

ENVIROSTOR:

Facility ID:	80000012
Status:	Inactive - Needs Evaluation
Status Date:	07/01/2005
Site Code:	Not reported
Site Type:	Military Evaluation
Site Type Detailed:	FUDS
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Not reported
Supervisor:	Douglas Bautista
Division Branch:	Cleanup Cypress
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	DERA
Latitude:	33.9
Longitude:	-117.2541
APN:	NONE SPECIFIED
Past Use:	NONE SPECIFIED
Potential COC:	NONE SPECIFIED
Confirmed COC:	NONE SPECIFIED
Potential Description:	NONE SPECIFIED
Alias Name:	CA99799F523200
Alias Type:	Federal Facility ID
Alias Name:	J09CA0011
Alias Type:	INPR
Alias Name:	80000012
Alias Type:	Envirostor ID Number

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Inventory Project Report (INPR)
Completed Date:	05/22/1995

MARCH MIL AIRFIELD (Continued) **S107736675**

Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

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27 **BADGER SPRINGS MIDDLE SCHOOL** **ENVIROSTOR** **S105089230**
East **24750 DELPHINIUM AVE** **SCH** **N/A**
1/2-1 **MORENO VALLEY, CA 92553** **NPDES**
0.782 mi.
4131 ft.

Relative:
Lower

Actual:
1549 ft.

ENVIROSTOR:
Facility ID: 60000826
Status: No Further Action
Status Date: 06/24/2008
Site Code: 404778
Site Type: School Investigation
Site Type Detailed: School
Acres: 0.21
NPL: NO
Regulatory Agencies: SMBRP
Lead Agency: SMBRP
Program Manager: Not reported
Supervisor: Shahir Haddad
Division Branch: Southern California Schools & Brownfields Outreach
Assembly: 61
Senate: 31
Special Program: Not reported
Restricted Use: NO
Site Mgmt Req: NONE SPECIFIED
Funding: School District
Latitude: 33.90641
Longitude: -117.2318
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS, SCHOOL - ELEMENTARY
Potential COC: Arsenic Chlordane DDD DDE DDT Endrin Toxaphene Arsenic Chlordane DDD DDE DDT Toxaphene
Confirmed COC: Not reported
Potential Description: SOIL, SOIL
Alias Name: 404778
Alias Type: Project Code (Site Code)
Alias Name: 60000826
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 03/04/2008
Comments: Agreement signed by Branch Chief, Sharon Fair . Copy sent to District.
Not reported

BADGER SPRINGS MIDDLE SCHOOL (Continued) **S105089230**

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Cost Recovery Closeout Memo
Completed Date:	06/27/2008
Comments:	Not reported

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Workplan
Completed Date:	03/20/2008
Comments:	DTSC concurred with the proposed sampling approach.

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	06/24/2008
Comments:	PEA Report approved with No Further Action determination.

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

SCH:

Facility ID:	60000826
Site Type:	School Investigation
Site Type Detail:	School
Site Mgmt. Req.:	NONE SPECIFIED
Acres:	0.21
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Site Cleanup Program
Project Manager:	Not reported
Supervisor:	Shahir Haddad
Division Branch:	Southern California Schools & Brownfields Outreach
Site Code:	404778
Assembly:	61
Senate:	31
Special Program Status:	Not reported
Status:	No Further Action
Status Date:	06/24/2008
Restricted Use:	NO
Funding:	School District
Latitude:	33.90641
Longitude:	-117.2318
APN:	NONE SPECIFIED
Past Use:	AGRICULTURAL - ROW CROPS, SCHOOL - ELEMENTARY
Potential COC:	Arsenic, Chlordane, DDD, DDE, DDT, Endrin, Toxaphene, Arsenic, Chlordane, DDD, DDE, DDT, Toxaphene

BADGER SPRINGS MIDDLE SCHOOL (Continued) **S105089230**

NPDES:

Facility Status:	Not reported
NPDES Number:	Not reported
Region:	Not reported
Agency Number:	Not reported
Regulatory Measure ID:	Not reported
Place ID:	Not reported
Order Number:	Not reported
WDID:	8 33W002351
Regulatory Measure Type:	Construction
Program Type:	Not reported
Adoption Date Of Regulatory Measure:	Not reported
Effective Date Of Regulatory Measure:	Not reported
Termination Date Of Regulatory Measure:	Not reported
Expiration Date Of Regulatory Measure:	Not reported
Discharge Address:	Not reported
Discharge Name:	Not reported
Discharge City:	Not reported
Discharge State:	Not reported
Discharge Zip:	Not reported
Status:	Expired
Status Date:	09/15/2015
Operator Name:	Moreno Valley Unified School District
Operator Address:	25634 Alessandro Boulevard
Operator City:	Moreno Valley
Operator State:	California
Operator Zip:	92553

28
East
1/2-1
0.867 mi.
4578 ft.

CHAPARRAL ELEMENTARY SCHOOL **ENVIROSTOR** **S118756708**
24850 DELPHINIUM AVENUE **SCH** **N/A**
MORENO VALLEY, CA 92553

Relative:
Lower

Actual:
1549 ft.

ENVIROSTOR:

Facility ID:	33010055
Status:	No Action Required
Status Date:	03/28/2002
Site Code:	404309
Site Type:	School Investigation
Site Type Detailed:	School
Acres:	9
NPL:	NO
Regulatory Agencies:	SMBRP
Lead Agency:	SMBRP
Program Manager:	Not reported
Supervisor:	Mark Malinowski
Division Branch:	Southern California Schools & Brownfields Outreach
Assembly:	61
Senate:	31
Special Program:	Not reported
Restricted Use:	NO
Site Mgmt Req:	NONE SPECIFIED
Funding:	School District
Latitude:	33.90708
Longitude:	-117.23
APN:	NONE SPECIFIED

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

Past Use: AGRICULTURAL - ROW CROPS
Potential COC: NONE SPECIFIED No Contaminants found
Confirmed COC: NONE SPECIFIED
Potential Description: NMA
Alias Name: CHAPARRAL ELEMENTARY SCHOOL
Alias Type: Alternate Name
Alias Name: MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: MORENO VALLEY USD-CHAPARREL ELEM SCHOOL
Alias Type: Alternate Name
Alias Name: 404309
Alias Type: Project Code (Site Code)
Alias Name: 33010055
Alias Type: Envirostor ID Number

Completed Info:
Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 05/16/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 03/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 01/31/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/28/2002
Comments: Not reported

Future Area Name: Not reported
Future Sub Area Name: Not reported
Future Document Type: Not reported
Future Due Date: Not reported
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported

SCH:

Facility ID: 33010055
Site Type: School Investigation
Site Type Detail: School
Site Mgmt. Req.: NONE SPECIFIED
Acres: 9

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

National Priorities List: NO
Cleanup Oversight Agencies: SMBRP
Lead Agency: SMBRP
Lead Agency Description: DTSC - Site Cleanup Program
Project Manager: Not reported
Supervisor: Mark Malinowski
Division Branch: Southern California Schools & Brownfields Outreach
Site Code: 404309
Assembly: 61
Senate: 31
Special Program Status: Not reported
Status: No Action Required
Status Date: 03/28/2002
Restricted Use: NO
Funding: School District
Latitude: 33.90708
Longitude: -117.23
APN: NONE SPECIFIED
Past Use: AGRICULTURAL - ROW CROPS
Potential COC: NONE SPECIFIED, No Contaminants found
Confirmed COC: NONE SPECIFIED
Potential Description: NMA
Alias Name: CHAPARRAL ELEMENTARY SCHOOL
Alias Type: Alternate Name
Alias Name: MORENO VALLEY UNIFIED SCHOOL DISTRICT
Alias Type: Alternate Name
Alias Name: MORENO VALLEY USD-CHAPARREL ELEM SCHOOL
Alias Type: Alternate Name
Alias Name: 404309
Alias Type: Project Code (Site Code)
Alias Name: 33010055
Alias Type: Envirostor ID Number

Completed Info:

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Cost Recovery Closeout Memo
Completed Date: 05/16/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Inspections/Visit (Non LUR)
Completed Date: 03/14/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Environmental Oversight Agreement
Completed Date: 01/31/2002
Comments: Not reported

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Phase 1
Completed Date: 03/28/2002
Comments: Not reported

CHAPARRAL ELEMENTARY SCHOOL (Continued) **S118756708**

Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported

Count: 5 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MORENO VALLEY	S107539751		ON CACTUS	92518	CDL
MORENO VALLEY	S108985918	U.S. AIR FORCE - MARCH AFB (FORMER	N/A GRAHAM		CPS-SLIC
RIVERSIDE	S108985920	RIVERSIDE PLUME	N/A RIVERSIDE II BASIN		CPS-SLIC
RIVERSIDE	S104970783	UCR - PARKING LOT 6	UNIVERSITY OF CALIF, RIVERSIDE		LUST
RIVERSIDE	S108985921	UCR (PESTICIDE PITS)	N/A UNIVERSITY AVENUE		CPS-SLIC

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 51

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 07/31/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 51

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 07/31/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/16/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 37

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)
Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Varies

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/10/2018
Number of Days to Update: 27
Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/09/2018
Number of Days to Update: 26
Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Semi-Annually

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69
Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 06/21/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63
Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 51
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 07/31/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38
Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/21/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 07/24/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 05/29/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 48

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 05/04/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 51

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 07/31/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2017
Date Data Arrived at EDR: 08/18/2017
Date Made Active in Reports: 09/21/2017
Number of Days to Update: 34

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 03/28/2018
Date Data Arrived at EDR: 05/25/2018
Date Made Active in Reports: 07/10/2018
Number of Days to Update: 46

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 04/19/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 10

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/05/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 43

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 41

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 51

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)
Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)
Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch
Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 05/15/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73
Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 05/08/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2
Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 05/25/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77
Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/05/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 85
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2018
Date Data Arrived at EDR: 04/16/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 74

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/03/2018
Date Data Arrived at EDR: 05/31/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 87

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 02/25/2018
Date Data Arrived at EDR: 03/17/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 06/01/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 30

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

CUPA SAN FRANCISCO CO: CUPA SAN FRANCISCO CO

Cupa facilities

Date of Government Version: 04/20/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 10

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

CUPA LIVERMORE-PLEASANTON: CUPA Facility Listing

list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 05/07/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 39

Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

DRYCLEAN AVAQMD: DRYCLEAN AVAQMD

A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 52

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner’s agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 03/27/2018
Date Data Arrived at EDR: 03/29/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 36

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Annually

DRYCLEAN SOUTH COAST: DRYCLEAN SOUTH COAST

A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 03/16/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 03/21/2017
Date Made Active in Reports: 08/15/2017
Number of Days to Update: 147

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 73

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/20/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 60

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/15/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 38

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/12/2017
Date Made Active in Reports: 10/17/2017
Number of Days to Update: 97

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 05/21/2018
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 55

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 05/21/2018
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 55

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 05/23/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 04/09/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 69

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 05/23/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 42

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/16/2018
Date Made Active in Reports: 07/05/2018
Number of Days to Update: 50

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/19/2018
Number of Days to Update: 43

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 03/12/2018
Date Data Arrived at EDR: 03/14/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 51

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 03/23/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 38

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 06/14/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: No Update Planned

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 04/27/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 34

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region’s active disposal pits are operating without permission.

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 04/13/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 67

Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Quarterly

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 06/25/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)
Produced water ponds sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)
Non-Case Information sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)
Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

CIWQS: California Integrated Water Quality System

The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 37

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)

Other Oil & Gas Projects sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)

Sampling point - public sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

UIC GEO: Underground Injection Control Sites (GEOTRACKER)

Underground control injection sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 44

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 07/25/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)

Military privatized sites

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/12/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 65

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 04/24/2047
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 03/31/2018
Date Data Arrived at EDR: 04/05/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 70

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 06/14/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 05/07/2018
Date Data Arrived at EDR: 05/09/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 36

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 06/25/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 05/23/2018
Date Data Arrived at EDR: 05/24/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 50

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 05/21/2018
Date Data Arrived at EDR: 05/25/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 56

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List
Cupa Facility list

Date of Government Version: 04/27/2018
Date Data Arrived at EDR: 05/02/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 44

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 07/24/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/08/2018
Date Made Active in Reports: 04/16/2018
Number of Days to Update: 39

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/05/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 9

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 03/05/2018
Date Data Arrived at EDR: 03/08/2018
Date Made Active in Reports: 04/30/2018
Number of Days to Update: 53

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 50

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 05/02/2018
Date Data Arrived at EDR: 05/07/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 72

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 06/12/2018
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 28

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/09/2018
Date Data Arrived at EDR: 05/11/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 34

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206
Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 04/16/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 60
Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 04/16/2018
Date Data Arrived at EDR: 04/17/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 63
Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 07/18/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2018
Date Data Arrived at EDR: 05/01/2018
Date Made Active in Reports: 05/14/2018
Number of Days to Update: 13
Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 04/17/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 63
Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21
Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/09/2017
Date Data Arrived at EDR: 03/10/2017
Date Made Active in Reports: 05/03/2017
Number of Days to Update: 54
Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/05/2018
Date Made Active in Reports: 01/18/2018
Number of Days to Update: 13

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 05/22/2018
Date Data Arrived at EDR: 05/24/2018
Date Made Active in Reports: 07/31/2018
Number of Days to Update: 68

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 03/30/2018
Date Data Arrived at EDR: 04/06/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 28

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 05/30/2018
Date Data Arrived at EDR: 06/01/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 42

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List
CUPA Facility List

Date of Government Version: 05/22/2018
Date Data Arrived at EDR: 05/24/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 50

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/13/2018
Date Data Arrived at EDR: 06/19/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 31
Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 07/02/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 05/23/2018
Date Data Arrived at EDR: 05/31/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 41
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List
CUPA facility list.

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/01/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 45
Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 07/24/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 05/11/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 42
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 05/11/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 45
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/07/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/10/2018
Number of Days to Update: 63
Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 05/08/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/05/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 43
Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/15/2018
Number of Days to Update: 50
Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/18/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 04/10/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 24
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 06/18/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/02/2018
Date Data Arrived at EDR: 04/04/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 71

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/03/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

Master Hazardous Materials Facility List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 02/02/2018
Date Data Arrived at EDR: 04/04/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 76

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 07/03/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 05/16/2018
Date Data Arrived at EDR: 05/22/2018
Date Made Active in Reports: 07/13/2018
Number of Days to Update: 52

Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 04/09/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 69

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 07/24/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 41

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/24/2018
Date Made Active in Reports: 06/19/2018
Number of Days to Update: 56
Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

Local Oversight Program Listing
A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 04/18/2018
Date Data Arrived at EDR: 04/23/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 11
Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24
Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 06/07/2018
Date Data Arrived at EDR: 06/12/2018
Date Made Active in Reports: 07/10/2018
Number of Days to Update: 28
Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 05/02/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15
Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 06/14/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 05/16/2018
Date Data Arrived at EDR: 05/22/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 56

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 03/14/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/15/2018
Date Data Arrived at EDR: 03/20/2018
Date Made Active in Reports: 05/04/2018
Number of Days to Update: 45

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List
Cupa facility list

Date of Government Version: 05/16/2018
Date Data Arrived at EDR: 05/23/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 55

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13
Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 05/22/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Annually

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 05/16/2018
Date Data Arrived at EDR: 05/22/2018
Date Made Active in Reports: 07/19/2018
Number of Days to Update: 58
Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90
Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51
Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 05/16/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/08/2018
Date Made Active in Reports: 07/18/2018
Number of Days to Update: 40
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/12/2018
Date Made Active in Reports: 07/12/2018
Number of Days to Update: 30
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List
Cupa Facility list

Date of Government Version: 06/19/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/17/2018
Number of Days to Update: 21

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 06/21/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/06/2018
Date Made Active in Reports: 05/09/2018
Number of Days to Update: 33

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 06/21/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/11/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 35

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/08/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 33

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA Facility List
Cupa facilities

Date of Government Version: 01/26/2018
Date Data Arrived at EDR: 02/02/2018
Date Made Active in Reports: 03/21/2018
Number of Days to Update: 47

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 51

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

TULARE COUNTY:

CUPA Facility List
Cupa program facilities

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/22/2018
Date Made Active in Reports: 04/17/2018
Number of Days to Update: 26

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 08/20/2018
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 58

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 05/09/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 04/26/2018
Date Data Arrived at EDR: 06/13/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 28

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report

Underground storage tank sites located in Yolo county.

Date of Government Version: 06/20/2018
Date Data Arrived at EDR: 07/03/2018
Date Made Active in Reports: 07/12/2018
Number of Days to Update: 9

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List

CUPA facility listing for Yuba County.

Date of Government Version: 05/10/2018
Date Data Arrived at EDR: 05/15/2018
Date Made Active in Reports: 06/15/2018
Number of Days to Update: 31

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 07/24/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/22/2018
Number of Days to Update: 36

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 05/18/2018
Next Scheduled EDR Contact: 08/27/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 04/11/2017
Date Made Active in Reports: 07/27/2017
Number of Days to Update: 107

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/03/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 35

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 05/03/2018
Next Scheduled EDR Contact: 08/13/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 05/21/2018
Next Scheduled EDR Contact: 09/03/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 07/09/2018
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

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GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

K-4 PARCEL AND CACTUS CHANNEL FORMER MAFB
CACTUS AVENUE/HARBOR FREIGHT
MARCH AIR RESERVE BASE, CA 92518

TARGET PROPERTY COORDINATES

Latitude (North):	33.909906 - 33° 54' 35.66''
Longitude (West):	117.256759 - 117° 15' 24.33''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	476263.3
UTM Y (Meters):	3752002.0
Elevation:	1552 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5641312 RIVERSIDE EAST, CA
Version Date:	2012
Northeast Map:	5641326 SUNNYMEAD, CA
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

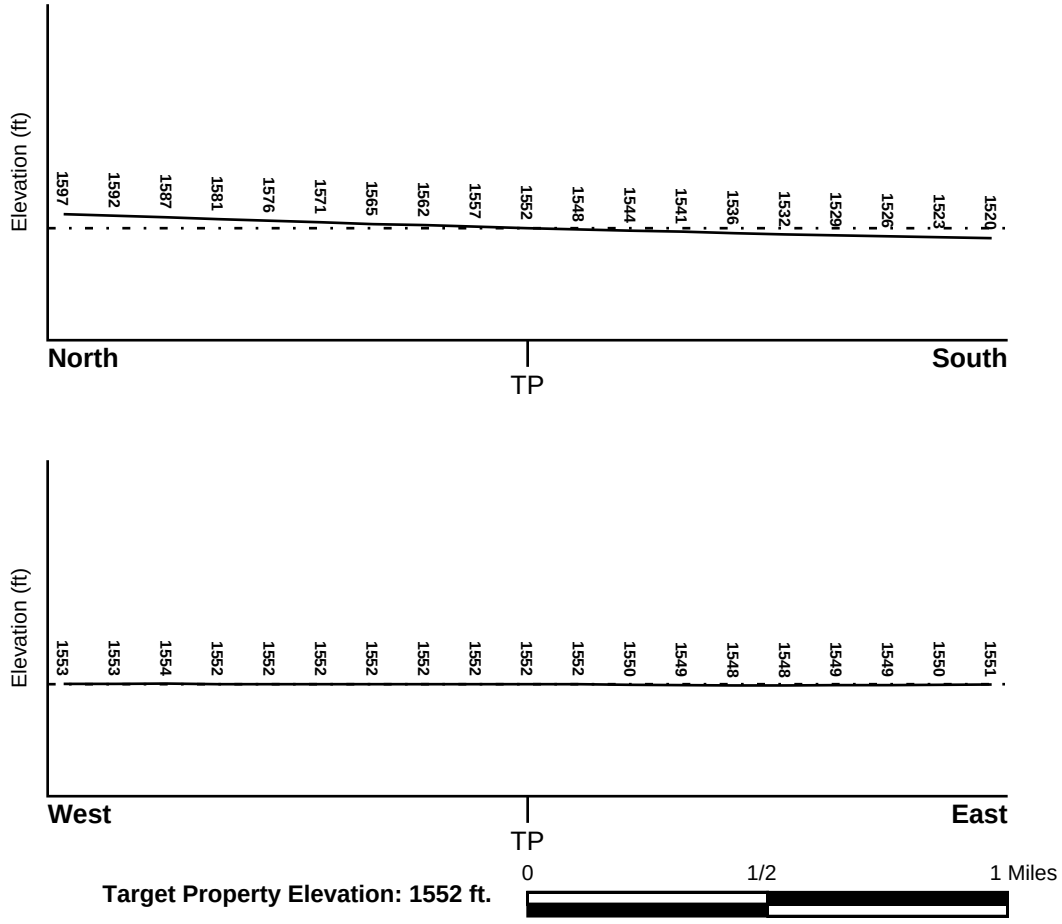
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06065C0745G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06065C0761G	FEMA FIRM Flood data
06065C0765G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
2	1/2 - 1 Mile NNW	Not Reported
1G	1/2 - 1 Mile NNW	Not Reported

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

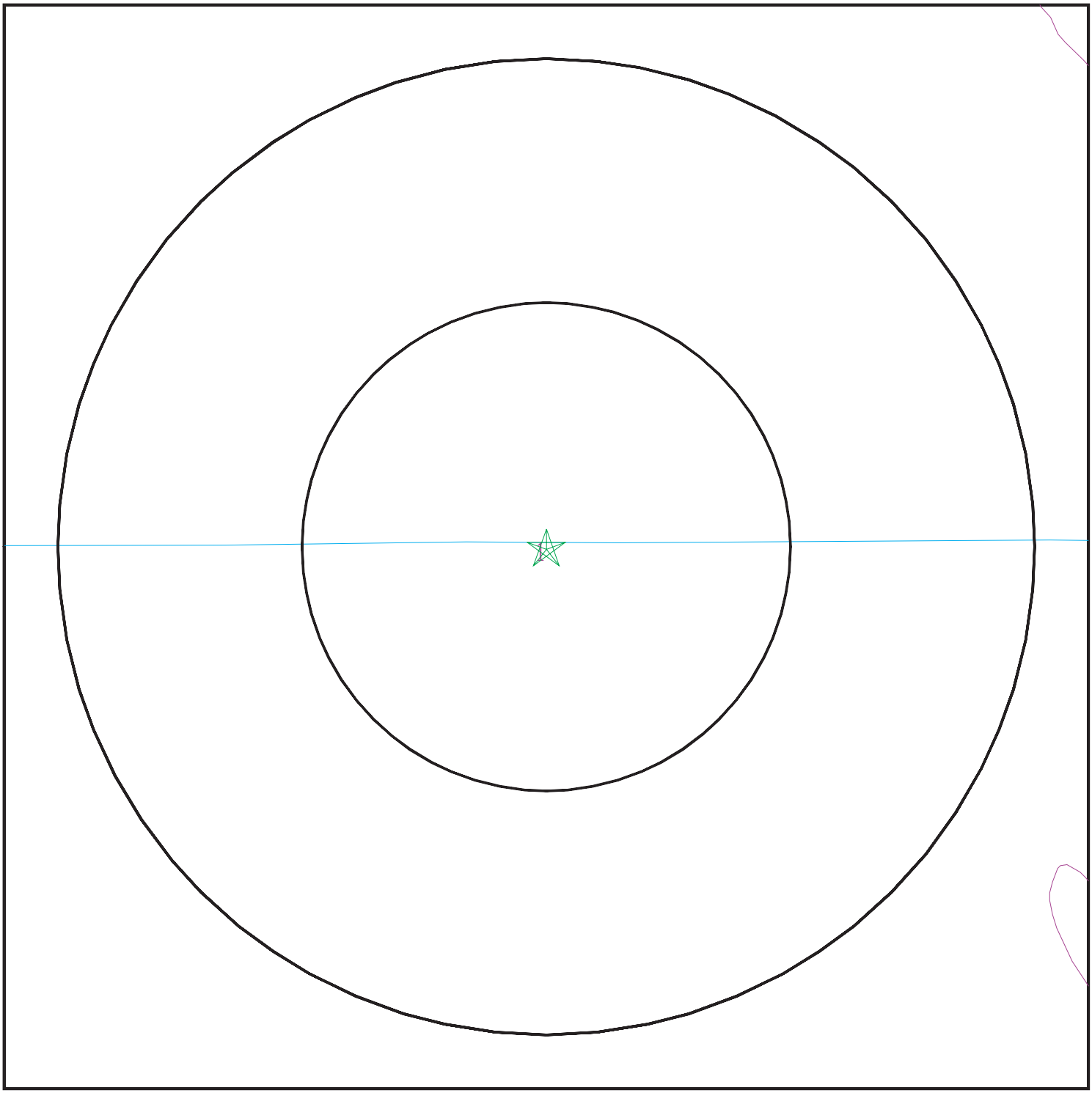
Era:	Mesozoic
System:	Cretaceous
Series:	Cretaceous granitic rocks
Code:	Kg *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Plutonic and Intrusive Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 5378862.2s



Target Property
SSURGO Soil
Water

0 1/16 1/8 1/4 Miles

N

SITE NAME:	K-4 Parcel and Cactus Channel Former MAFB	CLIENT:	LOR Geotechnical Group, Inc.
ADDRESS:	Cactus Avenue/Harbor Freight March Air Reserve Base CA 92518	CONTACT:	Mathew Hunt
LAT/LONG:	33.909906 / 117.256759	INQUIRY #:	5378862.2s
		DATE:	August 01, 2018 12:25 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: MONSERATE

Soil Surface Texture: sandy loam

Hydrologic Group: Class C - Slow infiltration rates. Soils with layers impeding downward movement of water, or soils with moderately fine or fine textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	9 inches	sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 7.3 Min: 6.1
2	9 inches	27 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 4 Min: 1.4	Max: 7.3 Min: 6.1
3	27 inches	44 inches	indurated	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
4	44 inches	57 inches	cemented	Not reported	Not reported	Max: 0.01 Min: 0	Max: Min:
5	57 inches	70 inches	loamy coarse sand	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 14 Min: 4	Max: 8.4 Min: 6.6

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A3	USGS40000138876	1/2 - 1 Mile South
A4	USGS40000138875	1/2 - 1 Mile South
5	USGS40000138874	1/2 - 1 Mile SSE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

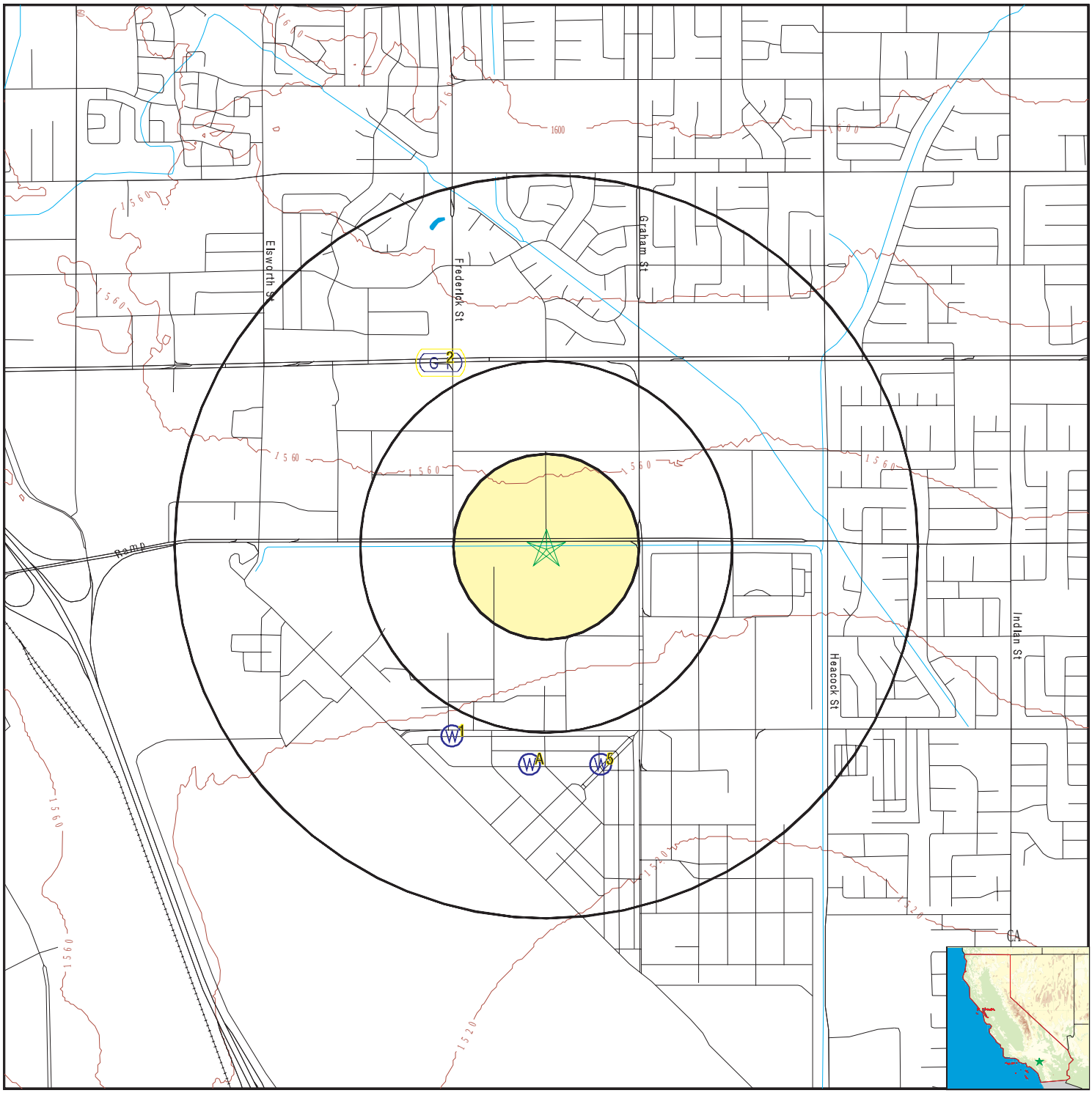
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	3523	1/2 - 1 Mile SSW

PHYSICAL SETTING SOURCE MAP - 5378862.2s



County Boundary
Major Roads
Contour Lines
Earthquake Fault Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

0 1/4 1/2 1 Miles

Groundwater Flow Direction
GI Indeterminate Groundwater Flow at Location
GV Groundwater Flow Varies at Location
HD Closest Hydrogeological Data
Oil, gas or related wells

N

SITE NAME:	K-4 Parcel and Cactus Channel Former MAFB	CLIENT:	LOR Geotechnical Group, Inc.
ADDRESS:	Cactus Avenue/Harbor Freight March Air Reserve Base CA 92518	CONTACT:	Mathew Hunt
LAT/LONG:	33.909906 / 117.256759	INQUIRY #:	5378862.2s
		DATE:	August 01, 2018 12:24 pm

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GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
1 **SSW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**3523**

Water System Information:

Prime Station Code:	03S/04W-24D01 S	User ID:	WAT
FRDS Number:	3310700001	County:	Riverside
District Number:	14	Station Type:	WELL/AMBNT
Water Type:	Well/Groundwater	Well Status:	Abandoned
Source Lat/Long:	335409.0 1171537.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01 - ABANDONED		
System Number:	3310700		
System Name:	MARCH AFB		
Organization That Operates System:			
	722 CES/CC 840 MACDILL,BLD2506 MARCH AFB, CA 92518		
Pop Served:	8186	Connections:	2348
Area Served:	MARCH AFB		

---

2 **NNW** **1/2 - 1 Mile** **Higher**	Site ID:	083302648T	**AQUIFLOW**	**50177**
	Groundwater Flow:	Not Reported		
	Shallow Water Depth:	100		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	08/21/1996		

A3 **South** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS40000138876**

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117152402		
Monloc name:	003S004W24D002S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014064
Longitude:	-117.2575397	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

A4
South **FED USGS** **USGS40000138875**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117152401		
Monloc name:	003S004W24D001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014064
Longitude:	-117.2575397	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

5
SSE **FED USGS** **USGS40000138874**
1/2 - 1 Mile
Lower

Org. Identifier:	USGS-CA		
Formal name:	USGS California Water Science Center		
Monloc Identifier:	USGS-335405117151201		
Monloc name:	003S004W24C001S		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	18070202	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	33.9014065
Longitude:	-117.2542062	Sourcemap scale:	Not Reported
Horiz Acc measure:	Unknown	Horiz Acc measure units:	Unknown
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	California Coastal Basin aquifers		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

1G
NNW
1/2 - 1 Mile
Lower

Site ID:	083302648T
Groundwater Flow:	Not Reported
Shallow Water Depth:	100
Deep Water Depth:	Not Reported
Average Water Depth:	Not Reported
Date:	08/21/1996

AQUIFLOW **50177**

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish & Game
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779
Oil and Gas well locations in the state.

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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HYDROLOGY STUDY

For:

Cactus Avenue K-4 Parcel Industrial

Project Site Location/Address:
Cactus Avenue
Moreno Valley, CA

Prepared For:
Meridian Park LLC
1156 N. Mountain Avenue
Upland, CA 91786
Contact: Timothy Reeves

Lead Agency:
March Joint Powers Authority
14205 Meridian Parkway #140
Riverside, CA 92518

Prepared by:
DRC Engineering, Inc.
160 S. Old Springs Road, Suite 210
Anaheim, CA 92808
(714) 685-6860
Christopher McKee, P.E.

July 11, 2018

Project No. 17-380

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Section I	Introduction
Section II	Hydrology Methodology
Section III	Project Description Pre-Existing Site Conditions Existing Site Conditions Proposed Site Conditions
Section IV	Conclusion
Appendix A	Vicinity Map Soils Map
Appendix B	Existing Hydrology Map Proposed Hydrology Map
Appendix C	Existing Condition 2-year Hydrology Calculation Proposed Condition 2-year Hydrology Calculation Existing Condition 100-year Hydrology Calculation Proposed Condition 100-year Hydrology Calculation
Appendix D	Existing Condition 2-year Hydrograph Proposed Condition 2-year Hydrograph Existing Condition 100-year Hydrograph Proposed Condition 100-year Hydrograph Hydrology Calculations Detention Analysis

Section I Introduction

The following preliminary hydrology study has been prepared for the development of the Meridian Park K-4 Parcel property on the south side of Cactus Avenue, generally between Veterans Way and Frederick Street in the March Joint Powers Authority Jurisdictional Area of Riverside County. The subject site is approximately 35.43 acres. The general location of the site is illustrated on the Vicinity Map, (see Appendix A of this report).

Section II Methodology

For both, the existing and proposed conditions, the peak storm discharge for the drainage sub-areas was calculated using the Riverside County Hydrology Manual. Rational Method Equation (1978 April), using AES Software (Ratscx), was used to calculate the 2-year and 100-year storm event (see calculations in Appendix C). A soil type of C was assigned to the project site based on the Riverside County Flood Control and Water Conservation District Hydrology Manual Hydrologic Soils Group Map Plate C-1.16 (see portion of map in Appendix A). Soil group C is defined as soils having slow infiltration rates when thoroughly wetted and consisting chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission.

The Riverside county unit hydrograph was used to calculate hydrographs for the existing and proposed 2-year and 100-year storms. The existing and proposed condition 2-year runoff volumes and Tc were used in determining the hydromodification conditions of concern. The existing and proposed condition 100-year storm runoff was calculated to size the underground detention system. A detention analysis was calculated using Hydraflow Hydrographs Extension version 6.066 for the proposed 2-year 24 hour and 100-year 24 hour storm events (see calculations in Appendix D).

Section III Project Description

Existing site conditions

The existing site is approximately 35.4 acres of natural open brush. The site is bounded by existing earthen Cactus channel to the north and generally surface flows to the south, onto March Reserve Base. The surface flows from the site, eventually enters the Heacock channel, which is located approximately 1.5 miles to the south east. For study purposes, the site has been divided into three (3) separate drainage subareas, refer to the “Existing Hydrology Map” in Appendix B.

Proposed site Conditions

The proposed development will consist of the construction of paved parking areas, drive aisles, storm drains, utilities, associated landscaping areas, and an approximately ±703,234 SF proposed industrial building. The proposed building finish floor will be sloping 0.5% from north to south. The site will be draining to three separate underground detention systems. The westerly 14.8 acres of the project site will drain to underground detention system 'A'. Detention system 'A' will consist of 14 rows of 750 linear feet of 42" diameter pipe for a total volume provided of 101,042 cf. The central 15.37 acres of the project site will drain to underground detention system 'B'. Detention system 'B' will consist of 13 rows of 685 linear feet of 42" diameter pipe for a total volume provided of 85,693 cf. The easterly 2.47 acres of the project site will drain to underground detention system 'C'. Detention system 'C' will consist of 10 rows of 515 linear feet of 42" diameter pipe for a total volume provided of 49,559 cf. Refer to the "Proposed Hydrology Map" in Appendix B for an illustration of the proposed drainage zones.

The following tables summarize the data and results for the 2-year and 100-year storm in the existing and proposed conditions. All calculations can be found in Appendix C and D of this report

2-YEAR – 24 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	0.76 CFS	2.83 CFS	2.94 CFS	0.46 CFS	6.23 CFS	
Vol. to be Detained	---	64,397 CF	57,475 CF	6,295 CF	126,780 CF	
Flowrate after Detention	---	0.16 CFS	0.37 CFS	0.14 CFS	0.67 CFS	12% Decrease

100-YEAR – 24 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	14.85 CFS	7.44 CFS	7.73 CFS	1.22 CFS	16.37 CFS	
Vol. to be Detained	---	96,028 CF	75,152 CF	13,206 CF	184,386 CF	
Flowrate after Detention	---	6.90 CFS	6.98 CFS	0.90 CFS	14.78 CFS	0.5% Decrease

100-YEAR – 6 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	45.28 CFS	21.28 CFS	22.10 CFS	3.70 CFS	47.08 CFS	
Vol. to be Detained	---	100,865 CF	84,657 CF	15,008 CF	200,530 CF	
Flowrate after Detention	---	20.07 CFS	18.73 CFS	1.85 CFS	40.65 CFS	10% Decrease

100-YEAR – 3 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	51.79 CFS	24.26 CFS	25.20 CFS	4.24 CFS	53.70 CFS	
Vol. to be Detained	---	91,651 CF	81,035 CF	13,392 CF	186,078 CF	
Flowrate after Detention	---	3.04 CFS	12.55 CFS	0.98 CFS	16.57 CFS	68% Decrease

100-YEAR – 1 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	76.40 CFS	34.67 CFS	36.01 CFS	6.89 CFS	77.57 CFS	
Vol. to be Detained	---	56,523 CF	58,033 CF	9,899 CF	124,455 CF	
Flowrate after Detention	---	0.15 CFS	0.37 CFS	0.16 CFS	0.68 CFS	99% Decrease

Proposed site Conditions

The proposed development will consist of the construction of paved parking areas, drive aisles, storm drains, utilities, associated landscaping areas, and an approximately ±703,234 SF proposed industrial building. The proposed building finish floor will be sloping 0.5% from north to south. The site will be draining to three separate underground detention systems. The westerly 14.8 acres of the project site will drain to underground detention system 'A'. Detention system 'A' will consist of 14 rows of 750 linear feet of 42" diameter pipe for a total volume provided of 101,042 cf. The central 15.37 acres of the project site will drain to underground detention system 'B'. Detention system 'B' will consist of 13 rows of 685 linear feet of 42" diameter pipe for a total volume provided of 85,693 cf. The easterly 2.47 acres of the project site will drain to underground detention system 'C'. Detention system 'C' will consist of 10 rows of 515 linear feet of 42" diameter pipe for a total volume provided of 49,559 cf. Refer to the "Proposed Hydrology Map" in Appendix B for an illustration of the proposed drainage zones.

The following tables summarize the data and results for the 2-year and 100-year storm in the existing and proposed conditions. All calculations can be found in Appendix C and D of this report

2-YEAR – 24 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	0.76 CFS	2.83 CFS	2.94 CFS	0.46 CFS	6.23 CFS	
Vol. to be Detained	---	64,397 CF	57,475 CF	6,295 CF	126,780 CF	
Flowrate after Detention	---	0.16 CFS	0.37 CFS	0.14 CFS	0.67 CFS	12% Decrease

100-YEAR – 24 HOUR STORM HYDROGRAPH TABLE

	EXIST. TOTAL	PROP. SYSTEM A	PROP. SYSTEM B	PROP. SYSTEM C	PROP. TOTAL	DIFFERENCE
Flowrate	14.85 CFS	7.44 CFS	7.73 CFS	1.22 CFS	16.37 CFS	
Vol. to be Detained	---	96,028 CF	75,152 CF	13,206 CF	184,386 CF	
Flowrate after Detention	---	6.90 CFS	6.98 CFS	0.90 CFS	14.78 CFS	0.5% Decrease

Section IV Conclusion

The 2-year storm flow rates were calculated using the Riverside county unit hydrograph dividing the project site roughly into 3 portions. For the 2-year storm, the flow rate increases in the proposed condition from 0.76 cfs to 6.23 cfs. Riverside County unit hydrograph was utilized to generate the 2-year hydrographs for the proposed drainage areas. Hydraflow Hydrographs used this hydrograph information to generate a peak discharge rate for the proposed storm drain system. Three proposed underground detention systems will be provided with system DET "1" made of 10,500 feet of parallel 42" storm drain pipes for a total volume of 101,042 cf, system DET 2 made of 8,220 feet of parallel 42" storm drain pipes for a total volume of 85,693 cf, system DET 3 made of 5,150 feet of parallel 42" storm drain pipes for a total volume of 49,559 cf. One 2" orifice will be set at the invert elevation of the system outlet for DET 1, a 3" orifice for DET 2, a 2.50" orifice for DET 3. With the proposed detention system DET 1, the peak discharge rate for the westerly 14.8 acres of the site will be reduced from 2.83 cfs to 0.16 cfs. With the proposed detention system DET 2, the peak discharge rate for the central 15.37 acres of the site will be reduced from 2.94 cfs to 0.37 cfs. With the proposed detention system DET 3, the peak discharge rate for the easterly 2.47 acres of the site will be reduced from 0.46 cfs to 0.14 cfs.

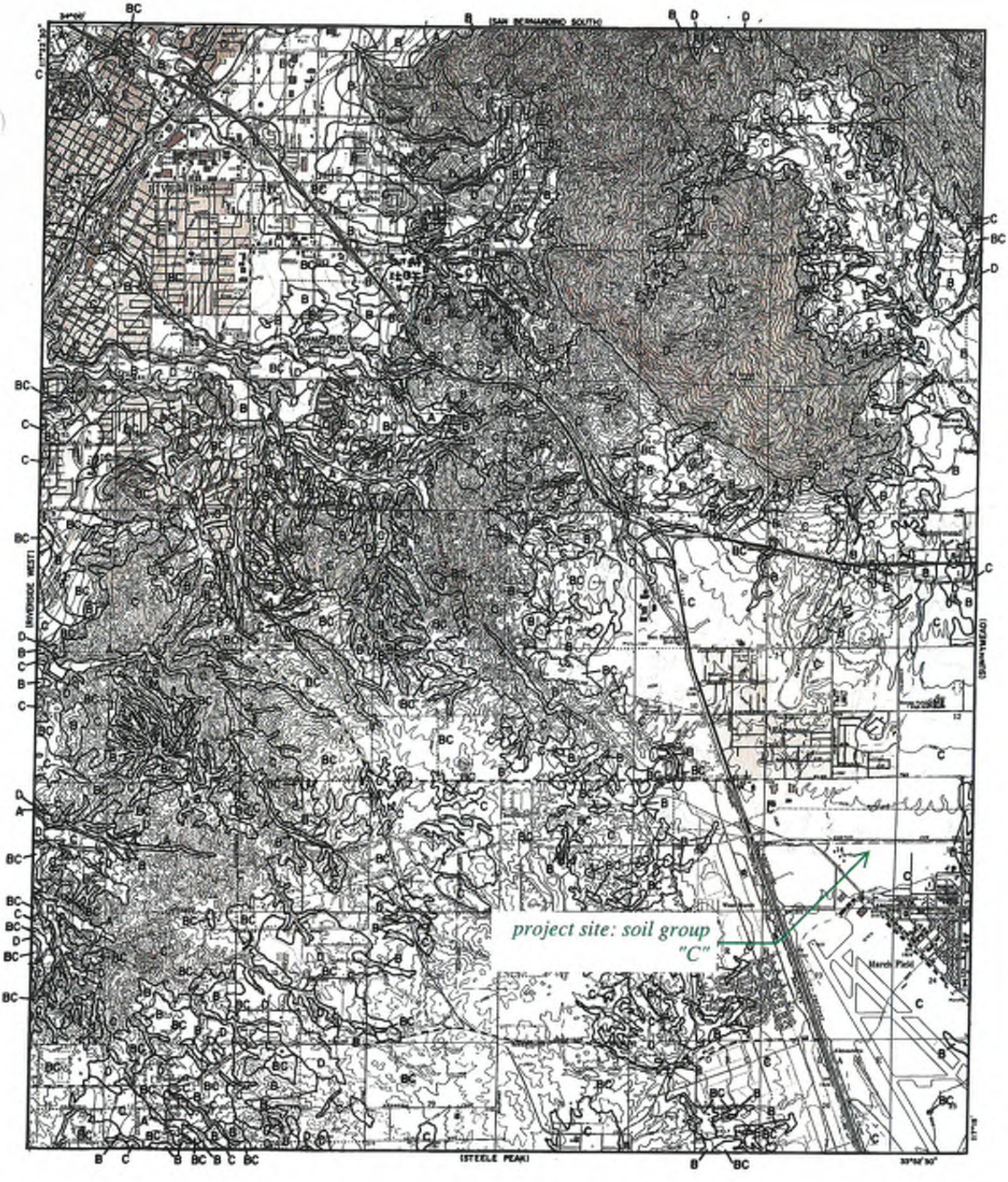
The 100-year storm flow rates were similarly calculated using the Riverside county unit hydrograph and Hydraflow Hydrographs dividing the project site roughly into three portions. For the 100-year storm, the total flow rate increases in the proposed condition from 14.85 cfs to 16.37 cfs. Three proposed underground detention systems will be provided with system DET 1 made of 10,500 feet of parallel 42" storm drain pipes for a total volume of 101,042 cf, system DET 2 made of 8,220 feet of parallel 42" storm drain pipes for a total volume of 85,693 cf, system DET 3 made of 5,150 feet of parallel 42" storm drain pipes for a total volume of 49,559 cf, and system. One 2" orifice will be set at the invert elevation of the system outlet for DET 1, a 3" orifice for DET 2, a 2.50" orifice for DET 3. With the proposed detention system DET 1, the peak discharge rate for the westerly 14.8 acres of the site will be reduced from 7.44 cfs to 6.90 cfs. With the proposed detention system DET 2, the peak discharge rate for the central 15.37 acres of the site will be reduced from 7.73 cfs to 6.98 cfs. With the proposed detention system DET 3, the peak discharge rate for the easterly 2.47 acres of the site will be reduced from 1.22 cfs to 0.90 cfs. The total reduced flow rate is 14.78 cfs, which is less than the existing flow rate of 14.85 cfs.

The site will have three separate underground detention systems consisting of a series of parallel 42" storm drain pipes (DET 1, DET 2 and DET 3). In the proposed condition, the low flows will outlet from the detention system to a Modular Wetlands treatment system. For systems DET 1 DET 2 and DET 3, the high flows will bypass the treatment system and outlet to the existing Cactus channel or proposed RCB channel. The development of this site will contain measures to control the peak flows and will not have a negative impact on downstream facilities.

APPENDIX A

VICINITY MAP





LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

HYDROLOGY MANUAL

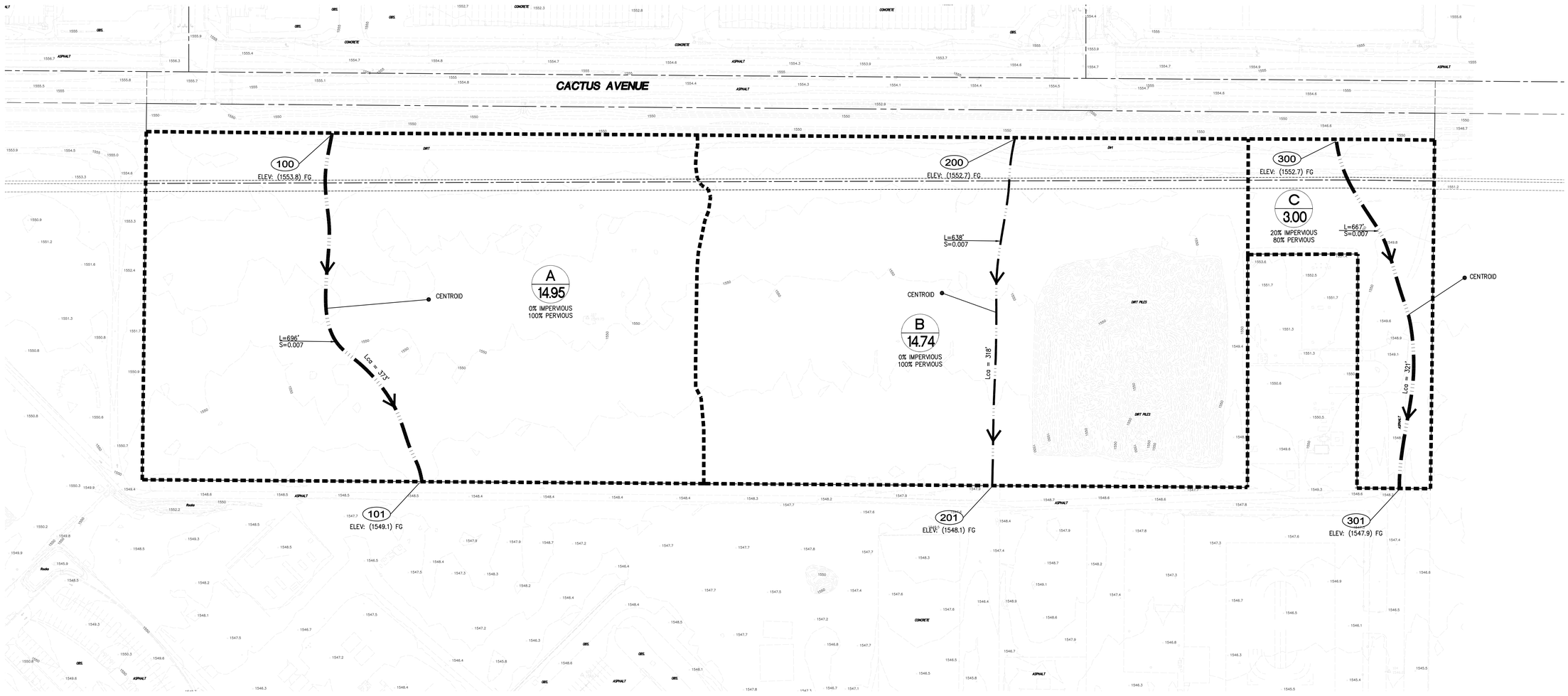
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE–EAST

PLATE C–1.16

APPENDIX B

Existing Hydrology Map
Proposed Hydrology Map



LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- X / 0.74 — DRAINAGE SUBAREA DESIGNATION / DRAINAGE SUBAREA IN ACRES
- 216 — NODE NUMBER

DISTURBED AREA = 32.69 ACRES

TOTAL IMPERVIOUS AREA = 0 ACRES (0%)
TOTAL PERVIOUS AREA = 32.69 ACRES (100%)

TOTAL Q2 = 11.77 CFS
TOTAL Q100 = 34.04 CFS

SCALE IN FEET
0 40 80 160 240
SCALE: 1" = 80'

160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

CHRISTOPHER MCKEE R.C.E. 74414 DATE

NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. 74414 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

DATE:

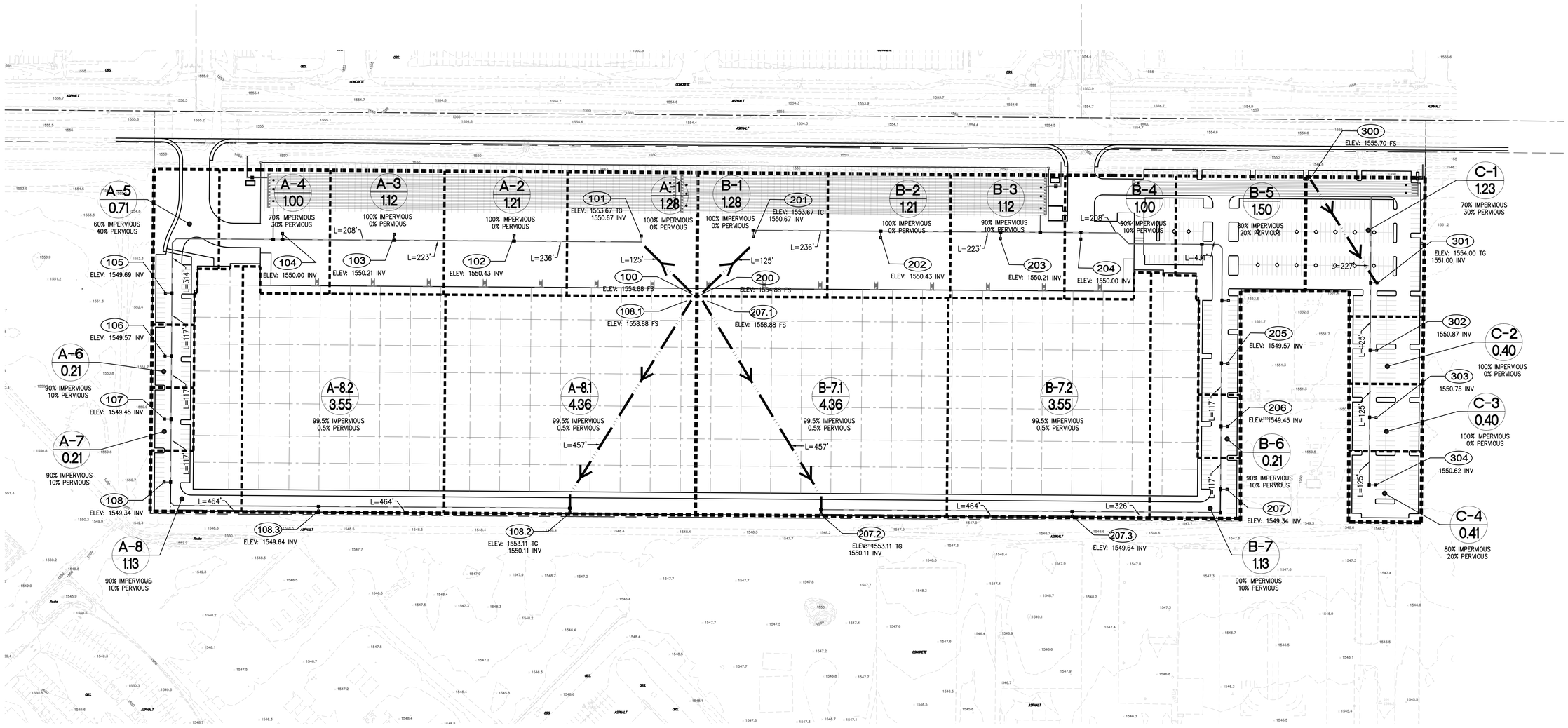
NO.: REVISION:

PROJECT: K-4 PARCEL INDUSTRIAL
CACTUS AVENUE
M.P.A, CALIFORNIA

DRAWING NAME: EXISTING HYDROLOGY MAP

ISSUE:	HYDROLOGY
DATE:	05/16/18
CHECKED: CM	DRAWN: WXC
DRAWING FILE:	16070HMPR
PROJECT NO.:	17-380
SHEET NUMBER:	1
OF	1 SHEETS
SCALE:	AS SHOWN

EXTERNAL REFERENCES: gfc_ca_storm 16-070 MA 17-380ab101 17-380 redwdg101
FILENAME: M:\2017\17-380 Lewis K4 Sec Moreno Valley\Hydrology\1380 HMEX.dwg, LAST SAVED ON: Jul 12 2018 9:38am, PLOTTED BY: MKING, ON: Jul 12 2018 9:39am, CFG:



LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- X / 0.74 — DRAINAGE SUBAREA DESIGNATION / DRAINAGE SUBAREA IN ACRES
- 216 — NODE NUMBER
- LANDSCAPE AREA
- STORM DRAIN PIPE

DISTURBED AREA = 32.6 ACRES

TOTAL IMPERVIOUS AREA = 29.42 ACRES (90%)
TOTAL PERVIOUS AREA = 3.27 ACRES (10%)

TOTAL Q2 = 38.16 CFS
TOTAL Q100 = 87.26 CFS

N

SCALE IN FEET
0 40 80 160 240
SCALE: 1" = 80'

NOT FOR CONSTRUCTION

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Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860
R.C.E. 74414
CHRISTOPHER MCKEE

PROFESSIONAL ENGINEER — CHRISTOPHER MCKEE — No. 74414 — Exp. 6-30-19 — CIVIL — STATE OF CALIFORNIA

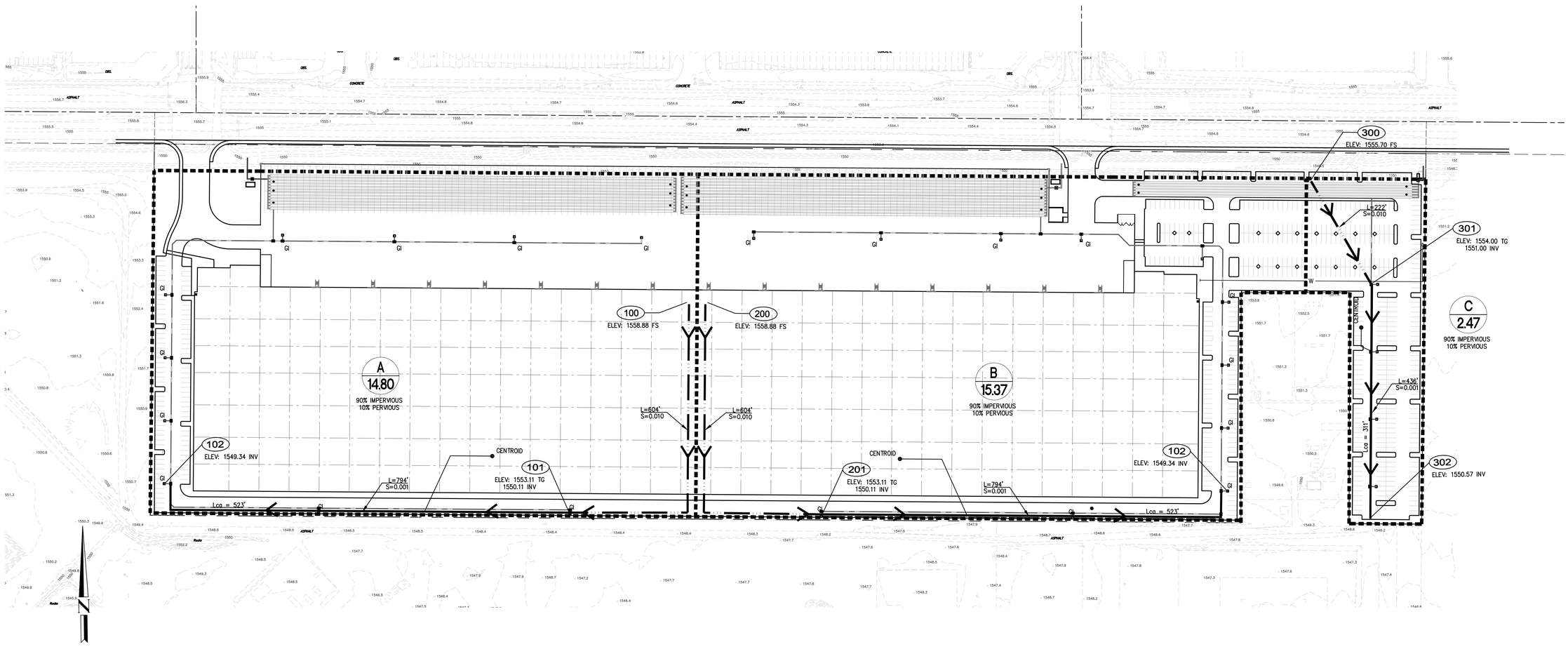
NO.:	REVISION:	DATE:

PROJECT: **MERIDIAN PARK SOUTH**
KRAMERIA AVENUE
RIVERSIDE, CALIFORNIA

DRAWING NAME: **PROPOSED HYDROLOGY MAP**

ISSUE:	HYDROLOGY
DATE:	10/13/16
CHECKED: CM	DRAWN: PB
DRAWING FILE:	16070HMPR
PROJECT NO.:	16-070
SHEET NUMBER:	1
OF	1 SHEETS
SCALE:	AS SHOWN

EXTERNAL REFERENCES: gr'_ca_stamp 16-070 MA 16-070 C1-Offsite 16070 bndy_XH 16-070 UTMA01 17-380 reshydy101 17380 mst01 17-380st101 17380 utm101 17380 sg102
FILENAME: M:\2017\17-380 Lewis MX Site Moreno Valley\Hydrology\M Parcel\17380 HMPR-Historical.dwg, LAST SAVED On: Aug 01 2018 3:24pm PLOTTED BY: MARNEC, On: Aug 01 2018 3:26pm, CFG:



DISTURBED AREA = 32.69 ACRES

TOTAL IMPERVIOUS AREA = 29.42 ACRES (90%)
TOTAL PERVIOUS AREA = 3.27 ACRES (10%)

TOTAL Q2 = 11.77 CFS
TOTAL Q100 = 34.04 CFS

LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- X / 0.74 — DRAINAGE SUBAREA DESIGNATION / DRAINAGE SUBAREA IN ACRES
- 216 — NODE NUMBER
- STORM DRAIN PIPE

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Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

R.C.E. 74414
CHRISTOPHER MCKEE
DATE

NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER — CHRISTOPHER MCKEE — No. 74414 — Exp. 6-30-19 — CIVIL — STATE OF CALIFORNIA

NO.:	REVISION:	DATE:

PROJECT: **K-4 PARCEL INDUSTRIAL**
CACTUS AVENUE
M.P.A, CALIFORNIA

DRAWING NAME: **PROPOSED HYDROLOGY MAP**

ISSUE:	HYDROLOGY
DATE:	5/21/18
CHECKED: CM	DRAWN: WC
DRAWING FILE: 17380HMPR	
PROJECT NO.: 17-380	
SHEET NUMBER: 1	
OF 1 SHEETS	
SCALE: AS SHOWN	

EXTERNAL REFERENCES: gr-_ca_storm 17-380 redwdy01 17380 ma101 17-380alt101 17380 utma101 17380 cg102 17300 CT101 17300 BT 17-300bndy01 17300 MA101 17300 STMA101 17300 UTMA101
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APPENDIX C

Existing Condition 2-year Hydrology Calculation
Proposed Condition 2-year Hydrology Calculation
Existing Condition 100-year Hydrology Calculation
Proposed Condition 100-year Hydrology Calculation

```
**********************************************************************************
      RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
    RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
          (RCFC&WCD)  1978 HYDROLOGY MANUAL
    (c) Copyright 1982-2015 Advanced Engineering Software (aes)
          (Rational Tabling Version 22.0)
        Release Date: 07/01/2015  License ID 1510

            Analysis prepared by:

            DRC Engineering, Inc.
        160 South Old Springs Road, Suite 210
            Anaheim Hills, CA 92808
              714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 17-380                                                                  *
* EXISTING CONDITION                                                      *
* 2-YEAR STORM                                                            *
 **************************************************************************

 FILE NAME: C:\DATA\380E2Y.DAT
 TIME/DATE OF STUDY: 08:52 05/17/2018
--------------------------------------------------------------------------
 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
 USER SPECIFIED STORM EVENT(YEAR) =    2.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
 10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
 10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
 100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
 100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
 SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
 SLOPE OF INTENSITY DURATION CURVE = 0.5004
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
     AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
 *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
   HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
```

```
   WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)   SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
=== ===== ========= ================== ====== ===== ====== ===== =======
 1  30.0    20.0   0.018/0.018/0.020  0.67    2.00 0.0312 0.167 0.0150

 GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
  1. Relative Flow-Depth =  0.00 FEET
    as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
 *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
  OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   696.00
 UPSTREAM ELEVATION(FEET) =   1553.80
 DOWNSTREAM ELEVATION(FEET) =   1549.10
 ELEVATION DIFFERENCE(FEET) =     4.70
 TC = 0.937*[(  696.00**3)/(    4.70)]**.2 =   34.920
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.727
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4934
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     5.36
 TOTAL AREA(ACRES) =    14.95   TOTAL RUNOFF(CFS) =     5.36

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   683.00
 UPSTREAM ELEVATION(FEET) =   1552.70
 DOWNSTREAM ELEVATION(FEET) =   1548.10
 ELEVATION DIFFERENCE(FEET) =     4.60
 TC = 0.937*[(  683.00**3)/(    4.60)]**.2 =   34.676
```

```
 2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.729
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4942
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     5.31
 TOTAL AREA(ACRES) =    14.74   TOTAL RUNOFF(CFS) =     5.31

****************************************************************************
 FLOW PROCESS FROM NODE   300.00 TO NODE   301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  667.00
 UPSTREAM ELEVATION(FEET) =  1552.70
 DOWNSTREAM ELEVATION(FEET) =  1547.90
 ELEVATION DIFFERENCE(FEET) =     4.80
 TC = 0.937*[(  667.00**3)/(    4.80)]**.2 =  33.896
  2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.738
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .4967
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     1.10
 TOTAL AREA(ACRES) =     3.00   TOTAL RUNOFF(CFS) =     1.10
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)    =      3.0  TC(MIN.) =    33.90
 PEAK FLOW RATE(CFS)  =      1.10
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
      RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
    RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
          (RCFC&WCD)  1978 HYDROLOGY MANUAL
    (c) Copyright 1982-2015 Advanced Engineering Software (aes)
          (Rational Tabling Version 22.0)
        Release Date: 07/01/2015  License ID 1510

            Analysis prepared by:

             DRC Engineering, Inc.
          160 South Old Springs Road, Suite 210
             Anaheim Hills, CA 92808
               714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 17-380                                                                  *
* PROPOSED CONDITION                                                      *
* 2-YEAR STORM                                                            *
 **************************************************************************

 FILE NAME: C:\DATA\380P2Y.DAT
 TIME/DATE OF STUDY: 13:45 05/17/2018
------------------------------------------------------------------------
 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
 USER SPECIFIED STORM EVENT(YEAR) =    2.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
 10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
 100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
 100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
 SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.554
 SLOPE OF INTENSITY DURATION CURVE = 0.5004
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
     AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
 *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
   HALF-  CROWN TO  STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
```

```
   WIDTH  CROSSFALL  IN- / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)   SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
=== ===== ========= ================== ====== ===== ====== ===== =======
 1  30.0    20.0   0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

 GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
  1. Relative Flow-Depth =  0.00 FEET
    as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
 *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 UPSTREAM ELEVATION(FEET) =   1554.88
 DOWNSTREAM ELEVATION(FEET) =   1553.67
 ELEVATION DIFFERENCE(FEET) =      1.21
 TC = 0.303*[(  125.00**3)/(    1.21)]**.2 =   5.287
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.869
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8782
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      2.10
 TOTAL AREA(ACRES) =      1.28   TOTAL RUNOFF(CFS) =     2.10

****************************************************************************
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.67  DOWNSTREAM(FEET) =  1550.43
 FLOW LENGTH(FEET) =   236.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  1.96
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =      2.10
 PIPE TRAVEL TIME(MIN.) =  2.00    Tc(MIN.) =   7.29
```

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 361.00 FEET.

****

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==========

2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.592

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8754

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 1.69

TOTAL AREA(ACRES) = 2.5 TOTAL RUNOFF(CFS) = 3.79

TC(MIN.) = 7.29

****

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

==========

ELEVATION DATA: UPSTREAM(FEET) = 1550.43 DOWNSTREAM(FEET) = 1550.21

FLOW LENGTH(FEET) = 223.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 2.23

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 3.79

PIPE TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 8.96

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 584.00 FEET.

****

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==========

2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.436

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8735

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 1.12 SUBAREA RUNOFF(CFS) = 1.40

TOTAL AREA(ACRES) = 3.6 TOTAL RUNOFF(CFS) = 5.19

TC(MIN.) = 8.96

****

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.21  DOWNSTREAM(FEET) = 1550.00
 FLOW LENGTH(FEET) =  208.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.44
 ESTIMATED PIPE DIAMETER(INCH) = 24.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     5.19
 PIPE TRAVEL TIME(MIN.) =  1.42   Tc(MIN.) =  10.37
 LONGEST FLOWPATH FROM NODE   100.00 TO NODE   104.00 =    792.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   104.00 TO NODE   104.00 IS CODE = 81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.334
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8721
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   1.00  SUBAREA RUNOFF(CFS) =   1.16
 TOTAL AREA(ACRES) =      4.6  TOTAL RUNOFF(CFS) =     6.36
 TC(MIN.) =  10.37

****************************************************************************
 FLOW PROCESS FROM NODE   104.00 TO NODE   105.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.00  DOWNSTREAM(FEET) = 1549.69
 FLOW LENGTH(FEET) =  314.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.50
 ESTIMATED PIPE DIAMETER(INCH) = 24.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     6.36
 PIPE TRAVEL TIME(MIN.) =  2.09   Tc(MIN.) =  12.47
 LONGEST FLOWPATH FROM NODE   100.00 TO NODE   105.00 =   1106.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   105.00 TO NODE   105.00 IS CODE = 81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.217
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8703
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.71  SUBAREA RUNOFF(CFS) =   0.75
 TOTAL AREA(ACRES) =      5.3  TOTAL RUNOFF(CFS) =     7.11
 TC(MIN.) =  12.47

****************************************************************************
 FLOW PROCESS FROM NODE   105.00 TO NODE   106.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1549.69  DOWNSTREAM(FEET) = 1549.57
 FLOW LENGTH(FEET) =  117.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.66
 ESTIMATED PIPE DIAMETER(INCH) = 27.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     7.11
 PIPE TRAVEL TIME(MIN.) =  0.73   Tc(MIN.) =  13.20
 LONGEST FLOWPATH FROM NODE   100.00 TO NODE   106.00 =   1223.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   106.00 TO NODE   106.00 IS CODE = 81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.183
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8697
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.21  SUBAREA RUNOFF(CFS) =   0.22
 TOTAL AREA(ACRES) =      5.5  TOTAL RUNOFF(CFS) =     7.32
 TC(MIN.) =  13.20

****************************************************************************
 FLOW PROCESS FROM NODE   106.00 TO NODE   107.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1549.57  DOWNSTREAM(FEET) = 1549.45
 FLOW LENGTH(FEET) =  117.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.67
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =      7.32
 PIPE TRAVEL TIME(MIN.) =  0.73    Tc(MIN.) =  13.93
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.151
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8692
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.21
 TOTAL AREA(ACRES) =       5.7   TOTAL RUNOFF(CFS) =      7.53
 TC(MIN.) =  13.93

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.45  DOWNSTREAM(FEET) =  1549.31
 FLOW LENGTH(FEET) =  117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.77
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =      7.53
 PIPE TRAVEL TIME(MIN.) =  0.71    Tc(MIN.) =  14.63
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1457.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.123
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8687
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.13   SUBAREA RUNOFF(CFS) =    1.10
 TOTAL AREA(ACRES) =       6.9   TOTAL RUNOFF(CFS) =      8.64
 TC(MIN.) =  14.63
```

```
 ****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
 ----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
 ============================================================================

 ****************************************************************************
  FLOW PROCESS FROM NODE    108.10 TO NODE    108.20 IS CODE =  21
 ----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ============================================================================
       ASSUMED INITIAL SUBAREA UNIFORM
       DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   457.00
  UPSTREAM ELEVATION(FEET) =   1558.88
  DOWNSTREAM ELEVATION(FEET) =   1553.11
  ELEVATION DIFFERENCE(FEET) =     5.77
  TC = 0.303*[(  457.00**3)/(    5.77)]**.2 =    8.420
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.481
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8741
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     5.64
  TOTAL AREA(ACRES) =     4.36   TOTAL RUNOFF(CFS) =     5.64

 ****************************************************************************
  FLOW PROCESS FROM NODE    108.20 TO NODE    108.30 IS CODE =  31
 ----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.11  DOWNSTREAM(FEET) =  1549.64
  FLOW LENGTH(FEET) =   464.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  2.48
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =  1
  PIPE-FLOW(CFS) =     5.64
  PIPE TRAVEL TIME(MIN.) =  3.11    Tc(MIN.) =  11.53
  LONGEST FLOWPATH FROM NODE    108.10 TO NODE    108.30 =    921.00 FEET.

 ****************************************************************************
  FLOW PROCESS FROM NODE    108.30 TO NODE    108.30 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.265
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8711
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =  3.55  SUBAREA RUNOFF(CFS) =  3.91
 TOTAL AREA(ACRES) =    7.9  TOTAL RUNOFF(CFS) =    9.56
 TC(MIN.) =  11.53

****************************************************************************
 FLOW PROCESS FROM NODE   108.30 TO NODE   108.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1549.64  DOWNSTREAM(FEET) = 1549.34
 FLOW LENGTH(FEET) =  326.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.74
 ESTIMATED PIPE DIAMETER(INCH) = 30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    9.56
 PIPE TRAVEL TIME(MIN.) =  1.98   Tc(MIN.) =  13.52
 LONGEST FLOWPATH FROM NODE   108.10 TO NODE   108.00 =   1247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   108.00 TO NODE   108.00 IS CODE = 11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
  1      9.56  13.52     1.169      7.91
LONGEST FLOWPATH FROM NODE   108.10 TO NODE   108.00 =   1247.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
STREAM    RUNOFF    Tc    INTENSITY    AREA
NUMBER    (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
  1      8.64  14.63     1.123      6.87
LONGEST FLOWPATH FROM NODE   100.00 TO NODE   108.00 =   1457.00 FEET.

****************************WARNING*************************************
IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
```

WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.

****

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	17.53	13.52	1.169
2	17.82	14.63	1.123

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 17.53 Tc(MIN.) = 13.52
TOTAL AREA(ACRES) = 14.8

****

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<

==========

****

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 13

>>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

==========

****

FLOW PROCESS FROM NODE 200.00 TO NODE 201.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

==========

ASSUMED INITIAL SUBAREA UNIFORM
DEVELOPMENT IS COMMERCIAL
TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
INITIAL SUBAREA FLOW-LENGTH(FEET) = 125.00
UPSTREAM ELEVATION(FEET) = 1554.88
DOWNSTREAM ELEVATION(FEET) = 1553.67
ELEVATION DIFFERENCE(FEET) = 1.21
TC = 0.303*[(125.00**3)/(1.21)]**.2 = 5.287
2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.869
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8782
SOIL CLASSIFICATION IS "C"
SUBAREA RUNOFF(CFS) = 2.10
TOTAL AREA(ACRES) = 1.28 TOTAL RUNOFF(CFS) = 2.10

```
 ****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
 ----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.67  DOWNSTREAM(FEET) =  1550.43
  FLOW LENGTH(FEET) =   236.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   1.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      2.10
  PIPE TRAVEL TIME(MIN.) =   2.00    Tc(MIN.) =    7.29
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     361.00 FEET.

 ****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.592
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8754
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    1.21   SUBAREA RUNOFF(CFS) =    1.69
  TOTAL AREA(ACRES) =       2.5   TOTAL RUNOFF(CFS) =      3.79
  TC(MIN.) =    7.29

 ****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
 ----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.43  DOWNSTREAM(FEET) =  1550.21
  FLOW LENGTH(FEET) =   223.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.23
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.79
  PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =     584.00 FEET.

 ****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
```

```
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.436
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8735
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    1.12   SUBAREA RUNOFF(CFS) =    1.40
  TOTAL AREA(ACRES) =       3.6   TOTAL RUNOFF(CFS) =      5.19
  TC(MIN.) =   8.96

 ****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
 ----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.21  DOWNSTREAM(FEET) =  1550.00
  FLOW LENGTH(FEET) =   208.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      5.19
  PIPE TRAVEL TIME(MIN.) =   1.42    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    204.00 =     792.00 FEET.

 ****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  81
 ----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 ============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.334
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8721
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    1.16
  TOTAL AREA(ACRES) =       4.6   TOTAL RUNOFF(CFS) =      6.36
  TC(MIN.) =   10.37

 ****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
 ----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.00  DOWNSTREAM(FEET) =  1549.57
```

```
 FLOW LENGTH(FEET) =  431.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.51
 ESTIMATED PIPE DIAMETER(INCH) =  24.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     6.36
 PIPE TRAVEL TIME(MIN.) =  2.86   Tc(MIN.) =  13.23
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   205.00 =   1223.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   205.00 TO NODE   205.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.181
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8697
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   1.50  SUBAREA RUNOFF(CFS) =   1.54
 TOTAL AREA(ACRES) =      6.1  TOTAL RUNOFF(CFS) =     7.90
 TC(MIN.) =  13.23

****************************************************************************
 FLOW PROCESS FROM NODE   205.00 TO NODE   206.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.57  DOWNSTREAM(FEET) =  1549.45
 FLOW LENGTH(FEET) =  117.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.71
 ESTIMATED PIPE DIAMETER(INCH) =  27.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     7.90
 PIPE TRAVEL TIME(MIN.) =  0.72   Tc(MIN.) =  13.95
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   206.00 =   1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   206.00 TO NODE   206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.150
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8692
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.21  SUBAREA RUNOFF(CFS) =   0.21
```

```
 TOTAL AREA(ACRES) =      6.3  TOTAL RUNOFF(CFS) =     8.11
 TC(MIN.) =  13.95

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.45  DOWNSTREAM(FEET) =  1549.34
 FLOW LENGTH(FEET) =  117.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.62
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     8.11
 PIPE TRAVEL TIME(MIN.) =  0.74    Tc(MIN.) =  14.70
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    207.00 =    1457.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.121
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8687
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.13  SUBAREA RUNOFF(CFS) =    1.10
 TOTAL AREA(ACRES) =      7.5  TOTAL RUNOFF(CFS) =     9.21
 TC(MIN.) =  14.70

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    207.10 TO NODE    207.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  457.00
 UPSTREAM ELEVATION(FEET) =  1558.88
 DOWNSTREAM ELEVATION(FEET) =  1553.11
 ELEVATION DIFFERENCE(FEET) =    5.77
 TC = 0.303*[(  457.00**3)/(    5.77)]**.2 =   8.420
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.481
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8741
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =    5.64
 TOTAL AREA(ACRES) =    4.36  TOTAL RUNOFF(CFS) =    5.64

****************************************************************************
 FLOW PROCESS FROM NODE   207.20 TO NODE   207.30 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.11  DOWNSTREAM(FEET) =  1547.64
 FLOW LENGTH(FEET) =  464.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  4.64
 ESTIMATED PIPE DIAMETER(INCH) =  18.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    5.64
 PIPE TRAVEL TIME(MIN.) =  1.67   Tc(MIN.) =  10.09
 LONGEST FLOWPATH FROM NODE   207.10 TO NODE   207.30 =   921.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   207.30 TO NODE   207.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.353
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8724
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   3.55  SUBAREA RUNOFF(CFS) =   4.19
 TOTAL AREA(ACRES) =     7.9  TOTAL RUNOFF(CFS) =    9.84
 TC(MIN.) =  10.09

****************************************************************************
 FLOW PROCESS FROM NODE   207.30 TO NODE   207.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =  1549.64  DOWNSTREAM(FEET) =  1549.34
 FLOW LENGTH(FEET) =  326.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.75
 ESTIMATED PIPE DIAMETER(INCH) =  30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     9.84
 PIPE TRAVEL TIME(MIN.) =  1.97   Tc(MIN.) =  12.06
 LONGEST FLOWPATH FROM NODE   207.10 TO NODE   207.00 =   1247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   207.00 TO NODE   207.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM    RUNOFF    Tc    INTENSITY    AREA
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
   1       9.84   12.06      1.237       7.91
 LONGEST FLOWPATH FROM NODE   207.10 TO NODE   207.00 =   1247.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM    RUNOFF    Tc    INTENSITY    AREA
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
   1       9.21   14.70      1.121       7.45
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   207.00 =   1457.00 FEET.

************************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF    Tc    INTENSITY
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)
   1      17.39    12.06      1.237
   2      18.12    14.70      1.121

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   17.39  Tc(MIN.) =  12.06
 TOTAL AREA(ACRES) =   15.4

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   227.00
 UPSTREAM ELEVATION(FEET) =   1555.70
 DOWNSTREAM ELEVATION(FEET) =   1554.00
 ELEVATION DIFFERENCE(FEET) =      1.70
 TC = 0.303*[(  227.00**3)/(    1.70)]**.2 =    7.065
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.617
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8757
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      1.74
 TOTAL AREA(ACRES) =      1.23   TOTAL RUNOFF(CFS) =      1.74

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1551.00  DOWNSTREAM(FEET) =  1550.87
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  1.86
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =      1.74
 PIPE TRAVEL TIME(MIN.) =  1.12    Tc(MIN.) =    8.18
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     352.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.502
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8743
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.40   SUBAREA RUNOFF(CFS) =   0.53
 TOTAL AREA(ACRES) =       1.6   TOTAL RUNOFF(CFS) =      2.27
 TC(MIN.) =   8.18

****************************************************************************
 FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.87  DOWNSTREAM(FEET) =  1550.75
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   1.95
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      2.27
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   9.25
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    303.00 =    477.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    303.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.413
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8732
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.40   SUBAREA RUNOFF(CFS) =   0.49
 TOTAL AREA(ACRES) =       2.0   TOTAL RUNOFF(CFS) =      2.76
 TC(MIN.) =   9.25

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.75  DOWNSTREAM(FEET) = 1550.62
 FLOW LENGTH(FEET) =  125.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.09
 ESTIMATED PIPE DIAMETER(INCH) = 18.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     2.76
 PIPE TRAVEL TIME(MIN.) =  1.00   Tc(MIN.) =  10.25
 LONGEST FLOWPATH FROM NODE   300.00 TO NODE   304.00 =    602.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   304.00 TO NODE   304.00 IS CODE = 81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) = 1.343
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8722
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.41  SUBAREA RUNOFF(CFS) =   0.48
 TOTAL AREA(ACRES) =      2.4  TOTAL RUNOFF(CFS) =     3.24
 TC(MIN.) =  10.25

****************************************************************************
 FLOW PROCESS FROM NODE   304.00 TO NODE   305.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.62  DOWNSTREAM(FEET) = 1550.57
 FLOW LENGTH(FEET) =   77.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  1.83
 ESTIMATED PIPE DIAMETER(INCH) = 21.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     3.24
 PIPE TRAVEL TIME(MIN.) =  0.70   Tc(MIN.) =  10.95
 LONGEST FLOWPATH FROM NODE   300.00 TO NODE   305.00 =    679.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)    =      2.4  TC(MIN.) =    10.95
 PEAK FLOW RATE(CFS)  =      3.24
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
      RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
    RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
          (RCFC&WCD)  1978 HYDROLOGY MANUAL
    (c) Copyright 1982-2015 Advanced Engineering Software (aes)
          (Rational Tabling Version 22.0)
        Release Date: 07/01/2015  License ID 1510

            Analysis prepared by:

            DRC Engineering, Inc.
        160 South Old Springs Road, Suite 210
            Anaheim Hills, CA 92808
              714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 17-380                                        *
* EXISTING CONDITION                              *
* 100-YEAR STORM                                *
**************************************************************************

 FILE NAME: C:\DATA\380E100Y.DAT
 TIME/DATE OF STUDY: 09:02 05/17/2018
--------------------------------------------------------------------------
 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
 USER SPECIFIED STORM EVENT(YEAR) =  100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
 10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
 10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
 100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
 100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
 SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT =  100.00  1-HOUR INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5001
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
     AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
 *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
   HALF-  CROWN TO  STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
```

```
   WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)   SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
=== ===== ========= ================== ====== ===== ====== ===== =======
 1  30.0    20.0   0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

 GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
  1. Relative Flow-Depth =  0.00 FEET
    as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
 *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   696.00
 UPSTREAM ELEVATION(FEET) =   1553.80
 DOWNSTREAM ELEVATION(FEET) =   1549.10
 ELEVATION DIFFERENCE(FEET) =     4.70
 TC = 0.937*[(  696.00**3)/(    4.70)]**.2 =   34.920
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.573
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6518
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =    15.33
 TOTAL AREA(ACRES) =    14.95   TOTAL RUNOFF(CFS) =    15.33

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   638.00
 UPSTREAM ELEVATION(FEET) =   1552.70
 DOWNSTREAM ELEVATION(FEET) =   1548.10
 ELEVATION DIFFERENCE(FEET) =     4.60
 TC = 0.937*[(  638.00**3)/(    4.60)]**.2 =   33.286
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.611
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6561
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =    15.58
 TOTAL AREA(ACRES) =    14.74   TOTAL RUNOFF(CFS) =    15.58

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   667.00
 UPSTREAM ELEVATION(FEET) =   1552.70
 DOWNSTREAM ELEVATION(FEET) =   1547.90
 ELEVATION DIFFERENCE(FEET) =     4.80
 TC = 0.937*[(  667.00**3)/(    4.80)]**.2 =   33.896
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.597
 UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6545
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     3.13
 TOTAL AREA(ACRES) =     3.00   TOTAL RUNOFF(CFS) =     3.13
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)    =      3.0  TC(MIN.) =    33.90
 PEAK FLOW RATE(CFS)  =     3.13
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
      RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
    RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
          (RCFC&WCD)  1978 HYDROLOGY MANUAL
    (c) Copyright 1982-2015 Advanced Engineering Software (aes)
          (Rational Tabling Version 22.0)
        Release Date: 07/01/2015  License ID 1510

            Analysis prepared by:

            DRC Engineering, Inc.
        160 South Old Springs Road, Suite 210
            Anaheim Hills, CA 92808
              714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* 17-380                                                                  *
* PROPOSED CONDITION                                                      *
* 100-YEAR STORM                                                          *
**************************************************************************

 FILE NAME: C:\DATA\380P100Y.DAT
 TIME/DATE OF STUDY: 14:03 05/17/2018
--------------------------------------------------------------------------
 USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
 USER SPECIFIED STORM EVENT(YEAR) =  100.00
 SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
 SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
 10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.010
 10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.820
 100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.940
 100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5003939
 SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5001161
 COMPUTED RAINFALL INTENSITY DATA:
 STORM EVENT =  100.00  1-HOUR INTENSITY(INCH/HOUR) =  1.200
 SLOPE OF INTENSITY DURATION CURVE = 0.5001
 RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
 NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
     AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
 *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
   HALF-  CROWN TO  STREET-CROSSFALL:  CURB  GUTTER-GEOMETRIES:  MANNING
```

```
   WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)   SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
=== ===== ========= ================== ====== ===== ====== ===== =======
 1  30.0    20.0   0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

 GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
  1. Relative Flow-Depth =  0.00 FEET
    as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
  2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
 *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
 OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
 FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 UPSTREAM ELEVATION(FEET) =   1554.88
 DOWNSTREAM ELEVATION(FEET) =   1553.67
 ELEVATION DIFFERENCE(FEET) =     1.21
 TC = 0.303*[(  125.00**3)/(    1.21)]**.2 =   5.287
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.044
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     4.60
 TOTAL AREA(ACRES) =     1.28   TOTAL RUNOFF(CFS) =     4.60

****************************************************************************
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.67  DOWNSTREAM(FEET) =  1550.43
 FLOW LENGTH(FEET) =  236.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.33
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     4.60
 PIPE TRAVEL TIME(MIN.) =  1.69    Tc(MIN.) =   6.98
```

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 361.00 FEET.

****

FLOW PROCESS FROM NODE 102.00 TO NODE 102.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.520

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 1.21 SUBAREA RUNOFF(CFS) = 3.78

TOTAL AREA(ACRES) = 2.5 TOTAL RUNOFF(CFS) = 8.38

TC(MIN.) = 6.98

****

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

==

ELEVATION DATA: UPSTREAM(FEET) = 1550.43 DOWNSTREAM(FEET) = 1550.21

FLOW LENGTH(FEET) = 223.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 2.69

ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 8.38

PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 8.36

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 584.00 FEET.

****

FLOW PROCESS FROM NODE 103.00 TO NODE 103.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.216

COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8859

SOIL CLASSIFICATION IS "C"

SUBAREA AREA(ACRES) = 1.12 SUBAREA RUNOFF(CFS) = 3.19

TOTAL AREA(ACRES) = 3.6 TOTAL RUNOFF(CFS) = 11.57

TC(MIN.) = 8.36

****

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 31

```
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.21  DOWNSTREAM(FEET) =  1550.00
 FLOW LENGTH(FEET) =   208.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.93
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     11.57
 PIPE TRAVEL TIME(MIN.) =  1.18    Tc(MIN.) =   9.54
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    104.00 =    792.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.010
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.00   SUBAREA RUNOFF(CFS) =    2.66
 TOTAL AREA(ACRES) =       4.6   TOTAL RUNOFF(CFS) =     14.23
 TC(MIN.) =   9.54

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.00  DOWNSTREAM(FEET) =  1549.69
 FLOW LENGTH(FEET) =   314.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  3.08
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     14.23
 PIPE TRAVEL TIME(MIN.) =  1.70    Tc(MIN.) =   11.24
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    105.00 =   1106.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.773
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8840
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.71   SUBAREA RUNOFF(CFS) =    1.74
 TOTAL AREA(ACRES) =       5.3   TOTAL RUNOFF(CFS) =     15.97
 TC(MIN.) =  11.24

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.69  DOWNSTREAM(FEET) =  1549.57
 FLOW LENGTH(FEET) =  117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  3.17
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     15.97
 PIPE TRAVEL TIME(MIN.) =  0.62    Tc(MIN.) =  11.86
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    106.00 =    1223.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.700
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.50
 TOTAL AREA(ACRES) =       5.5   TOTAL RUNOFF(CFS) =     16.47
 TC(MIN.) =  11.86

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.57  DOWNSTREAM(FEET) =  1549.45
 FLOW LENGTH(FEET) =  117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  27.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  3.17
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.47
 PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   12.47
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    107.00 =    1340.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.632
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8833
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.49
 TOTAL AREA(ACRES) =       5.7   TOTAL RUNOFF(CFS) =     16.96
 TC(MIN.) =   12.47

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.45  DOWNSTREAM(FEET) =  1549.31
 FLOW LENGTH(FEET) =   117.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.41
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     16.96
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.04
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1457.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.574
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.13   SUBAREA RUNOFF(CFS) =    2.57
 TOTAL AREA(ACRES) =       6.9   TOTAL RUNOFF(CFS) =     19.53
 TC(MIN.) =   13.04
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    108.10 TO NODE    108.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   457.00
 UPSTREAM ELEVATION(FEET) =   1558.88
 DOWNSTREAM ELEVATION(FEET) =   1553.11
 ELEVATION DIFFERENCE(FEET) =     5.77
 TC = 0.303*[(  457.00**3)/(    5.77)]**.2 =    8.420
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =    12.37
 TOTAL AREA(ACRES) =     4.36  TOTAL RUNOFF(CFS) =    12.37

****************************************************************************
 FLOW PROCESS FROM NODE    108.20 TO NODE    108.30 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.11  DOWNSTREAM(FEET) =  1549.64
 FLOW LENGTH(FEET) =   464.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.95
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    12.37
 PIPE TRAVEL TIME(MIN.) =  2.62    Tc(MIN.) =  11.04
 LONGEST FLOWPATH FROM NODE    108.10 TO NODE    108.30 =    921.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.30 TO NODE    108.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.798
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8841
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   3.55   SUBAREA RUNOFF(CFS) =   8.78
 TOTAL AREA(ACRES) =      7.9   TOTAL RUNOFF(CFS) =    21.16
 TC(MIN.) =  11.04

****************************************************************************
 FLOW PROCESS FROM NODE    108.30 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1549.64  DOWNSTREAM(FEET) =  1549.34
 FLOW LENGTH(FEET) =  326.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  3.31
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    21.16
 PIPE TRAVEL TIME(MIN.) =  1.64    Tc(MIN.) =  12.68
 LONGEST FLOWPATH FROM NODE    108.10 TO NODE    108.00 =    1247.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM    RUNOFF     Tc     INTENSITY    AREA
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
   1      21.16   12.68      2.611       7.91
 LONGEST FLOWPATH FROM NODE    108.10 TO NODE    108.00 =    1247.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM    RUNOFF     Tc     INTENSITY    AREA
 NUMBER     (CFS)   (MIN.)  (INCH/HOUR)  (ACRE)
   1      19.53   13.04      2.574       6.87
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    108.00 =    1457.00 FEET.

****************************WARNING*************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
```

```
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF     Tc     INTENSITY
 NUMBER    (CFS)   (MIN.)  (INCH/HOUR)
   1      40.14    12.68      2.611
   2      40.39    13.04      2.574

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =   40.14  Tc(MIN.) =  12.68
 TOTAL AREA(ACRES) =   14.8

 ****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

 ****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  125.00
 UPSTREAM ELEVATION(FEET) =  1554.88
 DOWNSTREAM ELEVATION(FEET) =  1553.67
 ELEVATION DIFFERENCE(FEET) =     1.21
 TC = 0.303*[(  125.00**3)/(    1.21)]**.2 =   5.287
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.044
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8884
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     4.60
 TOTAL AREA(ACRES) =     1.28   TOTAL RUNOFF(CFS) =     4.60
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.67  DOWNSTREAM(FEET) =  1550.43
 FLOW LENGTH(FEET) =   236.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.33
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      4.60
 PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =    6.98
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    361.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.520
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8869
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    1.21   SUBAREA RUNOFF(CFS) =    3.78
 TOTAL AREA(ACRES) =       2.5   TOTAL RUNOFF(CFS) =      8.38
 TC(MIN.) =    6.98

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.43  DOWNSTREAM(FEET) =  1550.21
 FLOW LENGTH(FEET) =   223.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.69
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      8.38
 PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =    8.36
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    203.00 =    584.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  81
```

```
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.216
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8859
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =  1.12  SUBAREA RUNOFF(CFS) =  3.19
 TOTAL AREA(ACRES) =    3.6  TOTAL RUNOFF(CFS) =   11.57
 TC(MIN.) =  8.36

************************************************************************
 FLOW PROCESS FROM NODE   203.00 TO NODE   204.00 IS CODE = 31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.21  DOWNSTREAM(FEET) = 1550.00
 FLOW LENGTH(FEET) =  208.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.93
 ESTIMATED PIPE DIAMETER(INCH) = 30.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =   11.57
 PIPE TRAVEL TIME(MIN.) =  1.18   Tc(MIN.) =  9.54
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   204.00 =   792.00 FEET.

************************************************************************
 FLOW PROCESS FROM NODE   204.00 TO NODE   204.00 IS CODE = 81
------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
========================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 3.010
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8851
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =  1.00  SUBAREA RUNOFF(CFS) =  2.66
 TOTAL AREA(ACRES) =    4.6  TOTAL RUNOFF(CFS) =   14.23
 TC(MIN.) =  9.54

************************************************************************
 FLOW PROCESS FROM NODE   204.00 TO NODE   205.00 IS CODE = 31
------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
========================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1550.00  DOWNSTREAM(FEET) = 1549.57
```

FLOW LENGTH(FEET) = 431.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.09
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 14.23
PIPE TRAVEL TIME(MIN.) = 2.32 Tc(MIN.) = 11.87
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 205.00 = 1223.00 FEET.

****

FLOW PROCESS FROM NODE 205.00 TO NODE 205.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==========

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.699
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8837
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 1.50 SUBAREA RUNOFF(CFS) = 3.58
TOTAL AREA(ACRES) = 6.1 TOTAL RUNOFF(CFS) = 17.81
TC(MIN.) = 11.87

****

FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

==========

ELEVATION DATA: UPSTREAM(FEET) = 1549.57 DOWNSTREAM(FEET) = 1549.45
FLOW LENGTH(FEET) = 117.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.31
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.81
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 12.45
LONGEST FLOWPATH FROM NODE 200.00 TO NODE 206.00 = 1340.00 FEET.

****

FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

==========

100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.634
COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8833
SOIL CLASSIFICATION IS "C"
SUBAREA AREA(ACRES) = 0.21 SUBAREA RUNOFF(CFS) = 0.49

```
 TOTAL AREA(ACRES) =      6.3  TOTAL RUNOFF(CFS) =    18.30
 TC(MIN.) =  12.45

****************************************************************************
 FLOW PROCESS FROM NODE   206.00 TO NODE   207.00 IS CODE = 31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) = 1549.45  DOWNSTREAM(FEET) = 1549.34
 FLOW LENGTH(FEET) =  117.00  MANNING'S N = 0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  3.20
 ESTIMATED PIPE DIAMETER(INCH) = 36.00   NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    18.30
 PIPE TRAVEL TIME(MIN.) =  0.61   Tc(MIN.) =  13.06
 LONGEST FLOWPATH FROM NODE   200.00 TO NODE   207.00 =   1457.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   207.00 TO NODE   207.00 IS CODE = 81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 2.572
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8830
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   1.13  SUBAREA RUNOFF(CFS) =   2.57
 TOTAL AREA(ACRES) =      7.5  TOTAL RUNOFF(CFS) =    20.86
 TC(MIN.) =  13.06

****************************************************************************
 FLOW PROCESS FROM NODE   207.00 TO NODE   207.00 IS CODE = 10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   207.10 TO NODE   207.20 IS CODE = 21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
     ASSUMED INITIAL SUBAREA UNIFORM
     DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  457.00
 UPSTREAM ELEVATION(FEET) =  1558.88
 DOWNSTREAM ELEVATION(FEET) =  1553.11
 ELEVATION DIFFERENCE(FEET) =    5.77
 TC = 0.303*[(  457.00**3)/(    5.77)]**.2 =   8.420
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.204
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8858
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =    12.37
 TOTAL AREA(ACRES) =     4.36  TOTAL RUNOFF(CFS) =    12.37

****************************************************************************
 FLOW PROCESS FROM NODE    207.20 TO NODE    207.30 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.11  DOWNSTREAM(FEET) =  1547.64
 FLOW LENGTH(FEET) =  464.00  MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  5.65
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =    12.37
 PIPE TRAVEL TIME(MIN.) =  1.37   Tc(MIN.) =   9.79
 LONGEST FLOWPATH FROM NODE    207.10 TO NODE    207.30 =    921.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    207.30 TO NODE    207.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.972
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8849
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   3.55  SUBAREA RUNOFF(CFS) =   9.33
 TOTAL AREA(ACRES) =      7.9  TOTAL RUNOFF(CFS) =    21.71
 TC(MIN.) =   9.79

****************************************************************************
 FLOW PROCESS FROM NODE    207.30 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

ELEVATION DATA: UPSTREAM(FEET) = 1549.64 DOWNSTREAM(FEET) = 1549.34
FLOW LENGTH(FEET) = 326.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.33
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.71
PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 11.42
LONGEST FLOWPATH FROM NODE 207.10 TO NODE 207.00 = 1247.00 FEET.

****

FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	21.71	11.42	2.751	7.91

LONGEST FLOWPATH FROM NODE 207.10 TO NODE 207.00 = 1247.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (ACRE)
1	20.86	13.06	2.572	7.45

LONGEST FLOWPATH FROM NODE 200.00 TO NODE 207.00 = 1457.00 FEET.

**********WARNING**********

IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.

****

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	39.95	11.42	2.751
2	41.16	13.06	2.572

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 39.95 Tc(MIN.) = 11.42
TOTAL AREA(ACRES) = 15.4

****

```
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
      ASSUMED INITIAL SUBAREA UNIFORM
      DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   227.00
 UPSTREAM ELEVATION(FEET) =   1555.70
 DOWNSTREAM ELEVATION(FEET) =   1554.00
 ELEVATION DIFFERENCE(FEET) =     1.70
 TC = 0.303*[(  227.00**3)/(    1.70)]**.2 =    7.065
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.498
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8868
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     3.82
 TOTAL AREA(ACRES) =     1.23   TOTAL RUNOFF(CFS) =     3.82

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1551.00  DOWNSTREAM(FEET) =  1550.87
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.28
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     3.82
 PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =    7.98
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =    352.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE   302.00 TO NODE   302.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.292
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8861
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.40   SUBAREA RUNOFF(CFS) =   1.17
 TOTAL AREA(ACRES) =      1.6   TOTAL RUNOFF(CFS) =     4.98
 TC(MIN.) =   7.98

****************************************************************************
 FLOW PROCESS FROM NODE   302.00 TO NODE   303.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.87  DOWNSTREAM(FEET) =  1550.75
 FLOW LENGTH(FEET) =  125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  2.37
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =  1
 PIPE-FLOW(CFS) =     4.98
 PIPE TRAVEL TIME(MIN.) =  0.88    Tc(MIN.) =   8.86
 LONGEST FLOWPATH FROM NODE   300.00 TO NODE   303.00 =    477.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   303.00 TO NODE   303.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.124
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8855
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =   0.40   SUBAREA RUNOFF(CFS) =   1.11
 TOTAL AREA(ACRES) =      2.0   TOTAL RUNOFF(CFS) =     6.09
 TC(MIN.) =   8.86

****************************************************************************
 FLOW PROCESS FROM NODE   303.00 TO NODE   304.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.75  DOWNSTREAM(FEET) =  1550.62
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.54
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      6.09
 PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    9.68
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    304.00 =    602.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.989
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8850
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.41   SUBAREA RUNOFF(CFS) =    1.08
 TOTAL AREA(ACRES) =       2.4   TOTAL RUNOFF(CFS) =      7.17
 TC(MIN.) =    9.68

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1550.62  DOWNSTREAM(FEET) =  1550.57
 FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.20
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      7.17
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   10.26
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    305.00 =    679.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)    =       2.4  TC(MIN.) =    10.26
 PEAK FLOW RATE(CFS)  =      7.17
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

APPENDIX D

Existing Condition 2-year Hydrograph
Proposed Condition 2-year Hydrograph
Existing Condition 100-year Hydrograph
Proposed Condition 100-year Hydrograph
Hydrology Calculations
Detention Analysis

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E2YR24HRA242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDTION AREA A
2 YEAR 24 HOUR
AREA A

Drainage Area = 14.95(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.95(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 696.00(Ft.)
Length along longest watercourse measured to centroid = 373.00(Ft.)
Length along longest watercourse = 0.132 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 4.70(Ft.)
Slope along watercourse = 35.6552 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.062 Hr.
Lag time = 3.71 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	1.70	25.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	3.90	58.30

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.950	85.00	0.000

Total Area Entered = 14.95(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	70.0	0.362	0.000	0.362	1.000	0.362

Sum (F) = 0.362
Area averaged mean soil loss (F) (In/Hr) = 0.362
Minimum soil loss rate ((In/Hr)) = 0.181
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time	% of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	134.943	29.353	4.423
2	0.167	269.886	48.019	7.235
3	0.250	404.829	12.148	1.830
4	0.333	539.772	5.387	0.812
5	0.417	674.715	2.930	0.441
6	0.500	809.658	2.163	0.326
		Sum = 100.000	Sum=	15.067

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.08	0.07	0.014	(0.642)	0.012	0.001
2 0.17	0.07	0.014	(0.639)	0.012	0.001
3 0.25	0.07	0.014	(0.637)	0.012	0.001
4 0.33	0.10	0.020	(0.634)	0.018	0.002
5 0.42	0.10	0.020	(0.632)	0.018	0.002
6 0.50	0.10	0.020	(0.629)	0.018	0.002
7 0.58	0.10	0.020	(0.627)	0.018	0.002
8 0.67	0.10	0.020	(0.624)	0.018	0.002
9 0.75	0.10	0.020	(0.622)	0.018	0.002
10 0.83	0.13	0.027	(0.620)	0.024	0.003
11 0.92	0.13	0.027	(0.617)	0.024	0.003
12 1.00	0.13	0.027	(0.615)	0.024	0.003
13 1.08	0.10	0.020	(0.612)	0.018	0.002
14 1.17	0.10	0.020	(0.610)	0.018	0.002
15 1.25	0.10	0.020	(0.607)	0.018	0.002
16 1.33	0.10	0.020	(0.605)	0.018	0.002
17 1.42	0.10	0.020	(0.603)	0.018	0.002
18 1.50	0.10	0.020	(0.600)	0.018	0.002
19 1.58	0.10	0.020	(0.598)	0.018	0.002
20 1.67	0.10	0.020	(0.595)	0.018	0.002
21 1.75	0.10	0.020	(0.593)	0.018	0.002
22 1.83	0.13	0.027	(0.591)	0.024	0.003
23 1.92	0.13	0.027	(0.588)	0.024	0.003
24 2.00	0.13	0.027	(0.586)	0.024	0.003
25 2.08	0.13	0.027	(0.583)	0.024	0.003

26	2.17	0.13	0.027	(0.581)	0.024	0.003
27	2.25	0.13	0.027	(0.579)	0.024	0.003
28	2.33	0.13	0.027	(0.576)	0.024	0.003
29	2.42	0.13	0.027	(0.574)	0.024	0.003
30	2.50	0.13	0.027	(0.572)	0.024	0.003
31	2.58	0.17	0.034	(0.569)	0.031	0.003
32	2.67	0.17	0.034	(0.567)	0.031	0.003
33	2.75	0.17	0.034	(0.565)	0.031	0.003
34	2.83	0.17	0.034	(0.562)	0.031	0.003
35	2.92	0.17	0.034	(0.560)	0.031	0.003
36	3.00	0.17	0.034	(0.558)	0.031	0.003
37	3.08	0.17	0.034	(0.555)	0.031	0.003
38	3.17	0.17	0.034	(0.553)	0.031	0.003
39	3.25	0.17	0.034	(0.551)	0.031	0.003
40	3.33	0.17	0.034	(0.549)	0.031	0.003
41	3.42	0.17	0.034	(0.546)	0.031	0.003
42	3.50	0.17	0.034	(0.544)	0.031	0.003
43	3.58	0.17	0.034	(0.542)	0.031	0.003
44	3.67	0.17	0.034	(0.539)	0.031	0.003
45	3.75	0.17	0.034	(0.537)	0.031	0.003
46	3.83	0.20	0.041	(0.535)	0.037	0.004
47	3.92	0.20	0.041	(0.533)	0.037	0.004
48	4.00	0.20	0.041	(0.530)	0.037	0.004
49	4.08	0.20	0.041	(0.528)	0.037	0.004
50	4.17	0.20	0.041	(0.526)	0.037	0.004
51	4.25	0.20	0.041	(0.524)	0.037	0.004
52	4.33	0.23	0.048	(0.521)	0.043	0.005
53	4.42	0.23	0.048	(0.519)	0.043	0.005
54	4.50	0.23	0.048	(0.517)	0.043	0.005
55	4.58	0.23	0.048	(0.515)	0.043	0.005
56	4.67	0.23	0.048	(0.513)	0.043	0.005
57	4.75	0.23	0.048	(0.510)	0.043	0.005
58	4.83	0.27	0.054	(0.508)	0.049	0.005
59	4.92	0.27	0.054	(0.506)	0.049	0.005
60	5.00	0.27	0.054	(0.504)	0.049	0.005
61	5.08	0.20	0.041	(0.502)	0.037	0.004
62	5.17	0.20	0.041	(0.499)	0.037	0.004
63	5.25	0.20	0.041	(0.497)	0.037	0.004
64	5.33	0.23	0.048	(0.495)	0.043	0.005
65	5.42	0.23	0.048	(0.493)	0.043	0.005
66	5.50	0.23	0.048	(0.491)	0.043	0.005
67	5.58	0.27	0.054	(0.489)	0.049	0.005
68	5.67	0.27	0.054	(0.486)	0.049	0.005
69	5.75	0.27	0.054	(0.484)	0.049	0.005

70	5.83	0.27	0.054	(0.482)	0.049	0.005
71	5.92	0.27	0.054	(0.480)	0.049	0.005
72	6.00	0.27	0.054	(0.478)	0.049	0.005
73	6.08	0.30	0.061	(0.476)	0.055	0.006
74	6.17	0.30	0.061	(0.474)	0.055	0.006
75	6.25	0.30	0.061	(0.471)	0.055	0.006
76	6.33	0.30	0.061	(0.469)	0.055	0.006
77	6.42	0.30	0.061	(0.467)	0.055	0.006
78	6.50	0.30	0.061	(0.465)	0.055	0.006
79	6.58	0.33	0.068	(0.463)	0.061	0.007
80	6.67	0.33	0.068	(0.461)	0.061	0.007
81	6.75	0.33	0.068	(0.459)	0.061	0.007
82	6.83	0.33	0.068	(0.457)	0.061	0.007
83	6.92	0.33	0.068	(0.455)	0.061	0.007
84	7.00	0.33	0.068	(0.453)	0.061	0.007
85	7.08	0.33	0.068	(0.451)	0.061	0.007
86	7.17	0.33	0.068	(0.449)	0.061	0.007
87	7.25	0.33	0.068	(0.447)	0.061	0.007
88	7.33	0.37	0.075	(0.445)	0.067	0.007
89	7.42	0.37	0.075	(0.442)	0.067	0.007
90	7.50	0.37	0.075	(0.440)	0.067	0.007
91	7.58	0.40	0.082	(0.438)	0.073	0.008
92	7.67	0.40	0.082	(0.436)	0.073	0.008
93	7.75	0.40	0.082	(0.434)	0.073	0.008
94	7.83	0.43	0.088	(0.432)	0.080	0.009
95	7.92	0.43	0.088	(0.430)	0.080	0.009
96	8.00	0.43	0.088	(0.428)	0.080	0.009
97	8.08	0.50	0.102	(0.426)	0.092	0.010
98	8.17	0.50	0.102	(0.424)	0.092	0.010
99	8.25	0.50	0.102	(0.422)	0.092	0.010
100	8.33	0.50	0.102	(0.420)	0.092	0.010
101	8.42	0.50	0.102	(0.419)	0.092	0.010
102	8.50	0.50	0.102	(0.417)	0.092	0.010
103	8.58	0.53	0.109	(0.415)	0.098	0.011
104	8.67	0.53	0.109	(0.413)	0.098	0.011
105	8.75	0.53	0.109	(0.411)	0.098	0.011
106	8.83	0.57	0.116	(0.409)	0.104	0.012
107	8.92	0.57	0.116	(0.407)	0.104	0.012
108	9.00	0.57	0.116	(0.405)	0.104	0.012
109	9.08	0.63	0.129	(0.403)	0.116	0.013
110	9.17	0.63	0.129	(0.401)	0.116	0.013
111	9.25	0.63	0.129	(0.399)	0.116	0.013
112	9.33	0.67	0.136	(0.397)	0.122	0.014
113	9.42	0.67	0.136	(0.395)	0.122	0.014

114	9.50	0.67	0.136	(0.393)	0.122	0.014
115	9.58	0.70	0.143	(0.392)	0.129	0.014
116	9.67	0.70	0.143	(0.390)	0.129	0.014
117	9.75	0.70	0.143	(0.388)	0.129	0.014
118	9.83	0.73	0.150	(0.386)	0.135	0.015
119	9.92	0.73	0.150	(0.384)	0.135	0.015
120	10.00	0.73	0.150	(0.382)	0.135	0.015
121	10.08	0.50	0.102	(0.380)	0.092	0.010
122	10.17	0.50	0.102	(0.379)	0.092	0.010
123	10.25	0.50	0.102	(0.377)	0.092	0.010
124	10.33	0.50	0.102	(0.375)	0.092	0.010
125	10.42	0.50	0.102	(0.373)	0.092	0.010
126	10.50	0.50	0.102	(0.371)	0.092	0.010
127	10.58	0.67	0.136	(0.369)	0.122	0.014
128	10.67	0.67	0.136	(0.368)	0.122	0.014
129	10.75	0.67	0.136	(0.366)	0.122	0.014
130	10.83	0.67	0.136	(0.364)	0.122	0.014
131	10.92	0.67	0.136	(0.362)	0.122	0.014
132	11.00	0.67	0.136	(0.360)	0.122	0.014
133	11.08	0.63	0.129	(0.359)	0.116	0.013
134	11.17	0.63	0.129	(0.357)	0.116	0.013
135	11.25	0.63	0.129	(0.355)	0.116	0.013
136	11.33	0.63	0.129	(0.353)	0.116	0.013
137	11.42	0.63	0.129	(0.352)	0.116	0.013
138	11.50	0.63	0.129	(0.350)	0.116	0.013
139	11.58	0.57	0.116	(0.348)	0.104	0.012
140	11.67	0.57	0.116	(0.346)	0.104	0.012
141	11.75	0.57	0.116	(0.345)	0.104	0.012
142	11.83	0.60	0.122	(0.343)	0.110	0.012
143	11.92	0.60	0.122	(0.341)	0.110	0.012
144	12.00	0.60	0.122	(0.340)	0.110	0.012
145	12.08	0.83	0.170	(0.338)	0.153	0.017
146	12.17	0.83	0.170	(0.336)	0.153	0.017
147	12.25	0.83	0.170	(0.335)	0.153	0.017
148	12.33	0.87	0.177	(0.333)	0.159	0.018
149	12.42	0.87	0.177	(0.331)	0.159	0.018
150	12.50	0.87	0.177	(0.330)	0.159	0.018
151	12.58	0.93	0.190	(0.328)	0.171	0.019
152	12.67	0.93	0.190	(0.326)	0.171	0.019
153	12.75	0.93	0.190	(0.325)	0.171	0.019
154	12.83	0.97	0.197	(0.323)	0.177	0.020
155	12.92	0.97	0.197	(0.321)	0.177	0.020
156	13.00	0.97	0.197	(0.320)	0.177	0.020
157	13.08	1.13	0.231	(0.318)	0.208	0.023

158	13.17	1.13	0.231	(0.316)	0.208	0.023
159	13.25	1.13	0.231	(0.315)	0.208	0.023
160	13.33	1.13	0.231	(0.313)	0.208	0.023
161	13.42	1.13	0.231	(0.312)	0.208	0.023
162	13.50	1.13	0.231	(0.310)	0.208	0.023
163	13.58	0.77	0.156	(0.308)	0.141	0.016
164	13.67	0.77	0.156	(0.307)	0.141	0.016
165	13.75	0.77	0.156	(0.305)	0.141	0.016
166	13.83	0.77	0.156	(0.304)	0.141	0.016
167	13.92	0.77	0.156	(0.302)	0.141	0.016
168	14.00	0.77	0.156	(0.301)	0.141	0.016
169	14.08	0.90	0.184	(0.299)	0.165	0.018
170	14.17	0.90	0.184	(0.298)	0.165	0.018
171	14.25	0.90	0.184	(0.296)	0.165	0.018
172	14.33	0.87	0.177	(0.295)	0.159	0.018
173	14.42	0.87	0.177	(0.293)	0.159	0.018
174	14.50	0.87	0.177	(0.292)	0.159	0.018
175	14.58	0.87	0.177	(0.290)	0.159	0.018
176	14.67	0.87	0.177	(0.289)	0.159	0.018
177	14.75	0.87	0.177	(0.287)	0.159	0.018
178	14.83	0.83	0.170	(0.286)	0.153	0.017
179	14.92	0.83	0.170	(0.284)	0.153	0.017
180	15.00	0.83	0.170	(0.283)	0.153	0.017
181	15.08	0.80	0.163	(0.281)	0.147	0.016
182	15.17	0.80	0.163	(0.280)	0.147	0.016
183	15.25	0.80	0.163	(0.278)	0.147	0.016
184	15.33	0.77	0.156	(0.277)	0.141	0.016
185	15.42	0.77	0.156	(0.276)	0.141	0.016
186	15.50	0.77	0.156	(0.274)	0.141	0.016
187	15.58	0.63	0.129	(0.273)	0.116	0.013
188	15.67	0.63	0.129	(0.271)	0.116	0.013
189	15.75	0.63	0.129	(0.270)	0.116	0.013
190	15.83	0.63	0.129	(0.269)	0.116	0.013
191	15.92	0.63	0.129	(0.267)	0.116	0.013
192	16.00	0.63	0.129	(0.266)	0.116	0.013
193	16.08	0.13	0.027	(0.264)	0.024	0.003
194	16.17	0.13	0.027	(0.263)	0.024	0.003
195	16.25	0.13	0.027	(0.262)	0.024	0.003
196	16.33	0.13	0.027	(0.260)	0.024	0.003
197	16.42	0.13	0.027	(0.259)	0.024	0.003
198	16.50	0.13	0.027	(0.258)	0.024	0.003
199	16.58	0.10	0.020	(0.256)	0.018	0.002
200	16.67	0.10	0.020	(0.255)	0.018	0.002
201	16.75	0.10	0.020	(0.254)	0.018	0.002

202	16.83	0.10	0.020	(0.253)	0.018	0.002
203	16.92	0.10	0.020	(0.251)	0.018	0.002
204	17.00	0.10	0.020	(0.250)	0.018	0.002
205	17.08	0.17	0.034	(0.249)	0.031	0.003
206	17.17	0.17	0.034	(0.248)	0.031	0.003
207	17.25	0.17	0.034	(0.246)	0.031	0.003
208	17.33	0.17	0.034	(0.245)	0.031	0.003
209	17.42	0.17	0.034	(0.244)	0.031	0.003
210	17.50	0.17	0.034	(0.243)	0.031	0.003
211	17.58	0.17	0.034	(0.241)	0.031	0.003
212	17.67	0.17	0.034	(0.240)	0.031	0.003
213	17.75	0.17	0.034	(0.239)	0.031	0.003
214	17.83	0.13	0.027	(0.238)	0.024	0.003
215	17.92	0.13	0.027	(0.237)	0.024	0.003
216	18.00	0.13	0.027	(0.235)	0.024	0.003
217	18.08	0.13	0.027	(0.234)	0.024	0.003
218	18.17	0.13	0.027	(0.233)	0.024	0.003
219	18.25	0.13	0.027	(0.232)	0.024	0.003
220	18.33	0.13	0.027	(0.231)	0.024	0.003
221	18.42	0.13	0.027	(0.230)	0.024	0.003
222	18.50	0.13	0.027	(0.229)	0.024	0.003
223	18.58	0.10	0.020	(0.228)	0.018	0.002
224	18.67	0.10	0.020	(0.226)	0.018	0.002
225	18.75	0.10	0.020	(0.225)	0.018	0.002
226	18.83	0.07	0.014	(0.224)	0.012	0.001
227	18.92	0.07	0.014	(0.223)	0.012	0.001
228	19.00	0.07	0.014	(0.222)	0.012	0.001
229	19.08	0.10	0.020	(0.221)	0.018	0.002
230	19.17	0.10	0.020	(0.220)	0.018	0.002
231	19.25	0.10	0.020	(0.219)	0.018	0.002
232	19.33	0.13	0.027	(0.218)	0.024	0.003
233	19.42	0.13	0.027	(0.217)	0.024	0.003
234	19.50	0.13	0.027	(0.216)	0.024	0.003
235	19.58	0.10	0.020	(0.215)	0.018	0.002
236	19.67	0.10	0.020	(0.214)	0.018	0.002
237	19.75	0.10	0.020	(0.213)	0.018	0.002
238	19.83	0.07	0.014	(0.212)	0.012	0.001
239	19.92	0.07	0.014	(0.211)	0.012	0.001
240	20.00	0.07	0.014	(0.210)	0.012	0.001
241	20.08	0.10	0.020	(0.209)	0.018	0.002
242	20.17	0.10	0.020	(0.208)	0.018	0.002
243	20.25	0.10	0.020	(0.207)	0.018	0.002
244	20.33	0.10	0.020	(0.207)	0.018	0.002
245	20.42	0.10	0.020	(0.206)	0.018	0.002

246	20.50	0.10	0.020	(0.205)	0.018	0.002
247	20.58	0.10	0.020	(0.204)	0.018	0.002
248	20.67	0.10	0.020	(0.203)	0.018	0.002
249	20.75	0.10	0.020	(0.202)	0.018	0.002
250	20.83	0.07	0.014	(0.201)	0.012	0.001
251	20.92	0.07	0.014	(0.201)	0.012	0.001
252	21.00	0.07	0.014	(0.200)	0.012	0.001
253	21.08	0.10	0.020	(0.199)	0.018	0.002
254	21.17	0.10	0.020	(0.198)	0.018	0.002
255	21.25	0.10	0.020	(0.197)	0.018	0.002
256	21.33	0.07	0.014	(0.197)	0.012	0.001
257	21.42	0.07	0.014	(0.196)	0.012	0.001
258	21.50	0.07	0.014	(0.195)	0.012	0.001
259	21.58	0.10	0.020	(0.195)	0.018	0.002
260	21.67	0.10	0.020	(0.194)	0.018	0.002
261	21.75	0.10	0.020	(0.193)	0.018	0.002
262	21.83	0.07	0.014	(0.192)	0.012	0.001
263	21.92	0.07	0.014	(0.192)	0.012	0.001
264	22.00	0.07	0.014	(0.191)	0.012	0.001
265	22.08	0.10	0.020	(0.190)	0.018	0.002
266	22.17	0.10	0.020	(0.190)	0.018	0.002
267	22.25	0.10	0.020	(0.189)	0.018	0.002
268	22.33	0.07	0.014	(0.189)	0.012	0.001
269	22.42	0.07	0.014	(0.188)	0.012	0.001
270	22.50	0.07	0.014	(0.188)	0.012	0.001
271	22.58	0.07	0.014	(0.187)	0.012	0.001
272	22.67	0.07	0.014	(0.186)	0.012	0.001
273	22.75	0.07	0.014	(0.186)	0.012	0.001
274	22.83	0.07	0.014	(0.185)	0.012	0.001
275	22.92	0.07	0.014	(0.185)	0.012	0.001
276	23.00	0.07	0.014	(0.185)	0.012	0.001
277	23.08	0.07	0.014	(0.184)	0.012	0.001
278	23.17	0.07	0.014	(0.184)	0.012	0.001
279	23.25	0.07	0.014	(0.183)	0.012	0.001
280	23.33	0.07	0.014	(0.183)	0.012	0.001
281	23.42	0.07	0.014	(0.183)	0.012	0.001
282	23.50	0.07	0.014	(0.182)	0.012	0.001
283	23.58	0.07	0.014	(0.182)	0.012	0.001
284	23.67	0.07	0.014	(0.182)	0.012	0.001
285	23.75	0.07	0.014	(0.181)	0.012	0.001
286	23.83	0.07	0.014	(0.181)	0.012	0.001
287	23.92	0.07	0.014	(0.181)	0.012	0.001
288	24.00	0.07	0.014	(0.181)	0.012	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 2.0

Flood volume = Effective rainfall 0.17(In)
times area 14.9(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 1.53(In)
Total soil loss = 1.906(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 9225.4 Cubic Feet
Total soil loss = 83028.4 Cubic Feet

Peak flow rate of this hydrograph = 0.349(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01 Q	|	|	|	|	
0+10	0.0002	0.02 Q	|	|	|	|	
0+15	0.0003	0.02 Q	|	|	|	|	
0+20	0.0004	0.02 Q	|	|	|	|	
0+25	0.0006	0.03 Q	|	|	|	|	
0+30	0.0008	0.03 Q	|	|	|	|	
0+35	0.0010	0.03 Q	|	|	|	|	
0+40	0.0012	0.03 Q	|	|	|	|	
0+45	0.0015	0.03 Q	|	|	|	|	
0+50	0.0017	0.03 Q	|	|	|	|	
0+55	0.0020	0.04 Q	|	|	|	|	
1+ 0	0.0022	0.04 Q	|	|	|	|	
1+ 5	0.0025	0.04 Q	|	|	|	|	
1+10	0.0027	0.03 Q	|	|	|	|	
1+15	0.0029	0.03 Q	|	|	|	|	
1+20	0.0032	0.03 Q	|	|	|	|	
1+25	0.0034	0.03 Q	|	|	|	|	
1+30	0.0036	0.03 Q	|	|	|	|	
1+35	0.0038	0.03 Q	|	|	|	|	
1+40	0.0040	0.03 Q	|	|	|	|	
1+45	0.0042	0.03 Q	|	|	|	|	
1+50	0.0044	0.03 Q	|	|	|	|	
1+55	0.0047	0.04 Q	|	|	|	|	
2+ 0	0.0050	0.04 Q	|	|	|	|	

2+ 5	0.0053	0.04	Q	|	|	|	|
2+10	0.0055	0.04	QV	|	|	|	|
2+15	0.0058	0.04	QV	|	|	|	|
2+20	0.0061	0.04	QV	|	|	|	|
2+25	0.0064	0.04	QV	|	|	|	|
2+30	0.0067	0.04	QV	|	|	|	|
2+35	0.0070	0.04	QV	|	|	|	|
2+40	0.0073	0.05	QV	|	|	|	|
2+45	0.0077	0.05	QV	|	|	|	|
2+50	0.0080	0.05	QV	|	|	|	|
2+55	0.0084	0.05	QV	|	|	|	|
3+ 0	0.0087	0.05	QV	|	|	|	|
3+ 5	0.0091	0.05	QV	|	|	|	|
3+10	0.0094	0.05	QV	|	|	|	|
3+15	0.0098	0.05	QV	|	|	|	|
3+20	0.0101	0.05	QV	|	|	|	|
3+25	0.0105	0.05	QV	|	|	|	|
3+30	0.0108	0.05	Q V	|	|	|	|
3+35	0.0112	0.05	Q V	|	|	|	|
3+40	0.0115	0.05	Q V	|	|	|	|
3+45	0.0119	0.05	Q V	|	|	|	|
3+50	0.0123	0.05	Q V	|	|	|	|
3+55	0.0127	0.06	Q V	|	|	|	|
4+ 0	0.0131	0.06	Q V	|	|	|	|
4+ 5	0.0135	0.06	Q V	|	|	|	|
4+10	0.0139	0.06	Q V	|	|	|	|
4+15	0.0144	0.06	Q V	|	|	|	|
4+20	0.0148	0.06	Q V	|	|	|	|
4+25	0.0153	0.07	Q V	|	|	|	|
4+30	0.0158	0.07	Q V	|	|	|	|
4+35	0.0163	0.07	Q V	|	|	|	|
4+40	0.0167	0.07	Q V	|	|	|	|
4+45	0.0172	0.07	Q V	|	|	|	|
4+50	0.0178	0.07	Q V	|	|	|	|
4+55	0.0183	0.08	Q V	|	|	|	|
5+ 0	0.0189	0.08	Q V	|	|	|	|
5+ 5	0.0194	0.08	Q V	|	|	|	|
5+10	0.0198	0.07	Q V	|	|	|	|
5+15	0.0203	0.06	Q V	|	|	|	|
5+20	0.0207	0.07	Q V	|	|	|	|
5+25	0.0212	0.07	Q V	|	|	|	|
5+30	0.0217	0.07	Q V	|	|	|	|
5+35	0.0222	0.07	Q V	|	|	|	|
5+40	0.0228	0.08	Q V	|	|	|	|

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5+45    0.0233    0.08 Q  V   |       |       |       |
5+50    0.0239    0.08 Q  V   |       |       |       |
5+55    0.0244    0.08 Q  V   |       |       |       |
6+ 0    0.0250    0.08 Q  V   |       |       |       |
6+ 5    0.0256    0.09 Q  V   |       |       |       |
6+10    0.0262    0.09 Q  V   |       |       |       |
6+15    0.0268    0.09 Q  V   |       |       |       |
6+20    0.0275    0.09 Q  V   |       |       |       |
6+25    0.0281    0.09 Q  V   |       |       |       |
6+30    0.0287    0.09 Q  V   |       |       |       |
6+35    0.0294    0.10 Q  V   |       |       |       |
6+40    0.0301    0.10 Q  V   |       |       |       |
6+45    0.0308    0.10 Q  V   |       |       |       |
6+50    0.0315    0.10 Q  V   |       |       |       |
6+55    0.0322    0.10 Q  V   |       |       |       |
7+ 0    0.0329    0.10 Q  V   |       |       |       |
7+ 5    0.0336    0.10 Q  V   |       |       |       |
7+10    0.0343    0.10 Q  V   |       |       |       |
7+15    0.0350    0.10 Q  V   |       |       |       |
7+20    0.0357    0.11 Q  V   |       |       |       |
7+25    0.0365    0.11 Q  V   |       |       |       |
7+30    0.0373    0.11 Q  V   |       |       |       |
7+35    0.0381    0.12 Q  V   |       |       |       |
7+40    0.0389    0.12 Q  V   |       |       |       |
7+45    0.0397    0.12 Q  V   |       |       |       |
7+50    0.0406    0.13 Q  V   |       |       |       |
7+55    0.0415    0.13 Q  V   |       |       |       |
8+ 0    0.0424    0.13 Q  V   |       |       |       |
8+ 5    0.0434    0.14 Q  V   |       |       |       |
8+10    0.0444    0.15 Q  V   |       |       |       |
8+15    0.0454    0.15 Q  V   |       |       |       |
8+20    0.0465    0.15 Q  V   |       |       |       |
8+25    0.0475    0.15 Q  V   |       |       |       |
8+30    0.0486    0.15 Q  V   |       |       |       |
8+35    0.0497    0.16 Q  V   |       |       |       |
8+40    0.0508    0.16 Q  V   |       |       |       |
8+45    0.0519    0.16 Q  V   |       |       |       |
8+50    0.0531    0.17 Q  V   |       |       |       |
8+55    0.0542    0.17 Q  V   |       |       |       |
9+ 0    0.0554    0.17 Q  V   |       |       |       |
9+ 5    0.0567    0.18 Q  V   |       |       |       |
9+10    0.0580    0.19 Q  V   |       |       |       |
9+15    0.0593    0.19 Q  |V  |       |       |       |
9+20    0.0607    0.20 Q  |V  |       |       |       |
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9+25	0.0621	0.20	Q	|V	|	|	|
9+30	0.0635	0.20	Q	|V	|	|	|
9+35	0.0649	0.21	Q	| V	|	|	|
9+40	0.0663	0.21	Q	| V	|	|	|
9+45	0.0678	0.21	Q	| V	|	|	|
9+50	0.0693	0.22	Q	| V	|	|	|
9+55	0.0709	0.22	Q	| V	|	|	|
10+ 0	0.0724	0.22	Q	| V	|	|	|
10+ 5	0.0738	0.20	Q	| V	|	|	|
10+10	0.0750	0.17	Q	| V	|	|	|
10+15	0.0761	0.16	Q	| V	|	|	|
10+20	0.0772	0.16	Q	| V	|	|	|
10+25	0.0782	0.16	Q	| V	|	|	|
10+30	0.0793	0.15	Q	| V	|	|	|
10+35	0.0805	0.17	Q	| V	|	|	|
10+40	0.0818	0.19	Q	| V	|	|	|
10+45	0.0832	0.20	Q	| V	|	|	|
10+50	0.0846	0.20	Q	| V	|	|	|
10+55	0.0860	0.20	Q	| V	|	|	|
11+ 0	0.0874	0.21	Q	| V	|	|	|
11+ 5	0.0888	0.20	Q	| V	|	|	|
11+10	0.0901	0.20	Q	| V	|	|	|
11+15	0.0915	0.20	Q	| V	|	|	|
11+20	0.0928	0.20	Q	| V	|	|	|
11+25	0.0942	0.19	Q	| V	|	|	|
11+30	0.0955	0.19	Q	| V|	|	|	|
11+35	0.0968	0.19	Q	| V|	|	|	|
11+40	0.0980	0.18	Q	| V|	|	|	|
11+45	0.0993	0.18	Q	| V|	|	|	|
11+50	0.1005	0.18	Q	| V|	|	|	|
11+55	0.1017	0.18	Q	| V|	|	|	|
12+ 0	0.1030	0.18	Q	| V|	|	|	|
12+ 5	0.1044	0.21	Q	| V|	|	|	|
12+10	0.1061	0.24	Q	| V	|	|	|
12+15	0.1078	0.25	Q	| V	|	|	|
12+20	0.1095	0.26	|Q	| V	|	|	|
12+25	0.1114	0.26	|Q	| |V	|	|	|
12+30	0.1132	0.27	|Q	| |V	|	|	|
12+35	0.1151	0.27	|Q	| |V	|	|	|
12+40	0.1170	0.28	|Q	| | V	|	|	|
12+45	0.1190	0.28	|Q	| | V	|	|	|
12+50	0.1209	0.29	|Q	| | V	|	|	|
12+55	0.1230	0.29	|Q	| | V	|	|	|
13+ 0	0.1250	0.30	|Q	| | V	|	|	|

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13+ 5    0.1272    0.31 |Q     |      | V    |       |
13+10    0.1295    0.34 |Q     |      | V    |       |
13+15    0.1318    0.34 |Q     |      | V    |       |
13+20    0.1342    0.35 |Q     |      | V    |       |
13+25    0.1366    0.35 |Q     |      | V    |       |
13+30    0.1390    0.35 |Q     |      | V    |       |
13+35    0.1412    0.32 |Q     |      | V    |       |
13+40    0.1430    0.26 |Q     |      | V    |       |
13+45    0.1447    0.25 Q      |      | V    |       |
13+50    0.1464    0.24 Q      |      | V    |       |
13+55    0.1480    0.24 Q      |      | V    |       |
14+ 0    0.1496    0.24 Q      |      | V    |       |
14+ 5    0.1513    0.25 Q      |      | V    |       |
14+10    0.1532    0.27 |Q     |      | V    |       |
14+15    0.1550    0.27 |Q     |      | V    |       |
14+20    0.1569    0.27 |Q     |      | V    |       |
14+25    0.1588    0.27 |Q     |      | V    |       |
14+30    0.1606    0.27 |Q     |      | V    |       |
14+35    0.1624    0.27 |Q     |      | V    |       |
14+40    0.1643    0.27 |Q     |      |  V   |       |
14+45    0.1661    0.27 |Q     |      |  V   |       |
14+50    0.1679    0.26 |Q     |      |  V   |       |
14+55    0.1697    0.26 |Q     |      |  V   |       |
15+ 0    0.1715    0.26 |Q     |      |  V   |       |
15+ 5    0.1732    0.25 |Q     |      |  V   |       |
15+10    0.1749    0.25 Q      |      |  V   |       |
15+15    0.1766    0.25 Q      |      |  V   |       |
15+20    0.1783    0.24 Q      |      |  V   |       |
15+25    0.1800    0.24 Q      |      |  V   |       |
15+30    0.1816    0.24 Q      |      |   V  |       |
15+35    0.1831    0.22 Q      |      |   V  |       |
15+40    0.1845    0.20 Q      |      |   V  |       |
15+45    0.1859    0.20 Q      |      |   V  |       |
15+50    0.1873    0.20 Q      |      |   V  |       |
15+55    0.1886    0.20 Q      |      |   V  |       |
16+ 0    0.1900    0.19 Q      |      |   V  |       |
16+ 5    0.1910    0.15 Q      |      |   V  |       |
16+10    0.1915    0.08 Q      |      |   V  |       |
16+15    0.1919    0.06 Q      |      |   V  |       |
16+20    0.1922    0.05 Q      |      |   V  |       |
16+25    0.1926    0.04 Q      |      |   V  |       |
16+30    0.1928    0.04 Q      |      |   V  |       |
16+35    0.1931    0.04 Q      |      |   V  |       |
16+40    0.1933    0.03 Q      |      |   V  |       |
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16+45	0.1935	0.03	Q	|	|	V |
16+50	0.1938	0.03	Q	|	|	V |
16+55	0.1940	0.03	Q	|	|	V |
17+ 0	0.1942	0.03	Q	|	|	V |
17+ 5	0.1944	0.04	Q	|	|	V |
17+10	0.1948	0.05	Q	|	|	V |
17+15	0.1951	0.05	Q	|	|	V |
17+20	0.1954	0.05	Q	|	|	V |
17+25	0.1958	0.05	Q	|	|	V |
17+30	0.1961	0.05	Q	|	|	V |
17+35	0.1965	0.05	Q	|	|	V |
17+40	0.1969	0.05	Q	|	|	V |
17+45	0.1972	0.05	Q	|	|	V |
17+50	0.1975	0.05	Q	|	|	V |
17+55	0.1978	0.04	Q	|	|	V |
18+ 0	0.1981	0.04	Q	|	|	V |
18+ 5	0.1984	0.04	Q	|	|	V |
18+10	0.1987	0.04	Q	|	|	V |
18+15	0.1990	0.04	Q	|	|	V |
18+20	0.1993	0.04	Q	|	|	V |
18+25	0.1995	0.04	Q	|	|	V |
18+30	0.1998	0.04	Q	|	|	V |
18+35	0.2001	0.04	Q	|	|	V |
18+40	0.2003	0.03	Q	|	|	V |
18+45	0.2005	0.03	Q	|	|	V |
18+50	0.2007	0.03	Q	|	|	V |
18+55	0.2009	0.02	Q	|	|	V |
19+ 0	0.2010	0.02	Q	|	|	V |
19+ 5	0.2012	0.02	Q	|	|	V |
19+10	0.2014	0.03	Q	|	|	V |
19+15	0.2016	0.03	Q	|	|	V |
19+20	0.2018	0.03	Q	|	|	V |
19+25	0.2021	0.04	Q	|	|	V |
19+30	0.2024	0.04	Q	|	|	V |
19+35	0.2026	0.04	Q	|	|	V |
19+40	0.2029	0.03	Q	|	|	V |
19+45	0.2031	0.03	Q	|	|	V |
19+50	0.2033	0.03	Q	|	|	V |
19+55	0.2034	0.02	Q	|	|	V |
20+ 0	0.2036	0.02	Q	|	|	V |
20+ 5	0.2037	0.02	Q	|	|	V |
20+10	0.2039	0.03	Q	|	|	V |
20+15	0.2041	0.03	Q	|	|	V |
20+20	0.2044	0.03	Q	|	|	V |

20+25	0.2046	0.03	Q	|	|	V |
20+30	0.2048	0.03	Q	|	|	V |
20+35	0.2050	0.03	Q	|	|	V |
20+40	0.2052	0.03	Q	|	|	V |
20+45	0.2054	0.03	Q	|	|	V |
20+50	0.2056	0.03	Q	|	|	V |
20+55	0.2058	0.02	Q	|	|	V |
21+ 0	0.2059	0.02	Q	|	|	V |
21+ 5	0.2061	0.02	Q	|	|	V |
21+10	0.2063	0.03	Q	|	|	V |
21+15	0.2065	0.03	Q	|	|	V |
21+20	0.2067	0.03	Q	|	|	V|
21+25	0.2068	0.02	Q	|	|	V|
21+30	0.2070	0.02	Q	|	|	V|
21+35	0.2071	0.02	Q	|	|	V|
21+40	0.2073	0.03	Q	|	|	V|
21+45	0.2075	0.03	Q	|	|	V|
21+50	0.2077	0.03	Q	|	|	V|
21+55	0.2079	0.02	Q	|	|	V|
22+ 0	0.2080	0.02	Q	|	|	V|
22+ 5	0.2082	0.02	Q	|	|	V|
22+10	0.2084	0.03	Q	|	|	V|
22+15	0.2086	0.03	Q	|	|	V|
22+20	0.2088	0.03	Q	|	|	V|
22+25	0.2089	0.02	Q	|	|	V|
22+30	0.2091	0.02	Q	|	|	V|
22+35	0.2092	0.02	Q	|	|	V|
22+40	0.2094	0.02	Q	|	|	V|
22+45	0.2095	0.02	Q	|	|	V|
22+50	0.2097	0.02	Q	|	|	V|
22+55	0.2098	0.02	Q	|	|	V|
23+ 0	0.2099	0.02	Q	|	|	V|
23+ 5	0.2101	0.02	Q	|	|	V|
23+10	0.2102	0.02	Q	|	|	V|
23+15	0.2104	0.02	Q	|	|	V|
23+20	0.2105	0.02	Q	|	|	V|
23+25	0.2106	0.02	Q	|	|	V|
23+30	0.2108	0.02	Q	|	|	V|
23+35	0.2109	0.02	Q	|	|	V|
23+40	0.2111	0.02	Q	|	|	V|
23+45	0.2112	0.02	Q	|	|	V|
23+50	0.2113	0.02	Q	|	|	V|
23+55	0.2115	0.02	Q	|	|	V|
24+ 0	0.2116	0.02	Q	|	|	V|

24+ 5	0.2117	0.01	Q	|	|	| V|
24+10	0.2118	0.00	Q	|	|	| V|
24+15	0.2118	0.00	Q	|	|	| V|
24+20	0.2118	0.00	Q	|	|	| V|
24+25	0.2118	0.00	Q	|	|	| V|

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E2YR24HRB242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
2 YEAR 24 HOUR
AREA B

Drainage Area = 14.74(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.74(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 638.00(Ft.)
Length along longest watercourse measured to centroid = 318.00(Ft.)
Length along longest watercourse = 0.121 Mi.
Length along longest watercourse measured to centroid = 0.060 Mi.
Difference in elevation = 4.60(Ft.)
Slope along watercourse = 38.0690 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.056 Hr.
Lag time = 3.33 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	1.70	25.06

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	3.90	57.49

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.740	85.00	0.000

Total Area Entered = 14.74(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	70.0	0.362	0.000	0.362	1.000	0.362

Sum (F) = 0.362
Area averaged mean soil loss (F) (In/Hr) = 0.362
Minimum soil loss rate ((In/Hr)) = 0.181
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	150.052	33.188	4.930
2	0.167	300.104	47.006	6.983
3	0.250	450.157	11.179	1.661
4	0.333	600.209	4.882	0.725
5	0.417	750.261	2.465	0.366
6	0.500	900.313	1.281	0.190
		Sum = 100.000	Sum=	14.855

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max |	Low	(In/Hr)
1	0.08	0.07	0.014	(0.642)	0.012	0.001
2	0.17	0.07	0.014	(0.639)	0.012	0.001
3	0.25	0.07	0.014	(0.637)	0.012	0.001
4	0.33	0.10	0.020	(0.634)	0.018	0.002
5	0.42	0.10	0.020	(0.632)	0.018	0.002
6	0.50	0.10	0.020	(0.629)	0.018	0.002
7	0.58	0.10	0.020	(0.627)	0.018	0.002
8	0.67	0.10	0.020	(0.624)	0.018	0.002
9	0.75	0.10	0.020	(0.622)	0.018	0.002
10	0.83	0.13	0.027	(0.620)	0.024	0.003
11	0.92	0.13	0.027	(0.617)	0.024	0.003
12	1.00	0.13	0.027	(0.615)	0.024	0.003
13	1.08	0.10	0.020	(0.612)	0.018	0.002
14	1.17	0.10	0.020	(0.610)	0.018	0.002
15	1.25	0.10	0.020	(0.607)	0.018	0.002
16	1.33	0.10	0.020	(0.605)	0.018	0.002
17	1.42	0.10	0.020	(0.603)	0.018	0.002
18	1.50	0.10	0.020	(0.600)	0.018	0.002
19	1.58	0.10	0.020	(0.598)	0.018	0.002
20	1.67	0.10	0.020	(0.595)	0.018	0.002
21	1.75	0.10	0.020	(0.593)	0.018	0.002
22	1.83	0.13	0.027	(0.591)	0.024	0.003
23	1.92	0.13	0.027	(0.588)	0.024	0.003
24	2.00	0.13	0.027	(0.586)	0.024	0.003
25	2.08	0.13	0.027	(0.583)	0.024	0.003

26	2.17	0.13	0.027	(0.581)	0.024	0.003
27	2.25	0.13	0.027	(0.579)	0.024	0.003
28	2.33	0.13	0.027	(0.576)	0.024	0.003
29	2.42	0.13	0.027	(0.574)	0.024	0.003
30	2.50	0.13	0.027	(0.572)	0.024	0.003
31	2.58	0.17	0.034	(0.569)	0.031	0.003
32	2.67	0.17	0.034	(0.567)	0.031	0.003
33	2.75	0.17	0.034	(0.565)	0.031	0.003
34	2.83	0.17	0.034	(0.562)	0.031	0.003
35	2.92	0.17	0.034	(0.560)	0.031	0.003
36	3.00	0.17	0.034	(0.558)	0.031	0.003
37	3.08	0.17	0.034	(0.555)	0.031	0.003
38	3.17	0.17	0.034	(0.553)	0.031	0.003
39	3.25	0.17	0.034	(0.551)	0.031	0.003
40	3.33	0.17	0.034	(0.549)	0.031	0.003
41	3.42	0.17	0.034	(0.546)	0.031	0.003
42	3.50	0.17	0.034	(0.544)	0.031	0.003
43	3.58	0.17	0.034	(0.542)	0.031	0.003
44	3.67	0.17	0.034	(0.539)	0.031	0.003
45	3.75	0.17	0.034	(0.537)	0.031	0.003
46	3.83	0.20	0.041	(0.535)	0.037	0.004
47	3.92	0.20	0.041	(0.533)	0.037	0.004
48	4.00	0.20	0.041	(0.530)	0.037	0.004
49	4.08	0.20	0.041	(0.528)	0.037	0.004
50	4.17	0.20	0.041	(0.526)	0.037	0.004
51	4.25	0.20	0.041	(0.524)	0.037	0.004
52	4.33	0.23	0.048	(0.521)	0.043	0.005
53	4.42	0.23	0.048	(0.519)	0.043	0.005
54	4.50	0.23	0.048	(0.517)	0.043	0.005
55	4.58	0.23	0.048	(0.515)	0.043	0.005
56	4.67	0.23	0.048	(0.513)	0.043	0.005
57	4.75	0.23	0.048	(0.510)	0.043	0.005
58	4.83	0.27	0.054	(0.508)	0.049	0.005
59	4.92	0.27	0.054	(0.506)	0.049	0.005
60	5.00	0.27	0.054	(0.504)	0.049	0.005
61	5.08	0.20	0.041	(0.502)	0.037	0.004
62	5.17	0.20	0.041	(0.499)	0.037	0.004
63	5.25	0.20	0.041	(0.497)	0.037	0.004
64	5.33	0.23	0.048	(0.495)	0.043	0.005
65	5.42	0.23	0.048	(0.493)	0.043	0.005
66	5.50	0.23	0.048	(0.491)	0.043	0.005
67	5.58	0.27	0.054	(0.489)	0.049	0.005
68	5.67	0.27	0.054	(0.486)	0.049	0.005
69	5.75	0.27	0.054	(0.484)	0.049	0.005

70	5.83	0.27	0.054	(0.482)	0.049	0.005
71	5.92	0.27	0.054	(0.480)	0.049	0.005
72	6.00	0.27	0.054	(0.478)	0.049	0.005
73	6.08	0.30	0.061	(0.476)	0.055	0.006
74	6.17	0.30	0.061	(0.474)	0.055	0.006
75	6.25	0.30	0.061	(0.471)	0.055	0.006
76	6.33	0.30	0.061	(0.469)	0.055	0.006
77	6.42	0.30	0.061	(0.467)	0.055	0.006
78	6.50	0.30	0.061	(0.465)	0.055	0.006
79	6.58	0.33	0.068	(0.463)	0.061	0.007
80	6.67	0.33	0.068	(0.461)	0.061	0.007
81	6.75	0.33	0.068	(0.459)	0.061	0.007
82	6.83	0.33	0.068	(0.457)	0.061	0.007
83	6.92	0.33	0.068	(0.455)	0.061	0.007
84	7.00	0.33	0.068	(0.453)	0.061	0.007
85	7.08	0.33	0.068	(0.451)	0.061	0.007
86	7.17	0.33	0.068	(0.449)	0.061	0.007
87	7.25	0.33	0.068	(0.447)	0.061	0.007
88	7.33	0.37	0.075	(0.445)	0.067	0.007
89	7.42	0.37	0.075	(0.442)	0.067	0.007
90	7.50	0.37	0.075	(0.440)	0.067	0.007
91	7.58	0.40	0.082	(0.438)	0.073	0.008
92	7.67	0.40	0.082	(0.436)	0.073	0.008
93	7.75	0.40	0.082	(0.434)	0.073	0.008
94	7.83	0.43	0.088	(0.432)	0.080	0.009
95	7.92	0.43	0.088	(0.430)	0.080	0.009
96	8.00	0.43	0.088	(0.428)	0.080	0.009
97	8.08	0.50	0.102	(0.426)	0.092	0.010
98	8.17	0.50	0.102	(0.424)	0.092	0.010
99	8.25	0.50	0.102	(0.422)	0.092	0.010
100	8.33	0.50	0.102	(0.420)	0.092	0.010
101	8.42	0.50	0.102	(0.419)	0.092	0.010
102	8.50	0.50	0.102	(0.417)	0.092	0.010
103	8.58	0.53	0.109	(0.415)	0.098	0.011
104	8.67	0.53	0.109	(0.413)	0.098	0.011
105	8.75	0.53	0.109	(0.411)	0.098	0.011
106	8.83	0.57	0.116	(0.409)	0.104	0.012
107	8.92	0.57	0.116	(0.407)	0.104	0.012
108	9.00	0.57	0.116	(0.405)	0.104	0.012
109	9.08	0.63	0.129	(0.403)	0.116	0.013
110	9.17	0.63	0.129	(0.401)	0.116	0.013
111	9.25	0.63	0.129	(0.399)	0.116	0.013
112	9.33	0.67	0.136	(0.397)	0.122	0.014
113	9.42	0.67	0.136	(0.395)	0.122	0.014

114	9.50	0.67	0.136	(0.393)	0.122	0.014
115	9.58	0.70	0.143	(0.392)	0.129	0.014
116	9.67	0.70	0.143	(0.390)	0.129	0.014
117	9.75	0.70	0.143	(0.388)	0.129	0.014
118	9.83	0.73	0.150	(0.386)	0.135	0.015
119	9.92	0.73	0.150	(0.384)	0.135	0.015
120	10.00	0.73	0.150	(0.382)	0.135	0.015
121	10.08	0.50	0.102	(0.380)	0.092	0.010
122	10.17	0.50	0.102	(0.379)	0.092	0.010
123	10.25	0.50	0.102	(0.377)	0.092	0.010
124	10.33	0.50	0.102	(0.375)	0.092	0.010
125	10.42	0.50	0.102	(0.373)	0.092	0.010
126	10.50	0.50	0.102	(0.371)	0.092	0.010
127	10.58	0.67	0.136	(0.369)	0.122	0.014
128	10.67	0.67	0.136	(0.368)	0.122	0.014
129	10.75	0.67	0.136	(0.366)	0.122	0.014
130	10.83	0.67	0.136	(0.364)	0.122	0.014
131	10.92	0.67	0.136	(0.362)	0.122	0.014
132	11.00	0.67	0.136	(0.360)	0.122	0.014
133	11.08	0.63	0.129	(0.359)	0.116	0.013
134	11.17	0.63	0.129	(0.357)	0.116	0.013
135	11.25	0.63	0.129	(0.355)	0.116	0.013
136	11.33	0.63	0.129	(0.353)	0.116	0.013
137	11.42	0.63	0.129	(0.352)	0.116	0.013
138	11.50	0.63	0.129	(0.350)	0.116	0.013
139	11.58	0.57	0.116	(0.348)	0.104	0.012
140	11.67	0.57	0.116	(0.346)	0.104	0.012
141	11.75	0.57	0.116	(0.345)	0.104	0.012
142	11.83	0.60	0.122	(0.343)	0.110	0.012
143	11.92	0.60	0.122	(0.341)	0.110	0.012
144	12.00	0.60	0.122	(0.340)	0.110	0.012
145	12.08	0.83	0.170	(0.338)	0.153	0.017
146	12.17	0.83	0.170	(0.336)	0.153	0.017
147	12.25	0.83	0.170	(0.335)	0.153	0.017
148	12.33	0.87	0.177	(0.333)	0.159	0.018
149	12.42	0.87	0.177	(0.331)	0.159	0.018
150	12.50	0.87	0.177	(0.330)	0.159	0.018
151	12.58	0.93	0.190	(0.328)	0.171	0.019
152	12.67	0.93	0.190	(0.326)	0.171	0.019
153	12.75	0.93	0.190	(0.325)	0.171	0.019
154	12.83	0.97	0.197	(0.323)	0.177	0.020
155	12.92	0.97	0.197	(0.321)	0.177	0.020
156	13.00	0.97	0.197	(0.320)	0.177	0.020
157	13.08	1.13	0.231	(0.318)	0.208	0.023

158	13.17	1.13	0.231	(0.316)	0.208	0.023
159	13.25	1.13	0.231	(0.315)	0.208	0.023
160	13.33	1.13	0.231	(0.313)	0.208	0.023
161	13.42	1.13	0.231	(0.312)	0.208	0.023
162	13.50	1.13	0.231	(0.310)	0.208	0.023
163	13.58	0.77	0.156	(0.308)	0.141	0.016
164	13.67	0.77	0.156	(0.307)	0.141	0.016
165	13.75	0.77	0.156	(0.305)	0.141	0.016
166	13.83	0.77	0.156	(0.304)	0.141	0.016
167	13.92	0.77	0.156	(0.302)	0.141	0.016
168	14.00	0.77	0.156	(0.301)	0.141	0.016
169	14.08	0.90	0.184	(0.299)	0.165	0.018
170	14.17	0.90	0.184	(0.298)	0.165	0.018
171	14.25	0.90	0.184	(0.296)	0.165	0.018
172	14.33	0.87	0.177	(0.295)	0.159	0.018
173	14.42	0.87	0.177	(0.293)	0.159	0.018
174	14.50	0.87	0.177	(0.292)	0.159	0.018
175	14.58	0.87	0.177	(0.290)	0.159	0.018
176	14.67	0.87	0.177	(0.289)	0.159	0.018
177	14.75	0.87	0.177	(0.287)	0.159	0.018
178	14.83	0.83	0.170	(0.286)	0.153	0.017
179	14.92	0.83	0.170	(0.284)	0.153	0.017
180	15.00	0.83	0.170	(0.283)	0.153	0.017
181	15.08	0.80	0.163	(0.281)	0.147	0.016
182	15.17	0.80	0.163	(0.280)	0.147	0.016
183	15.25	0.80	0.163	(0.278)	0.147	0.016
184	15.33	0.77	0.156	(0.277)	0.141	0.016
185	15.42	0.77	0.156	(0.276)	0.141	0.016
186	15.50	0.77	0.156	(0.274)	0.141	0.016
187	15.58	0.63	0.129	(0.273)	0.116	0.013
188	15.67	0.63	0.129	(0.271)	0.116	0.013
189	15.75	0.63	0.129	(0.270)	0.116	0.013
190	15.83	0.63	0.129	(0.269)	0.116	0.013
191	15.92	0.63	0.129	(0.267)	0.116	0.013
192	16.00	0.63	0.129	(0.266)	0.116	0.013
193	16.08	0.13	0.027	(0.264)	0.024	0.003
194	16.17	0.13	0.027	(0.263)	0.024	0.003
195	16.25	0.13	0.027	(0.262)	0.024	0.003
196	16.33	0.13	0.027	(0.260)	0.024	0.003
197	16.42	0.13	0.027	(0.259)	0.024	0.003
198	16.50	0.13	0.027	(0.258)	0.024	0.003
199	16.58	0.10	0.020	(0.256)	0.018	0.002
200	16.67	0.10	0.020	(0.255)	0.018	0.002
201	16.75	0.10	0.020	(0.254)	0.018	0.002

202	16.83	0.10	0.020	(0.253)	0.018	0.002
203	16.92	0.10	0.020	(0.251)	0.018	0.002
204	17.00	0.10	0.020	(0.250)	0.018	0.002
205	17.08	0.17	0.034	(0.249)	0.031	0.003
206	17.17	0.17	0.034	(0.248)	0.031	0.003
207	17.25	0.17	0.034	(0.246)	0.031	0.003
208	17.33	0.17	0.034	(0.245)	0.031	0.003
209	17.42	0.17	0.034	(0.244)	0.031	0.003
210	17.50	0.17	0.034	(0.243)	0.031	0.003
211	17.58	0.17	0.034	(0.241)	0.031	0.003
212	17.67	0.17	0.034	(0.240)	0.031	0.003
213	17.75	0.17	0.034	(0.239)	0.031	0.003
214	17.83	0.13	0.027	(0.238)	0.024	0.003
215	17.92	0.13	0.027	(0.237)	0.024	0.003
216	18.00	0.13	0.027	(0.235)	0.024	0.003
217	18.08	0.13	0.027	(0.234)	0.024	0.003
218	18.17	0.13	0.027	(0.233)	0.024	0.003
219	18.25	0.13	0.027	(0.232)	0.024	0.003
220	18.33	0.13	0.027	(0.231)	0.024	0.003
221	18.42	0.13	0.027	(0.230)	0.024	0.003
222	18.50	0.13	0.027	(0.229)	0.024	0.003
223	18.58	0.10	0.020	(0.228)	0.018	0.002
224	18.67	0.10	0.020	(0.226)	0.018	0.002
225	18.75	0.10	0.020	(0.225)	0.018	0.002
226	18.83	0.07	0.014	(0.224)	0.012	0.001
227	18.92	0.07	0.014	(0.223)	0.012	0.001
228	19.00	0.07	0.014	(0.222)	0.012	0.001
229	19.08	0.10	0.020	(0.221)	0.018	0.002
230	19.17	0.10	0.020	(0.220)	0.018	0.002
231	19.25	0.10	0.020	(0.219)	0.018	0.002
232	19.33	0.13	0.027	(0.218)	0.024	0.003
233	19.42	0.13	0.027	(0.217)	0.024	0.003
234	19.50	0.13	0.027	(0.216)	0.024	0.003
235	19.58	0.10	0.020	(0.215)	0.018	0.002
236	19.67	0.10	0.020	(0.214)	0.018	0.002
237	19.75	0.10	0.020	(0.213)	0.018	0.002
238	19.83	0.07	0.014	(0.212)	0.012	0.001
239	19.92	0.07	0.014	(0.211)	0.012	0.001
240	20.00	0.07	0.014	(0.210)	0.012	0.001
241	20.08	0.10	0.020	(0.209)	0.018	0.002
242	20.17	0.10	0.020	(0.208)	0.018	0.002
243	20.25	0.10	0.020	(0.207)	0.018	0.002
244	20.33	0.10	0.020	(0.207)	0.018	0.002
245	20.42	0.10	0.020	(0.206)	0.018	0.002

246	20.50	0.10	0.020	(0.205)	0.018	0.002
247	20.58	0.10	0.020	(0.204)	0.018	0.002
248	20.67	0.10	0.020	(0.203)	0.018	0.002
249	20.75	0.10	0.020	(0.202)	0.018	0.002
250	20.83	0.07	0.014	(0.201)	0.012	0.001
251	20.92	0.07	0.014	(0.201)	0.012	0.001
252	21.00	0.07	0.014	(0.200)	0.012	0.001
253	21.08	0.10	0.020	(0.199)	0.018	0.002
254	21.17	0.10	0.020	(0.198)	0.018	0.002
255	21.25	0.10	0.020	(0.197)	0.018	0.002
256	21.33	0.07	0.014	(0.197)	0.012	0.001
257	21.42	0.07	0.014	(0.196)	0.012	0.001
258	21.50	0.07	0.014	(0.195)	0.012	0.001
259	21.58	0.10	0.020	(0.195)	0.018	0.002
260	21.67	0.10	0.020	(0.194)	0.018	0.002
261	21.75	0.10	0.020	(0.193)	0.018	0.002
262	21.83	0.07	0.014	(0.192)	0.012	0.001
263	21.92	0.07	0.014	(0.192)	0.012	0.001
264	22.00	0.07	0.014	(0.191)	0.012	0.001
265	22.08	0.10	0.020	(0.190)	0.018	0.002
266	22.17	0.10	0.020	(0.190)	0.018	0.002
267	22.25	0.10	0.020	(0.189)	0.018	0.002
268	22.33	0.07	0.014	(0.189)	0.012	0.001
269	22.42	0.07	0.014	(0.188)	0.012	0.001
270	22.50	0.07	0.014	(0.188)	0.012	0.001
271	22.58	0.07	0.014	(0.187)	0.012	0.001
272	22.67	0.07	0.014	(0.186)	0.012	0.001
273	22.75	0.07	0.014	(0.186)	0.012	0.001
274	22.83	0.07	0.014	(0.185)	0.012	0.001
275	22.92	0.07	0.014	(0.185)	0.012	0.001
276	23.00	0.07	0.014	(0.185)	0.012	0.001
277	23.08	0.07	0.014	(0.184)	0.012	0.001
278	23.17	0.07	0.014	(0.184)	0.012	0.001
279	23.25	0.07	0.014	(0.183)	0.012	0.001
280	23.33	0.07	0.014	(0.183)	0.012	0.001
281	23.42	0.07	0.014	(0.183)	0.012	0.001
282	23.50	0.07	0.014	(0.182)	0.012	0.001
283	23.58	0.07	0.014	(0.182)	0.012	0.001
284	23.67	0.07	0.014	(0.182)	0.012	0.001
285	23.75	0.07	0.014	(0.181)	0.012	0.001
286	23.83	0.07	0.014	(0.181)	0.012	0.001
287	23.92	0.07	0.014	(0.181)	0.012	0.001
288	24.00	0.07	0.014	(0.181)	0.012	0.001

(Loss Rate Not Used)

Sum = 100.0 Sum = 2.0

Flood volume = Effective rainfall 0.17(In)
times area 14.7(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 1.53(In)
Total soil loss = 1.879(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 9095.8 Cubic Feet
Total soil loss = 81862.1 Cubic Feet

Peak flow rate of this hydrograph = 0.344(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.01 Q	|	|	|	|	
0+10	0.0002	0.02 Q	|	|	|	|	
0+15	0.0003	0.02 Q	|	|	|	|	
0+20	0.0004	0.02 Q	|	|	|	|	
0+25	0.0006	0.03 Q	|	|	|	|	
0+30	0.0008	0.03 Q	|	|	|	|	
0+35	0.0010	0.03 Q	|	|	|	|	
0+40	0.0013	0.03 Q	|	|	|	|	
0+45	0.0015	0.03 Q	|	|	|	|	
0+50	0.0017	0.03 Q	|	|	|	|	
0+55	0.0020	0.04 Q	|	|	|	|	
1+ 0	0.0022	0.04 Q	|	|	|	|	
1+ 5	0.0025	0.04 Q	|	|	|	|	
1+10	0.0027	0.03 Q	|	|	|	|	
1+15	0.0029	0.03 Q	|	|	|	|	
1+20	0.0031	0.03 Q	|	|	|	|	
1+25	0.0033	0.03 Q	|	|	|	|	
1+30	0.0035	0.03 Q	|	|	|	|	
1+35	0.0038	0.03 Q	|	|	|	|	
1+40	0.0040	0.03 Q	|	|	|	|	
1+45	0.0042	0.03 Q	|	|	|	|	
1+50	0.0044	0.03 Q	|	|	|	|	
1+55	0.0047	0.04 Q	|	|	|	|	
2+ 0	0.0049	0.04 Q	|	|	|	|	

2+ 5	0.0052	0.04	QV	|	|	|	|
2+10	0.0055	0.04	QV	|	|	|	|
2+15	0.0058	0.04	QV	|	|	|	|
2+20	0.0061	0.04	QV	|	|	|	|
2+25	0.0063	0.04	QV	|	|	|	|
2+30	0.0066	0.04	QV	|	|	|	|
2+35	0.0069	0.04	QV	|	|	|	|
2+40	0.0072	0.05	QV	|	|	|	|
2+45	0.0076	0.05	QV	|	|	|	|
2+50	0.0079	0.05	QV	|	|	|	|
2+55	0.0083	0.05	QV	|	|	|	|
3+ 0	0.0086	0.05	QV	|	|	|	|
3+ 5	0.0090	0.05	QV	|	|	|	|
3+10	0.0093	0.05	QV	|	|	|	|
3+15	0.0097	0.05	QV	|	|	|	|
3+20	0.0100	0.05	QV	|	|	|	|
3+25	0.0104	0.05	QV	|	|	|	|
3+30	0.0107	0.05	Q V	|	|	|	|
3+35	0.0111	0.05	Q V	|	|	|	|
3+40	0.0114	0.05	Q V	|	|	|	|
3+45	0.0118	0.05	Q V	|	|	|	|
3+50	0.0121	0.05	Q V	|	|	|	|
3+55	0.0125	0.06	Q V	|	|	|	|
4+ 0	0.0129	0.06	Q V	|	|	|	|
4+ 5	0.0134	0.06	Q V	|	|	|	|
4+10	0.0138	0.06	Q V	|	|	|	|
4+15	0.0142	0.06	Q V	|	|	|	|
4+20	0.0146	0.06	Q V	|	|	|	|
4+25	0.0151	0.07	Q V	|	|	|	|
4+30	0.0156	0.07	Q V	|	|	|	|
4+35	0.0161	0.07	Q V	|	|	|	|
4+40	0.0166	0.07	Q V	|	|	|	|
4+45	0.0171	0.07	Q V	|	|	|	|
4+50	0.0176	0.07	Q V	|	|	|	|
4+55	0.0181	0.08	Q V	|	|	|	|
5+ 0	0.0187	0.08	Q V	|	|	|	|
5+ 5	0.0192	0.07	Q V	|	|	|	|
5+10	0.0196	0.06	Q V	|	|	|	|
5+15	0.0200	0.06	Q V	|	|	|	|
5+20	0.0205	0.06	Q V	|	|	|	|
5+25	0.0210	0.07	Q V	|	|	|	|
5+30	0.0214	0.07	Q V	|	|	|	|
5+35	0.0219	0.07	Q V	|	|	|	|
5+40	0.0225	0.08	Q V	|	|	|	|

5+45	0.0230	0.08	Q	V	|	|	|	|
5+50	0.0236	0.08	Q	V	|	|	|	|
5+55	0.0242	0.08	Q	V	|	|	|	|
6+ 0	0.0247	0.08	Q	V	|	|	|	|
6+ 5	0.0253	0.08	Q	V	|	|	|	|
6+10	0.0259	0.09	Q	V	|	|	|	|
6+15	0.0265	0.09	Q	V	|	|	|	|
6+20	0.0271	0.09	Q	V	|	|	|	|
6+25	0.0278	0.09	Q	V	|	|	|	|
6+30	0.0284	0.09	Q	V	|	|	|	|
6+35	0.0290	0.09	Q	V	|	|	|	|
6+40	0.0297	0.10	Q	V	|	|	|	|
6+45	0.0304	0.10	Q	V	|	|	|	|
6+50	0.0311	0.10	Q	V	|	|	|	|
6+55	0.0318	0.10	Q	V	|	|	|	|
7+ 0	0.0325	0.10	Q	V	|	|	|	|
7+ 5	0.0332	0.10	Q	V	|	|	|	|
7+10	0.0339	0.10	Q	V	|	|	|	|
7+15	0.0346	0.10	Q	V	|	|	|	|
7+20	0.0353	0.10	Q	V	|	|	|	|
7+25	0.0361	0.11	Q	V	|	|	|	|
7+30	0.0368	0.11	Q	V	|	|	|	|
7+35	0.0376	0.11	Q	V	|	|	|	|
7+40	0.0384	0.12	Q	V	|	|	|	|
7+45	0.0393	0.12	Q	V	|	|	|	|
7+50	0.0401	0.12	Q	V	|	|	|	|
7+55	0.0410	0.13	Q	V	|	|	|	|
8+ 0	0.0419	0.13	Q	V	|	|	|	|
8+ 5	0.0429	0.14	Q	V	|	|	|	|
8+10	0.0439	0.15	Q	V	|	|	|	|
8+15	0.0449	0.15	Q	V	|	|	|	|
8+20	0.0459	0.15	Q	V	|	|	|	|
8+25	0.0470	0.15	Q	V	|	|	|	|
8+30	0.0480	0.15	Q	V	|	|	|	|
8+35	0.0491	0.15	Q	V	|	|	|	|
8+40	0.0502	0.16	Q	V	|	|	|	|
8+45	0.0513	0.16	Q	V	|	|	|	|
8+50	0.0524	0.16	Q	V	|	|	|	|
8+55	0.0536	0.17	Q	V	|	|	|	|
9+ 0	0.0548	0.17	Q	V	|	|	|	|
9+ 5	0.0560	0.18	Q	V	|	|	|	|
9+10	0.0573	0.19	Q	V	|	|	|	|
9+15	0.0586	0.19	Q	|V	|	|	|	|
9+20	0.0599	0.19	Q	|V	|	|	|	|

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 9+25    0.0613    0.20 Q     |V     |      |      |
 9+30    0.0627    0.20 Q     | V    |      |      |
 9+35    0.0641    0.21 Q     | V    |      |      |
 9+40    0.0656    0.21 Q     | V    |      |      |
 9+45    0.0670    0.21 Q     | V    |      |      |
 9+50    0.0685    0.22 Q     |  V   |      |      |
 9+55    0.0700    0.22 Q     |  V   |      |      |
10+ 0    0.0716    0.22 Q     |  V   |      |      |
10+ 5    0.0729    0.20 Q     |  V   |      |      |
10+10    0.0741    0.17 Q     |   V  |      |      |
10+15    0.0751    0.16 Q     |   V  |      |      |
10+20    0.0762    0.15 Q     |   V  |      |      |
10+25    0.0773    0.15 Q     |   V  |      |      |
10+30    0.0783    0.15 Q     |   V  |      |      |
10+35    0.0795    0.17 Q     |   V  |      |      |
10+40    0.0808    0.19 Q     |   V  |      |      |
10+45    0.0821    0.20 Q     |   V  |      |      |
10+50    0.0835    0.20 Q     |    V |      |      |
10+55    0.0849    0.20 Q     |    V |      |      |
11+ 0    0.0863    0.20 Q     |    V |      |      |
11+ 5    0.0877    0.20 Q     |    V |      |      |
11+10    0.0890    0.19 Q     |     V|      |      |
11+15    0.0903    0.19 Q     |     V|      |      |
11+20    0.0917    0.19 Q     |     V|      |      |
11+25    0.0930    0.19 Q     |     V|      |      |
11+30    0.0943    0.19 Q     |      V      |      |
11+35    0.0956    0.19 Q     |      V      |      |
11+40    0.0968    0.18 Q     |      V      |      |
11+45    0.0980    0.17 Q     |      V      |      |
11+50    0.0992    0.18 Q     |      V      |      |
11+55    0.1004    0.18 Q     |      V      |      |
12+ 0    0.1017    0.18 Q     |      V      |      |
12+ 5    0.1031    0.21 Q     |      V      |      |
12+10    0.1047    0.24 Q     |       V     |      |
12+15    0.1064    0.25 Q     |       V     |      |
12+20    0.1082    0.25 |Q    |       V     |      |
12+25    0.1100    0.26 |Q    |       |V    |      |
12+30    0.1118    0.26 |Q    |       |V    |      |
12+35    0.1136    0.27 |Q    |       |V    |      |
12+40    0.1156    0.28 |Q    |       | V   |      |
12+45    0.1175    0.28 |Q    |       | V   |      |
12+50    0.1195    0.29 |Q    |       | V   |      |
12+55    0.1215    0.29 |Q    |       |  V  |      |
13+ 0    0.1235    0.29 |Q    |       |  V  |      |
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13+ 5    0.1256    0.31 |Q     |       |  V    |       |
13+10    0.1279    0.33 |Q     |       |  V    |       |
13+15    0.1302    0.34 |Q     |       |  V    |       |
13+20    0.1326    0.34 |Q     |       |  V    |       |
13+25    0.1350    0.34 |Q     |       |  V    |       |
13+30    0.1373    0.34 |Q     |       |  V    |       |
13+35    0.1394    0.31 |Q     |       |  V    |       |
13+40    0.1412    0.25 |Q     |       |   V   |       |
13+45    0.1429    0.24 Q      |       |   V   |       |
13+50    0.1445    0.24 Q      |       |   V   |       |
13+55    0.1461    0.23 Q      |       |   V   |       |
14+ 0    0.1477    0.23 Q      |       |   V   |       |
14+ 5    0.1494    0.25 Q      |       |   V   |       |
14+10    0.1512    0.26 |Q     |       |   V   |       |
14+15    0.1531    0.27 |Q     |       |   V   |       |
14+20    0.1549    0.27 |Q     |       |   V   |       |
14+25    0.1567    0.26 |Q     |       |   V   |       |
14+30    0.1585    0.26 |Q     |       |   V   |       |
14+35    0.1604    0.26 |Q     |       |   V   |       |
14+40    0.1622    0.26 |Q     |       |   |V  |       |
14+45    0.1640    0.26 |Q     |       |   |V  |       |
14+50    0.1658    0.26 |Q     |       |   |V  |       |
14+55    0.1675    0.25 |Q     |       |   | V |       |
15+ 0    0.1693    0.25 |Q     |       |   | V |       |
15+ 5    0.1710    0.25 Q      |       |   | V |       |
15+10    0.1727    0.24 Q      |       |   |  V|       |
15+15    0.1743    0.24 Q      |       |   |  V|       |
15+20    0.1760    0.24 Q      |       |   |  V|       |
15+25    0.1776    0.23 Q      |       |   |  V|       |
15+30    0.1792    0.23 Q      |       |   |  V|       |
15+35    0.1807    0.22 Q      |       |   |  V|       |
15+40    0.1821    0.20 Q      |       |   |  V|       |
15+45    0.1835    0.20 Q      |       |   |   V       |
15+50    0.1848    0.19 Q      |       |   |   V       |
15+55    0.1861    0.19 Q      |       |   |   V       |
16+ 0    0.1874    0.19 Q      |       |   |   V       |
16+ 5    0.1884    0.14 Q      |       |   |   V       |
16+10    0.1889    0.07 Q      |       |   |   V       |
16+15    0.1893    0.05 Q      |       |   |   V       |
16+20    0.1896    0.05 Q      |       |   |   V       |
16+25    0.1899    0.04 Q      |       |   |   V       |
16+30    0.1902    0.04 Q      |       |   |   V       |
16+35    0.1904    0.04 Q      |       |   |   V       |
16+40    0.1906    0.03 Q      |       |   |   V       |
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16+45	0.1908	0.03	Q	|	|	|	V |
16+50	0.1911	0.03	Q	|	|	|	V |
16+55	0.1913	0.03	Q	|	|	|	V |
17+ 0	0.1915	0.03	Q	|	|	|	V |
17+ 5	0.1917	0.04	Q	|	|	|	V |
17+10	0.1921	0.05	Q	|	|	|	V |
17+15	0.1924	0.05	Q	|	|	|	V |
17+20	0.1927	0.05	Q	|	|	|	V |
17+25	0.1931	0.05	Q	|	|	|	V |
17+30	0.1934	0.05	Q	|	|	|	V |
17+35	0.1938	0.05	Q	|	|	|	V |
17+40	0.1941	0.05	Q	|	|	|	V |
17+45	0.1945	0.05	Q	|	|	|	V |
17+50	0.1948	0.05	Q	|	|	|	V |
17+55	0.1951	0.04	Q	|	|	|	V |
18+ 0	0.1954	0.04	Q	|	|	|	V |
18+ 5	0.1957	0.04	Q	|	|	|	V |
18+10	0.1959	0.04	Q	|	|	|	V |
18+15	0.1962	0.04	Q	|	|	|	V |
18+20	0.1965	0.04	Q	|	|	|	V |
18+25	0.1968	0.04	Q	|	|	|	V |
18+30	0.1970	0.04	Q	|	|	|	V |
18+35	0.1973	0.04	Q	|	|	|	V |
18+40	0.1975	0.03	Q	|	|	|	V |
18+45	0.1977	0.03	Q	|	|	|	V |
18+50	0.1979	0.03	Q	|	|	|	V |
18+55	0.1981	0.02	Q	|	|	|	V |
19+ 0	0.1982	0.02	Q	|	|	|	V |
19+ 5	0.1984	0.02	Q	|	|	|	V |
19+10	0.1986	0.03	Q	|	|	|	V |
19+15	0.1988	0.03	Q	|	|	|	V |
19+20	0.1990	0.03	Q	|	|	|	V |
19+25	0.1993	0.04	Q	|	|	|	V |
19+30	0.1996	0.04	Q	|	|	|	V |
19+35	0.1998	0.04	Q	|	|	|	V |
19+40	0.2000	0.03	Q	|	|	|	V |
19+45	0.2002	0.03	Q	|	|	|	V |
19+50	0.2004	0.03	Q	|	|	|	V |
19+55	0.2006	0.02	Q	|	|	|	V |
20+ 0	0.2007	0.02	Q	|	|	|	V |
20+ 5	0.2009	0.02	Q	|	|	|	V |
20+10	0.2011	0.03	Q	|	|	|	V |
20+15	0.2013	0.03	Q	|	|	|	V |
20+20	0.2015	0.03	Q	|	|	|	V |

20+25	0.2017	0.03	Q	|	|	V |
20+30	0.2019	0.03	Q	|	|	V |
20+35	0.2021	0.03	Q	|	|	V |
20+40	0.2023	0.03	Q	|	|	V |
20+45	0.2025	0.03	Q	|	|	V |
20+50	0.2027	0.03	Q	|	|	V |
20+55	0.2029	0.02	Q	|	|	V |
21+ 0	0.2030	0.02	Q	|	|	V |
21+ 5	0.2032	0.02	Q	|	|	V |
21+10	0.2034	0.03	Q	|	|	V |
21+15	0.2036	0.03	Q	|	|	V|
21+20	0.2038	0.03	Q	|	|	V|
21+25	0.2039	0.02	Q	|	|	V|
21+30	0.2041	0.02	Q	|	|	V|
21+35	0.2042	0.02	Q	|	|	V|
21+40	0.2044	0.03	Q	|	|	V|
21+45	0.2046	0.03	Q	|	|	V|
21+50	0.2048	0.03	Q	|	|	V|
21+55	0.2050	0.02	Q	|	|	V|
22+ 0	0.2051	0.02	Q	|	|	V|
22+ 5	0.2053	0.02	Q	|	|	V|
22+10	0.2055	0.03	Q	|	|	V|
22+15	0.2057	0.03	Q	|	|	V|
22+20	0.2059	0.03	Q	|	|	V|
22+25	0.2060	0.02	Q	|	|	V|
22+30	0.2062	0.02	Q	|	|	V|
22+35	0.2063	0.02	Q	|	|	V|
22+40	0.2064	0.02	Q	|	|	V|
22+45	0.2066	0.02	Q	|	|	V|
22+50	0.2067	0.02	Q	|	|	V|
22+55	0.2069	0.02	Q	|	|	V|
23+ 0	0.2070	0.02	Q	|	|	V|
23+ 5	0.2071	0.02	Q	|	|	V|
23+10	0.2073	0.02	Q	|	|	V|
23+15	0.2074	0.02	Q	|	|	V|
23+20	0.2076	0.02	Q	|	|	V|
23+25	0.2077	0.02	Q	|	|	V|
23+30	0.2078	0.02	Q	|	|	V|
23+35	0.2080	0.02	Q	|	|	V|
23+40	0.2081	0.02	Q	|	|	V|
23+45	0.2083	0.02	Q	|	|	V|
23+50	0.2084	0.02	Q	|	|	V|
23+55	0.2085	0.02	Q	|	|	V|
24+ 0	0.2087	0.02	Q	|	|	V|

24+ 5	0.2088	0.01	Q	|	|	| V|
24+10	0.2088	0.00	Q	|	|	| V|
24+15	0.2088	0.00	Q	|	|	| V|
24+20	0.2088	0.00	Q	|	|	| V|
24+25	0.2088	0.00	Q	|	|	| V

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E2YR24HRC242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
2 YEAR 24 HOUR
AREA C

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 667.00(Ft.)
Length along longest watercourse measured to centroid = 321.00(Ft.)
Length along longest watercourse = 0.126 Mi.
Length along longest watercourse measured to centroid = 0.061 Mi.
Difference in elevation = 4.80(Ft.)
Slope along watercourse = 37.9970 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.047 Hr.
Lag time = 2.84 Min.
25% of lag time = 0.71 Min.
40% of lag time = 1.13 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	1.70	5.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	3.90	11.70

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	85.00	0.200

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	70.0	0.362	0.200	0.297	1.000	0.297

Sum (F) = 0.297
Area averaged mean soil loss (F) (In/Hr) = 0.297
Minimum soil loss rate ((In/Hr)) = 0.148
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	176.353	38.997	1.179
2	0.167	352.705	45.050	1.362
3	0.250	529.058	9.831	0.297
4	0.333	705.410	4.067	0.123
5	0.417	881.763	2.056	0.062
		Sum = 100.000	Sum=	3.023

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1 0.08	0.07	0.014	(0.526)	0.012	0.001
2 0.17	0.07	0.014	(0.524)	0.012	0.001
3 0.25	0.07	0.014	(0.522)	0.012	0.001
4 0.33	0.10	0.020	(0.520)	0.018	0.002
5 0.42	0.10	0.020	(0.518)	0.018	0.002
6 0.50	0.10	0.020	(0.516)	0.018	0.002
7 0.58	0.10	0.020	(0.514)	0.018	0.002
8 0.67	0.10	0.020	(0.512)	0.018	0.002
9 0.75	0.10	0.020	(0.510)	0.018	0.002
10 0.83	0.13	0.027	(0.508)	0.024	0.003
11 0.92	0.13	0.027	(0.506)	0.024	0.003
12 1.00	0.13	0.027	(0.504)	0.024	0.003
13 1.08	0.10	0.020	(0.502)	0.018	0.002
14 1.17	0.10	0.020	(0.500)	0.018	0.002
15 1.25	0.10	0.020	(0.498)	0.018	0.002
16 1.33	0.10	0.020	(0.496)	0.018	0.002
17 1.42	0.10	0.020	(0.494)	0.018	0.002
18 1.50	0.10	0.020	(0.492)	0.018	0.002
19 1.58	0.10	0.020	(0.490)	0.018	0.002
20 1.67	0.10	0.020	(0.488)	0.018	0.002
21 1.75	0.10	0.020	(0.486)	0.018	0.002
22 1.83	0.13	0.027	(0.484)	0.024	0.003
23 1.92	0.13	0.027	(0.482)	0.024	0.003
24 2.00	0.13	0.027	(0.480)	0.024	0.003
25 2.08	0.13	0.027	(0.478)	0.024	0.003
26 2.17	0.13	0.027	(0.477)	0.024	0.003

27	2.25	0.13	0.027	(0.475)	0.024	0.003
28	2.33	0.13	0.027	(0.473)	0.024	0.003
29	2.42	0.13	0.027	(0.471)	0.024	0.003
30	2.50	0.13	0.027	(0.469)	0.024	0.003
31	2.58	0.17	0.034	(0.467)	0.031	0.003
32	2.67	0.17	0.034	(0.465)	0.031	0.003
33	2.75	0.17	0.034	(0.463)	0.031	0.003
34	2.83	0.17	0.034	(0.461)	0.031	0.003
35	2.92	0.17	0.034	(0.459)	0.031	0.003
36	3.00	0.17	0.034	(0.457)	0.031	0.003
37	3.08	0.17	0.034	(0.455)	0.031	0.003
38	3.17	0.17	0.034	(0.454)	0.031	0.003
39	3.25	0.17	0.034	(0.452)	0.031	0.003
40	3.33	0.17	0.034	(0.450)	0.031	0.003
41	3.42	0.17	0.034	(0.448)	0.031	0.003
42	3.50	0.17	0.034	(0.446)	0.031	0.003
43	3.58	0.17	0.034	(0.444)	0.031	0.003
44	3.67	0.17	0.034	(0.442)	0.031	0.003
45	3.75	0.17	0.034	(0.440)	0.031	0.003
46	3.83	0.20	0.041	(0.439)	0.037	0.004
47	3.92	0.20	0.041	(0.437)	0.037	0.004
48	4.00	0.20	0.041	(0.435)	0.037	0.004
49	4.08	0.20	0.041	(0.433)	0.037	0.004
50	4.17	0.20	0.041	(0.431)	0.037	0.004
51	4.25	0.20	0.041	(0.429)	0.037	0.004
52	4.33	0.23	0.048	(0.428)	0.043	0.005
53	4.42	0.23	0.048	(0.426)	0.043	0.005
54	4.50	0.23	0.048	(0.424)	0.043	0.005
55	4.58	0.23	0.048	(0.422)	0.043	0.005
56	4.67	0.23	0.048	(0.420)	0.043	0.005
57	4.75	0.23	0.048	(0.418)	0.043	0.005
58	4.83	0.27	0.054	(0.417)	0.049	0.005
59	4.92	0.27	0.054	(0.415)	0.049	0.005
60	5.00	0.27	0.054	(0.413)	0.049	0.005
61	5.08	0.20	0.041	(0.411)	0.037	0.004
62	5.17	0.20	0.041	(0.409)	0.037	0.004
63	5.25	0.20	0.041	(0.408)	0.037	0.004
64	5.33	0.23	0.048	(0.406)	0.043	0.005
65	5.42	0.23	0.048	(0.404)	0.043	0.005
66	5.50	0.23	0.048	(0.402)	0.043	0.005
67	5.58	0.27	0.054	(0.401)	0.049	0.005
68	5.67	0.27	0.054	(0.399)	0.049	0.005
69	5.75	0.27	0.054	(0.397)	0.049	0.005
70	5.83	0.27	0.054	(0.395)	0.049	0.005

71	5.92	0.27	0.054	(0.394)	0.049	0.005
72	6.00	0.27	0.054	(0.392)	0.049	0.005
73	6.08	0.30	0.061	(0.390)	0.055	0.006
74	6.17	0.30	0.061	(0.388)	0.055	0.006
75	6.25	0.30	0.061	(0.387)	0.055	0.006
76	6.33	0.30	0.061	(0.385)	0.055	0.006
77	6.42	0.30	0.061	(0.383)	0.055	0.006
78	6.50	0.30	0.061	(0.381)	0.055	0.006
79	6.58	0.33	0.068	(0.380)	0.061	0.007
80	6.67	0.33	0.068	(0.378)	0.061	0.007
81	6.75	0.33	0.068	(0.376)	0.061	0.007
82	6.83	0.33	0.068	(0.375)	0.061	0.007
83	6.92	0.33	0.068	(0.373)	0.061	0.007
84	7.00	0.33	0.068	(0.371)	0.061	0.007
85	7.08	0.33	0.068	(0.370)	0.061	0.007
86	7.17	0.33	0.068	(0.368)	0.061	0.007
87	7.25	0.33	0.068	(0.366)	0.061	0.007
88	7.33	0.37	0.075	(0.365)	0.067	0.007
89	7.42	0.37	0.075	(0.363)	0.067	0.007
90	7.50	0.37	0.075	(0.361)	0.067	0.007
91	7.58	0.40	0.082	(0.360)	0.073	0.008
92	7.67	0.40	0.082	(0.358)	0.073	0.008
93	7.75	0.40	0.082	(0.356)	0.073	0.008
94	7.83	0.43	0.088	(0.355)	0.080	0.009
95	7.92	0.43	0.088	(0.353)	0.080	0.009
96	8.00	0.43	0.088	(0.351)	0.080	0.009
97	8.08	0.50	0.102	(0.350)	0.092	0.010
98	8.17	0.50	0.102	(0.348)	0.092	0.010
99	8.25	0.50	0.102	(0.346)	0.092	0.010
100	8.33	0.50	0.102	(0.345)	0.092	0.010
101	8.42	0.50	0.102	(0.343)	0.092	0.010
102	8.50	0.50	0.102	(0.342)	0.092	0.010
103	8.58	0.53	0.109	(0.340)	0.098	0.011
104	8.67	0.53	0.109	(0.338)	0.098	0.011
105	8.75	0.53	0.109	(0.337)	0.098	0.011
106	8.83	0.57	0.116	(0.335)	0.104	0.012
107	8.92	0.57	0.116	(0.334)	0.104	0.012
108	9.00	0.57	0.116	(0.332)	0.104	0.012
109	9.08	0.63	0.129	(0.330)	0.116	0.013
110	9.17	0.63	0.129	(0.329)	0.116	0.013
111	9.25	0.63	0.129	(0.327)	0.116	0.013
112	9.33	0.67	0.136	(0.326)	0.122	0.014
113	9.42	0.67	0.136	(0.324)	0.122	0.014
114	9.50	0.67	0.136	(0.323)	0.122	0.014

115	9.58	0.70	0.143	(0.321)	0.129	0.014
116	9.67	0.70	0.143	(0.320)	0.129	0.014
117	9.75	0.70	0.143	(0.318)	0.129	0.014
118	9.83	0.73	0.150	(0.317)	0.135	0.015
119	9.92	0.73	0.150	(0.315)	0.135	0.015
120	10.00	0.73	0.150	(0.313)	0.135	0.015
121	10.08	0.50	0.102	(0.312)	0.092	0.010
122	10.17	0.50	0.102	(0.310)	0.092	0.010
123	10.25	0.50	0.102	(0.309)	0.092	0.010
124	10.33	0.50	0.102	(0.307)	0.092	0.010
125	10.42	0.50	0.102	(0.306)	0.092	0.010
126	10.50	0.50	0.102	(0.304)	0.092	0.010
127	10.58	0.67	0.136	(0.303)	0.122	0.014
128	10.67	0.67	0.136	(0.301)	0.122	0.014
129	10.75	0.67	0.136	(0.300)	0.122	0.014
130	10.83	0.67	0.136	(0.299)	0.122	0.014
131	10.92	0.67	0.136	(0.297)	0.122	0.014
132	11.00	0.67	0.136	(0.296)	0.122	0.014
133	11.08	0.63	0.129	(0.294)	0.116	0.013
134	11.17	0.63	0.129	(0.293)	0.116	0.013
135	11.25	0.63	0.129	(0.291)	0.116	0.013
136	11.33	0.63	0.129	(0.290)	0.116	0.013
137	11.42	0.63	0.129	(0.288)	0.116	0.013
138	11.50	0.63	0.129	(0.287)	0.116	0.013
139	11.58	0.57	0.116	(0.286)	0.104	0.012
140	11.67	0.57	0.116	(0.284)	0.104	0.012
141	11.75	0.57	0.116	(0.283)	0.104	0.012
142	11.83	0.60	0.122	(0.281)	0.110	0.012
143	11.92	0.60	0.122	(0.280)	0.110	0.012
144	12.00	0.60	0.122	(0.278)	0.110	0.012
145	12.08	0.83	0.170	(0.277)	0.153	0.017
146	12.17	0.83	0.170	(0.276)	0.153	0.017
147	12.25	0.83	0.170	(0.274)	0.153	0.017
148	12.33	0.87	0.177	(0.273)	0.159	0.018
149	12.42	0.87	0.177	(0.272)	0.159	0.018
150	12.50	0.87	0.177	(0.270)	0.159	0.018
151	12.58	0.93	0.190	(0.269)	0.171	0.019
152	12.67	0.93	0.190	(0.267)	0.171	0.019
153	12.75	0.93	0.190	(0.266)	0.171	0.019
154	12.83	0.97	0.197	(0.265)	0.177	0.020
155	12.92	0.97	0.197	(0.263)	0.177	0.020
156	13.00	0.97	0.197	(0.262)	0.177	0.020
157	13.08	1.13	0.231	(0.261)	0.208	0.023
158	13.17	1.13	0.231	(0.259)	0.208	0.023

159	13.25	1.13	0.231	(0.258)	0.208	0.023
160	13.33	1.13	0.231	(0.257)	0.208	0.023
161	13.42	1.13	0.231	(0.256)	0.208	0.023
162	13.50	1.13	0.231	(0.254)	0.208	0.023
163	13.58	0.77	0.156	(0.253)	0.141	0.016
164	13.67	0.77	0.156	(0.252)	0.141	0.016
165	13.75	0.77	0.156	(0.250)	0.141	0.016
166	13.83	0.77	0.156	(0.249)	0.141	0.016
167	13.92	0.77	0.156	(0.248)	0.141	0.016
168	14.00	0.77	0.156	(0.247)	0.141	0.016
169	14.08	0.90	0.184	(0.245)	0.165	0.018
170	14.17	0.90	0.184	(0.244)	0.165	0.018
171	14.25	0.90	0.184	(0.243)	0.165	0.018
172	14.33	0.87	0.177	(0.242)	0.159	0.018
173	14.42	0.87	0.177	(0.240)	0.159	0.018
174	14.50	0.87	0.177	(0.239)	0.159	0.018
175	14.58	0.87	0.177	(0.238)	0.159	0.018
176	14.67	0.87	0.177	(0.237)	0.159	0.018
177	14.75	0.87	0.177	(0.235)	0.159	0.018
178	14.83	0.83	0.170	(0.234)	0.153	0.017
179	14.92	0.83	0.170	(0.233)	0.153	0.017
180	15.00	0.83	0.170	(0.232)	0.153	0.017
181	15.08	0.80	0.163	(0.231)	0.147	0.016
182	15.17	0.80	0.163	(0.229)	0.147	0.016
183	15.25	0.80	0.163	(0.228)	0.147	0.016
184	15.33	0.77	0.156	(0.227)	0.141	0.016
185	15.42	0.77	0.156	(0.226)	0.141	0.016
186	15.50	0.77	0.156	(0.225)	0.141	0.016
187	15.58	0.63	0.129	(0.224)	0.116	0.013
188	15.67	0.63	0.129	(0.223)	0.116	0.013
189	15.75	0.63	0.129	(0.221)	0.116	0.013
190	15.83	0.63	0.129	(0.220)	0.116	0.013
191	15.92	0.63	0.129	(0.219)	0.116	0.013
192	16.00	0.63	0.129	(0.218)	0.116	0.013
193	16.08	0.13	0.027	(0.217)	0.024	0.003
194	16.17	0.13	0.027	(0.216)	0.024	0.003
195	16.25	0.13	0.027	(0.215)	0.024	0.003
196	16.33	0.13	0.027	(0.214)	0.024	0.003
197	16.42	0.13	0.027	(0.212)	0.024	0.003
198	16.50	0.13	0.027	(0.211)	0.024	0.003
199	16.58	0.10	0.020	(0.210)	0.018	0.002
200	16.67	0.10	0.020	(0.209)	0.018	0.002
201	16.75	0.10	0.020	(0.208)	0.018	0.002
202	16.83	0.10	0.020	(0.207)	0.018	0.002

203	16.92	0.10	0.020	(0.206)	0.018	0.002
204	17.00	0.10	0.020	(0.205)	0.018	0.002
205	17.08	0.17	0.034	(0.204)	0.031	0.003
206	17.17	0.17	0.034	(0.203)	0.031	0.003
207	17.25	0.17	0.034	(0.202)	0.031	0.003
208	17.33	0.17	0.034	(0.201)	0.031	0.003
209	17.42	0.17	0.034	(0.200)	0.031	0.003
210	17.50	0.17	0.034	(0.199)	0.031	0.003
211	17.58	0.17	0.034	(0.198)	0.031	0.003
212	17.67	0.17	0.034	(0.197)	0.031	0.003
213	17.75	0.17	0.034	(0.196)	0.031	0.003
214	17.83	0.13	0.027	(0.195)	0.024	0.003
215	17.92	0.13	0.027	(0.194)	0.024	0.003
216	18.00	0.13	0.027	(0.193)	0.024	0.003
217	18.08	0.13	0.027	(0.192)	0.024	0.003
218	18.17	0.13	0.027	(0.191)	0.024	0.003
219	18.25	0.13	0.027	(0.190)	0.024	0.003
220	18.33	0.13	0.027	(0.189)	0.024	0.003
221	18.42	0.13	0.027	(0.188)	0.024	0.003
222	18.50	0.13	0.027	(0.187)	0.024	0.003
223	18.58	0.10	0.020	(0.187)	0.018	0.002
224	18.67	0.10	0.020	(0.186)	0.018	0.002
225	18.75	0.10	0.020	(0.185)	0.018	0.002
226	18.83	0.07	0.014	(0.184)	0.012	0.001
227	18.92	0.07	0.014	(0.183)	0.012	0.001
228	19.00	0.07	0.014	(0.182)	0.012	0.001
229	19.08	0.10	0.020	(0.181)	0.018	0.002
230	19.17	0.10	0.020	(0.180)	0.018	0.002
231	19.25	0.10	0.020	(0.180)	0.018	0.002
232	19.33	0.13	0.027	(0.179)	0.024	0.003
233	19.42	0.13	0.027	(0.178)	0.024	0.003
234	19.50	0.13	0.027	(0.177)	0.024	0.003
235	19.58	0.10	0.020	(0.176)	0.018	0.002
236	19.67	0.10	0.020	(0.175)	0.018	0.002
237	19.75	0.10	0.020	(0.175)	0.018	0.002
238	19.83	0.07	0.014	(0.174)	0.012	0.001
239	19.92	0.07	0.014	(0.173)	0.012	0.001
240	20.00	0.07	0.014	(0.172)	0.012	0.001
241	20.08	0.10	0.020	(0.172)	0.018	0.002
242	20.17	0.10	0.020	(0.171)	0.018	0.002
243	20.25	0.10	0.020	(0.170)	0.018	0.002
244	20.33	0.10	0.020	(0.169)	0.018	0.002
245	20.42	0.10	0.020	(0.169)	0.018	0.002
246	20.50	0.10	0.020	(0.168)	0.018	0.002

247	20.58	0.10	0.020	(0.167)	0.018	0.002
248	20.67	0.10	0.020	(0.167)	0.018	0.002
249	20.75	0.10	0.020	(0.166)	0.018	0.002
250	20.83	0.07	0.014	(0.165)	0.012	0.001
251	20.92	0.07	0.014	(0.164)	0.012	0.001
252	21.00	0.07	0.014	(0.164)	0.012	0.001
253	21.08	0.10	0.020	(0.163)	0.018	0.002
254	21.17	0.10	0.020	(0.163)	0.018	0.002
255	21.25	0.10	0.020	(0.162)	0.018	0.002
256	21.33	0.07	0.014	(0.161)	0.012	0.001
257	21.42	0.07	0.014	(0.161)	0.012	0.001
258	21.50	0.07	0.014	(0.160)	0.012	0.001
259	21.58	0.10	0.020	(0.160)	0.018	0.002
260	21.67	0.10	0.020	(0.159)	0.018	0.002
261	21.75	0.10	0.020	(0.158)	0.018	0.002
262	21.83	0.07	0.014	(0.158)	0.012	0.001
263	21.92	0.07	0.014	(0.157)	0.012	0.001
264	22.00	0.07	0.014	(0.157)	0.012	0.001
265	22.08	0.10	0.020	(0.156)	0.018	0.002
266	22.17	0.10	0.020	(0.156)	0.018	0.002
267	22.25	0.10	0.020	(0.155)	0.018	0.002
268	22.33	0.07	0.014	(0.155)	0.012	0.001
269	22.42	0.07	0.014	(0.154)	0.012	0.001
270	22.50	0.07	0.014	(0.154)	0.012	0.001
271	22.58	0.07	0.014	(0.153)	0.012	0.001
272	22.67	0.07	0.014	(0.153)	0.012	0.001
273	22.75	0.07	0.014	(0.153)	0.012	0.001
274	22.83	0.07	0.014	(0.152)	0.012	0.001
275	22.92	0.07	0.014	(0.152)	0.012	0.001
276	23.00	0.07	0.014	(0.151)	0.012	0.001
277	23.08	0.07	0.014	(0.151)	0.012	0.001
278	23.17	0.07	0.014	(0.151)	0.012	0.001
279	23.25	0.07	0.014	(0.150)	0.012	0.001
280	23.33	0.07	0.014	(0.150)	0.012	0.001
281	23.42	0.07	0.014	(0.150)	0.012	0.001
282	23.50	0.07	0.014	(0.149)	0.012	0.001
283	23.58	0.07	0.014	(0.149)	0.012	0.001
284	23.67	0.07	0.014	(0.149)	0.012	0.001
285	23.75	0.07	0.014	(0.149)	0.012	0.001
286	23.83	0.07	0.014	(0.149)	0.012	0.001
287	23.92	0.07	0.014	(0.149)	0.012	0.001
288	24.00	0.07	0.014	(0.148)	0.012	0.001
			(Loss Rate Not Used)			
Sum =		100.0			Sum =	2.0

Flood volume = Effective rainfall 0.17(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.0(Ac.Ft)
Total soil loss = 1.53(In)
Total soil loss = 0.382(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 1851.3 Cubic Feet
Total soil loss = 16661.6 Cubic Feet

Peak flow rate of this hydrograph = 0.070(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00 Q	|	|	|	|	
0+10	0.0000	0.00 Q	|	|	|	|	
0+15	0.0001	0.00 Q	|	|	|	|	
0+20	0.0001	0.00 Q	|	|	|	|	
0+25	0.0001	0.01 Q	|	|	|	|	
0+30	0.0002	0.01 Q	|	|	|	|	
0+35	0.0002	0.01 Q	|	|	|	|	
0+40	0.0003	0.01 Q	|	|	|	|	
0+45	0.0003	0.01 Q	|	|	|	|	
0+50	0.0004	0.01 Q	|	|	|	|	
0+55	0.0004	0.01 Q	|	|	|	|	
1+ 0	0.0005	0.01 Q	|	|	|	|	
1+ 5	0.0005	0.01 Q	|	|	|	|	
1+10	0.0006	0.01 Q	|	|	|	|	
1+15	0.0006	0.01 Q	|	|	|	|	
1+20	0.0006	0.01 Q	|	|	|	|	
1+25	0.0007	0.01 Q	|	|	|	|	
1+30	0.0007	0.01 Q	|	|	|	|	
1+35	0.0008	0.01 Q	|	|	|	|	
1+40	0.0008	0.01 Q	|	|	|	|	
1+45	0.0009	0.01 Q	|	|	|	|	
1+50	0.0009	0.01 Q	|	|	|	|	
1+55	0.0010	0.01 Q	|	|	|	|	
2+ 0	0.0010	0.01 Q	|	|	|	|	
2+ 5	0.0011	0.01 QV	|	|	|	|	

2+10	0.0011	0.01	QV	|	|	|	|
2+15	0.0012	0.01	QV	|	|	|	|
2+20	0.0012	0.01	QV	|	|	|	|
2+25	0.0013	0.01	QV	|	|	|	|
2+30	0.0014	0.01	QV	|	|	|	|
2+35	0.0014	0.01	QV	|	|	|	|
2+40	0.0015	0.01	QV	|	|	|	|
2+45	0.0016	0.01	QV	|	|	|	|
2+50	0.0016	0.01	QV	|	|	|	|
2+55	0.0017	0.01	QV	|	|	|	|
3+ 0	0.0018	0.01	QV	|	|	|	|
3+ 5	0.0018	0.01	QV	|	|	|	|
3+10	0.0019	0.01	QV	|	|	|	|
3+15	0.0020	0.01	QV	|	|	|	|
3+20	0.0021	0.01	QV	|	|	|	|
3+25	0.0021	0.01	QV	|	|	|	|
3+30	0.0022	0.01	Q V	|	|	|	|
3+35	0.0023	0.01	Q V	|	|	|	|
3+40	0.0023	0.01	Q V	|	|	|	|
3+45	0.0024	0.01	Q V	|	|	|	|
3+50	0.0025	0.01	Q V	|	|	|	|
3+55	0.0026	0.01	Q V	|	|	|	|
4+ 0	0.0026	0.01	Q V	|	|	|	|
4+ 5	0.0027	0.01	Q V	|	|	|	|
4+10	0.0028	0.01	Q V	|	|	|	|
4+15	0.0029	0.01	Q V	|	|	|	|
4+20	0.0030	0.01	Q V	|	|	|	|
4+25	0.0031	0.01	Q V	|	|	|	|
4+30	0.0032	0.01	Q V	|	|	|	|
4+35	0.0033	0.01	Q V	|	|	|	|
4+40	0.0034	0.01	Q V	|	|	|	|
4+45	0.0035	0.01	Q V	|	|	|	|
4+50	0.0036	0.02	Q V	|	|	|	|
4+55	0.0037	0.02	Q V	|	|	|	|
5+ 0	0.0038	0.02	Q V	|	|	|	|
5+ 5	0.0039	0.01	Q V	|	|	|	|
5+10	0.0040	0.01	Q V	|	|	|	|
5+15	0.0041	0.01	Q V	|	|	|	|
5+20	0.0042	0.01	Q V	|	|	|	|
5+25	0.0043	0.01	Q V	|	|	|	|
5+30	0.0044	0.01	Q V	|	|	|	|
5+35	0.0045	0.02	Q V	|	|	|	|
5+40	0.0046	0.02	Q V	|	|	|	|
5+45	0.0047	0.02	Q V	|	|	|	|

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5+50     0.0048    0.02 Q  V    |       |       |       |
5+55     0.0049    0.02 Q  V    |       |       |       |
6+ 0     0.0050    0.02 Q  V    |       |       |       |
6+ 5     0.0052    0.02 Q  V    |       |       |       |
6+10     0.0053    0.02 Q  V    |       |       |       |
6+15     0.0054    0.02 Q  V    |       |       |       |
6+20     0.0055    0.02 Q  V    |       |       |       |
6+25     0.0057    0.02 Q  V    |       |       |       |
6+30     0.0058    0.02 Q  V    |       |       |       |
6+35     0.0059    0.02 Q  V    |       |       |       |
6+40     0.0061    0.02 Q  V    |       |       |       |
6+45     0.0062    0.02 Q  V    |       |       |       |
6+50     0.0064    0.02 Q  V    |       |       |       |
6+55     0.0065    0.02 Q  V    |       |       |       |
7+ 0     0.0066    0.02 Q  V    |       |       |       |
7+ 5     0.0068    0.02 Q  V    |       |       |       |
7+10     0.0069    0.02 Q  V    |       |       |       |
7+15     0.0071    0.02 Q  V    |       |       |       |
7+20     0.0072    0.02 Q  V    |       |       |       |
7+25     0.0074    0.02 Q  V    |       |       |       |
7+30     0.0075    0.02 Q  V    |       |       |       |
7+35     0.0077    0.02 Q  V    |       |       |       |
7+40     0.0078    0.02 Q  V    |       |       |       |
7+45     0.0080    0.02 Q  V    |       |       |       |
7+50     0.0082    0.03 Q  V    |       |       |       |
7+55     0.0084    0.03 Q  V    |       |       |       |
8+ 0     0.0086    0.03 Q  V    |       |       |       |
8+ 5     0.0088    0.03 Q  V    |       |       |       |
8+10     0.0090    0.03 Q  V    |       |       |       |
8+15     0.0092    0.03 Q  V    |       |       |       |
8+20     0.0094    0.03 Q  V    |       |       |       |
8+25     0.0096    0.03 Q  V    |       |       |       |
8+30     0.0098    0.03 Q  V    |       |       |       |
8+35     0.0100    0.03 Q  V    |       |       |       |
8+40     0.0102    0.03 Q  V    |       |       |       |
8+45     0.0105    0.03 Q  V    |       |       |       |
8+50     0.0107    0.03 Q  V    |       |       |       |
8+55     0.0109    0.03 Q  V    |       |       |       |
9+ 0     0.0112    0.03 Q  V    |       |       |       |
9+ 5     0.0114    0.04 Q  V    |       |       |       |
9+10     0.0117    0.04 Q  |V   |       |       |       |
9+15     0.0120    0.04 Q  |V   |       |       |       |
9+20     0.0122    0.04 Q  |V   |       |       |       |
9+25     0.0125    0.04 Q  |V   |       |       |       |
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 9+30    0.0128    0.04 Q     | V     |       |       |
 9+35    0.0131    0.04 Q     | V     |       |       |
 9+40    0.0134    0.04 Q     | V     |       |       |
 9+45    0.0137    0.04 Q     | V     |       |       |
 9+50    0.0140    0.04 Q     |  V    |       |       |
 9+55    0.0143    0.04 Q     |  V    |       |       |
10+ 0    0.0146    0.05 Q     |  V    |       |       |
10+ 5    0.0149    0.04 Q     |   V   |       |       |
10+10    0.0151    0.03 Q     |   V   |       |       |
10+15    0.0153    0.03 Q     |   V   |       |       |
10+20    0.0155    0.03 Q     |   V   |       |       |
10+25    0.0158    0.03 Q     |   V   |       |       |
10+30    0.0160    0.03 Q     |    V  |       |       |
10+35    0.0162    0.03 Q     |    V  |       |       |
10+40    0.0165    0.04 Q     |    V  |       |       |
10+45    0.0168    0.04 Q     |    V  |       |       |
10+50    0.0170    0.04 Q     |    V  |       |       |
10+55    0.0173    0.04 Q     |    V  |       |       |
11+ 0    0.0176    0.04 Q     |    V  |       |       |
11+ 5    0.0179    0.04 Q     |    V  |       |       |
11+10    0.0182    0.04 Q     |     V |       |       |
11+15    0.0184    0.04 Q     |     V |       |       |
11+20    0.0187    0.04 Q     |     V |       |       |
11+25    0.0190    0.04 Q     |     V |       |       |
11+30    0.0192    0.04 Q     |      V|       |       |
11+35    0.0195    0.04 Q     |      V|       |       |
11+40    0.0197    0.04 Q     |      V|       |       |
11+45    0.0200    0.04 Q     |      V|       |       |
11+50    0.0202    0.04 Q     |      V|       |       |
11+55    0.0205    0.04 Q     |      V|       |       |
12+ 0    0.0207    0.04 Q     |      V|       |       |
12+ 5    0.0210    0.04 Q     |      V|       |       |
12+10    0.0214    0.05 Q     |       V       |       |
12+15    0.0217    0.05 Q     |       V       |       |
12+20    0.0221    0.05 Q     |       V       |       |
12+25    0.0224    0.05 Q     |       |V      |       |
12+30    0.0228    0.05 Q     |       |V      |       |
12+35    0.0232    0.06 Q     |       |V      |       |
12+40    0.0236    0.06 Q     |       | V     |       |
12+45    0.0240    0.06 Q     |       | V     |       |
12+50    0.0244    0.06 Q     |       | V     |       |
12+55    0.0248    0.06 Q     |       |  V    |       |
13+ 0    0.0252    0.06 Q     |       |  V    |       |
13+ 5    0.0256    0.06 Q     |       |  V    |       |
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13+10    0.0261    0.07 Q     |       |  V    |       |
13+15    0.0266    0.07 Q     |       |  V    |       |
13+20    0.0271    0.07 Q     |       |  V    |       |
13+25    0.0275    0.07 Q     |       |  V    |       |
13+30    0.0280    0.07 Q     |       |  V    |       |
13+35    0.0284    0.06 Q     |       |  V    |       |
13+40    0.0288    0.05 Q     |       |  V    |       |
13+45    0.0291    0.05 Q     |       |  V    |       |
13+50    0.0295    0.05 Q     |       |  V    |       |
13+55    0.0298    0.05 Q     |       |  V    |       |
14+ 0    0.0301    0.05 Q     |       |  V    |       |
14+ 5    0.0305    0.05 Q     |       |  V    |       |
14+10    0.0308    0.05 Q     |       |  V    |       |
14+15    0.0312    0.06 Q     |       |  V    |       |
14+20    0.0316    0.05 Q     |       |  V    |       |
14+25    0.0320    0.05 Q     |       |  V    |
14+30    0.0323    0.05 Q     |       |  V    |
14+35    0.0327    0.05 Q     |       |  V    |
14+40    0.0331    0.05 Q     |       |  V    |
14+45    0.0334    0.05 Q     |       |  V    |
14+50    0.0338    0.05 Q     |       |  V    |
14+55    0.0342    0.05 Q     |       |  V    |
15+ 0    0.0345    0.05 Q     |       |  V    |
15+ 5    0.0349    0.05 Q     |       |  V    |
15+10    0.0352    0.05 Q     |       |  V    |
15+15    0.0355    0.05 Q     |       |  V    |
15+20    0.0359    0.05 Q     |       |  V    |
15+25    0.0362    0.05 Q     |       |  V    |
15+30    0.0365    0.05 Q     |       |  V    |
15+35    0.0368    0.04 Q     |       |  V    |
15+40    0.0371    0.04 Q     |       |  V    |
15+45    0.0374    0.04 Q     |       |  V    |
15+50    0.0377    0.04 Q     |       |  V    |
15+55    0.0379    0.04 Q     |       |  V    |
16+ 0    0.0382    0.04 Q     |       |  V    |
16+ 5    0.0384    0.03 Q     |       |  V    |
16+10    0.0385    0.01 Q     |       |  V    |
16+15    0.0385    0.01 Q     |       |  V    |
16+20    0.0386    0.01 Q     |       |  V    |
16+25    0.0387    0.01 Q     |       |  V    |
16+30    0.0387    0.01 Q     |       |  V    |
16+35    0.0388    0.01 Q     |       |  V    |
16+40    0.0388    0.01 Q     |       |  V    |
16+45    0.0389    0.01 Q     |       |  V    |
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16+50	0.0389	0.01	Q	|	|	| V |
16+55	0.0389	0.01	Q	|	|	| V |
17+ 0	0.0390	0.01	Q	|	|	| V |
17+ 5	0.0390	0.01	Q	|	|	| V |
17+10	0.0391	0.01	Q	|	|	| V |
17+15	0.0392	0.01	Q	|	|	| V |
17+20	0.0392	0.01	Q	|	|	| V |
17+25	0.0393	0.01	Q	|	|	| V |
17+30	0.0394	0.01	Q	|	|	| V |
17+35	0.0395	0.01	Q	|	|	| V |
17+40	0.0395	0.01	Q	|	|	| V |
17+45	0.0396	0.01	Q	|	|	| V |
17+50	0.0397	0.01	Q	|	|	| V |
17+55	0.0397	0.01	Q	|	|	| V |
18+ 0	0.0398	0.01	Q	|	|	| V |
18+ 5	0.0398	0.01	Q	|	|	| V |
18+10	0.0399	0.01	Q	|	|	| V |
18+15	0.0399	0.01	Q	|	|	| V |
18+20	0.0400	0.01	Q	|	|	| V |
18+25	0.0401	0.01	Q	|	|	| V |
18+30	0.0401	0.01	Q	|	|	| V |
18+35	0.0402	0.01	Q	|	|	| V |
18+40	0.0402	0.01	Q	|	|	| V |
18+45	0.0403	0.01	Q	|	|	| V |
18+50	0.0403	0.01	Q	|	|	| V |
18+55	0.0403	0.00	Q	|	|	| V |
19+ 0	0.0404	0.00	Q	|	|	| V |
19+ 5	0.0404	0.00	Q	|	|	| V |
19+10	0.0404	0.01	Q	|	|	| V |
19+15	0.0405	0.01	Q	|	|	| V |
19+20	0.0405	0.01	Q	|	|	| V |
19+25	0.0406	0.01	Q	|	|	| V |
19+30	0.0406	0.01	Q	|	|	| V |
19+35	0.0407	0.01	Q	|	|	| V |
19+40	0.0407	0.01	Q	|	|	| V |
19+45	0.0408	0.01	Q	|	|	| V |
19+50	0.0408	0.01	Q	|	|	| V |
19+55	0.0408	0.00	Q	|	|	| V |
20+ 0	0.0409	0.00	Q	|	|	| V |
20+ 5	0.0409	0.00	Q	|	|	| V |
20+10	0.0409	0.01	Q	|	|	| V |
20+15	0.0410	0.01	Q	|	|	| V |
20+20	0.0410	0.01	Q	|	|	| V |
20+25	0.0411	0.01	Q	|	|	| V |

20+30	0.0411	0.01	Q	|	|	V |
20+35	0.0411	0.01	Q	|	|	V |
20+40	0.0412	0.01	Q	|	|	V |
20+45	0.0412	0.01	Q	|	|	V |
20+50	0.0413	0.01	Q	|	|	V |
20+55	0.0413	0.00	Q	|	|	V |
21+ 0	0.0413	0.00	Q	|	|	V |
21+ 5	0.0414	0.00	Q	|	|	V |
21+10	0.0414	0.01	Q	|	|	V |
21+15	0.0414	0.01	Q	|	|	V|
21+20	0.0415	0.01	Q	|	|	V|
21+25	0.0415	0.00	Q	|	|	V|
21+30	0.0415	0.00	Q	|	|	V|
21+35	0.0416	0.00	Q	|	|	V|
21+40	0.0416	0.01	Q	|	|	V|
21+45	0.0417	0.01	Q	|	|	V|
21+50	0.0417	0.01	Q	|	|	V|
21+55	0.0417	0.00	Q	|	|	V|
22+ 0	0.0418	0.00	Q	|	|	V|
22+ 5	0.0418	0.00	Q	|	|	V|
22+10	0.0418	0.01	Q	|	|	V|
22+15	0.0419	0.01	Q	|	|	V|
22+20	0.0419	0.01	Q	|	|	V|
22+25	0.0419	0.00	Q	|	|	V|
22+30	0.0420	0.00	Q	|	|	V|
22+35	0.0420	0.00	Q	|	|	V|
22+40	0.0420	0.00	Q	|	|	V|
22+45	0.0421	0.00	Q	|	|	V|
22+50	0.0421	0.00	Q	|	|	V|
22+55	0.0421	0.00	Q	|	|	V|
23+ 0	0.0421	0.00	Q	|	|	V|
23+ 5	0.0422	0.00	Q	|	|	V|
23+10	0.0422	0.00	Q	|	|	V|
23+15	0.0422	0.00	Q	|	|	V|
23+20	0.0422	0.00	Q	|	|	V|
23+25	0.0423	0.00	Q	|	|	V|
23+30	0.0423	0.00	Q	|	|	V|
23+35	0.0423	0.00	Q	|	|	V|
23+40	0.0424	0.00	Q	|	|	V|
23+45	0.0424	0.00	Q	|	|	V|
23+50	0.0424	0.00	Q	|	|	V|
23+55	0.0424	0.00	Q	|	|	V|
24+ 0	0.0425	0.00	Q	|	|	V|
24+ 5	0.0425	0.00	Q	|	|	V|

24+10	0.0425	0.00	Q	|	|	|	V|
24+15	0.0425	0.00	Q	|	|	|	V|
24+20	0.0425	0.00	Q	|	|	|	V|

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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P2YR24HRA242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
2 YEAR 24 HOUR
AREA A

Drainage Area = 14.80(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.80(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	1.70	25.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	3.90	57.72

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.800	69.00	0.900

Total Area Entered = 14.80(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109

Sum (F) = 0.109
Area averaged mean soil loss (F) (In/Hr) = 0.109
Minimum soil loss rate ((In/Hr)) = 0.055
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.149
2	0.167	311.381	46.590	6.949
3	0.250	467.071	10.860	1.620
4	0.333	622.762	4.712	0.703
5	0.417	778.452	2.311	0.345
6	0.500	934.142	1.003	0.150
		Sum = 100.000	Sum=	14.916

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1	0.08	0.07	0.014	(0.193)	0.002	0.011
2	0.17	0.07	0.014	(0.193)	0.002	0.011
3	0.25	0.07	0.014	(0.192)	0.002	0.011
4	0.33	0.10	0.020	(0.191)	0.004	0.017
5	0.42	0.10	0.020	(0.190)	0.004	0.017
6	0.50	0.10	0.020	(0.190)	0.004	0.017
7	0.58	0.10	0.020	(0.189)	0.004	0.017
8	0.67	0.10	0.020	(0.188)	0.004	0.017
9	0.75	0.10	0.020	(0.187)	0.004	0.017
10	0.83	0.13	0.027	(0.187)	0.005	0.022
11	0.92	0.13	0.027	(0.186)	0.005	0.022
12	1.00	0.13	0.027	(0.185)	0.005	0.022
13	1.08	0.10	0.020	(0.184)	0.004	0.017
14	1.17	0.10	0.020	(0.184)	0.004	0.017
15	1.25	0.10	0.020	(0.183)	0.004	0.017
16	1.33	0.10	0.020	(0.182)	0.004	0.017
17	1.42	0.10	0.020	(0.182)	0.004	0.017
18	1.50	0.10	0.020	(0.181)	0.004	0.017
19	1.58	0.10	0.020	(0.180)	0.004	0.017
20	1.67	0.10	0.020	(0.179)	0.004	0.017
21	1.75	0.10	0.020	(0.179)	0.004	0.017
22	1.83	0.13	0.027	(0.178)	0.005	0.022
23	1.92	0.13	0.027	(0.177)	0.005	0.022
24	2.00	0.13	0.027	(0.176)	0.005	0.022
25	2.08	0.13	0.027	(0.176)	0.005	0.022

26	2.17	0.13	0.027	(0.175)	0.005	0.022
27	2.25	0.13	0.027	(0.174)	0.005	0.022
28	2.33	0.13	0.027	(0.174)	0.005	0.022
29	2.42	0.13	0.027	(0.173)	0.005	0.022
30	2.50	0.13	0.027	(0.172)	0.005	0.022
31	2.58	0.17	0.034	(0.172)	0.006	0.028
32	2.67	0.17	0.034	(0.171)	0.006	0.028
33	2.75	0.17	0.034	(0.170)	0.006	0.028
34	2.83	0.17	0.034	(0.169)	0.006	0.028
35	2.92	0.17	0.034	(0.169)	0.006	0.028
36	3.00	0.17	0.034	(0.168)	0.006	0.028
37	3.08	0.17	0.034	(0.167)	0.006	0.028
38	3.17	0.17	0.034	(0.167)	0.006	0.028
39	3.25	0.17	0.034	(0.166)	0.006	0.028
40	3.33	0.17	0.034	(0.165)	0.006	0.028
41	3.42	0.17	0.034	(0.165)	0.006	0.028
42	3.50	0.17	0.034	(0.164)	0.006	0.028
43	3.58	0.17	0.034	(0.163)	0.006	0.028
44	3.67	0.17	0.034	(0.162)	0.006	0.028
45	3.75	0.17	0.034	(0.162)	0.006	0.028
46	3.83	0.20	0.041	(0.161)	0.007	0.033
47	3.92	0.20	0.041	(0.160)	0.007	0.033
48	4.00	0.20	0.041	(0.160)	0.007	0.033
49	4.08	0.20	0.041	(0.159)	0.007	0.033
50	4.17	0.20	0.041	(0.158)	0.007	0.033
51	4.25	0.20	0.041	(0.158)	0.007	0.033
52	4.33	0.23	0.048	(0.157)	0.009	0.039
53	4.42	0.23	0.048	(0.156)	0.009	0.039
54	4.50	0.23	0.048	(0.156)	0.009	0.039
55	4.58	0.23	0.048	(0.155)	0.009	0.039
56	4.67	0.23	0.048	(0.154)	0.009	0.039
57	4.75	0.23	0.048	(0.154)	0.009	0.039
58	4.83	0.27	0.054	(0.153)	0.010	0.045
59	4.92	0.27	0.054	(0.152)	0.010	0.045
60	5.00	0.27	0.054	(0.152)	0.010	0.045
61	5.08	0.20	0.041	(0.151)	0.007	0.033
62	5.17	0.20	0.041	(0.150)	0.007	0.033
63	5.25	0.20	0.041	(0.150)	0.007	0.033
64	5.33	0.23	0.048	(0.149)	0.009	0.039
65	5.42	0.23	0.048	(0.148)	0.009	0.039
66	5.50	0.23	0.048	(0.148)	0.009	0.039
67	5.58	0.27	0.054	(0.147)	0.010	0.045
68	5.67	0.27	0.054	(0.147)	0.010	0.045
69	5.75	0.27	0.054	(0.146)	0.010	0.045

70	5.83	0.27	0.054	(0.145)	0.010	0.045
71	5.92	0.27	0.054	(0.145)	0.010	0.045
72	6.00	0.27	0.054	(0.144)	0.010	0.045
73	6.08	0.30	0.061	(0.143)	0.011	0.050
74	6.17	0.30	0.061	(0.143)	0.011	0.050
75	6.25	0.30	0.061	(0.142)	0.011	0.050
76	6.33	0.30	0.061	(0.141)	0.011	0.050
77	6.42	0.30	0.061	(0.141)	0.011	0.050
78	6.50	0.30	0.061	(0.140)	0.011	0.050
79	6.58	0.33	0.068	(0.140)	0.012	0.056
80	6.67	0.33	0.068	(0.139)	0.012	0.056
81	6.75	0.33	0.068	(0.138)	0.012	0.056
82	6.83	0.33	0.068	(0.138)	0.012	0.056
83	6.92	0.33	0.068	(0.137)	0.012	0.056
84	7.00	0.33	0.068	(0.136)	0.012	0.056
85	7.08	0.33	0.068	(0.136)	0.012	0.056
86	7.17	0.33	0.068	(0.135)	0.012	0.056
87	7.25	0.33	0.068	(0.135)	0.012	0.056
88	7.33	0.37	0.075	(0.134)	0.013	0.061
89	7.42	0.37	0.075	(0.133)	0.013	0.061
90	7.50	0.37	0.075	(0.133)	0.013	0.061
91	7.58	0.40	0.082	(0.132)	0.015	0.067
92	7.67	0.40	0.082	(0.131)	0.015	0.067
93	7.75	0.40	0.082	(0.131)	0.015	0.067
94	7.83	0.43	0.088	(0.130)	0.016	0.072
95	7.92	0.43	0.088	(0.130)	0.016	0.072
96	8.00	0.43	0.088	(0.129)	0.016	0.072
97	8.08	0.50	0.102	(0.128)	0.018	0.084
98	8.17	0.50	0.102	(0.128)	0.018	0.084
99	8.25	0.50	0.102	(0.127)	0.018	0.084
100	8.33	0.50	0.102	(0.127)	0.018	0.084
101	8.42	0.50	0.102	(0.126)	0.018	0.084
102	8.50	0.50	0.102	(0.125)	0.018	0.084
103	8.58	0.53	0.109	(0.125)	0.020	0.089
104	8.67	0.53	0.109	(0.124)	0.020	0.089
105	8.75	0.53	0.109	(0.124)	0.020	0.089
106	8.83	0.57	0.116	(0.123)	0.021	0.095
107	8.92	0.57	0.116	(0.123)	0.021	0.095
108	9.00	0.57	0.116	(0.122)	0.021	0.095
109	9.08	0.63	0.129	(0.121)	0.023	0.106
110	9.17	0.63	0.129	(0.121)	0.023	0.106
111	9.25	0.63	0.129	(0.120)	0.023	0.106
112	9.33	0.67	0.136	(0.120)	0.024	0.112
113	9.42	0.67	0.136	(0.119)	0.024	0.112

114	9.50	0.67	0.136	(0.119)	0.024	0.112
115	9.58	0.70	0.143	(0.118)	0.026	0.117
116	9.67	0.70	0.143	(0.117)	0.026	0.117
117	9.75	0.70	0.143	(0.117)	0.026	0.117
118	9.83	0.73	0.150	(0.116)	0.027	0.123
119	9.92	0.73	0.150	(0.116)	0.027	0.123
120	10.00	0.73	0.150	(0.115)	0.027	0.123
121	10.08	0.50	0.102	(0.115)	0.018	0.084
122	10.17	0.50	0.102	(0.114)	0.018	0.084
123	10.25	0.50	0.102	(0.113)	0.018	0.084
124	10.33	0.50	0.102	(0.113)	0.018	0.084
125	10.42	0.50	0.102	(0.112)	0.018	0.084
126	10.50	0.50	0.102	(0.112)	0.018	0.084
127	10.58	0.67	0.136	(0.111)	0.024	0.112
128	10.67	0.67	0.136	(0.111)	0.024	0.112
129	10.75	0.67	0.136	(0.110)	0.024	0.112
130	10.83	0.67	0.136	(0.110)	0.024	0.112
131	10.92	0.67	0.136	(0.109)	0.024	0.112
132	11.00	0.67	0.136	(0.109)	0.024	0.112
133	11.08	0.63	0.129	(0.108)	0.023	0.106
134	11.17	0.63	0.129	(0.108)	0.023	0.106
135	11.25	0.63	0.129	(0.107)	0.023	0.106
136	11.33	0.63	0.129	(0.106)	0.023	0.106
137	11.42	0.63	0.129	(0.106)	0.023	0.106
138	11.50	0.63	0.129	(0.105)	0.023	0.106
139	11.58	0.57	0.116	(0.105)	0.021	0.095
140	11.67	0.57	0.116	(0.104)	0.021	0.095
141	11.75	0.57	0.116	(0.104)	0.021	0.095
142	11.83	0.60	0.122	(0.103)	0.022	0.100
143	11.92	0.60	0.122	(0.103)	0.022	0.100
144	12.00	0.60	0.122	(0.102)	0.022	0.100
145	12.08	0.83	0.170	(0.102)	0.031	0.139
146	12.17	0.83	0.170	(0.101)	0.031	0.139
147	12.25	0.83	0.170	(0.101)	0.031	0.139
148	12.33	0.87	0.177	(0.100)	0.032	0.145
149	12.42	0.87	0.177	(0.100)	0.032	0.145
150	12.50	0.87	0.177	(0.099)	0.032	0.145
151	12.58	0.93	0.190	(0.099)	0.034	0.156
152	12.67	0.93	0.190	(0.098)	0.034	0.156
153	12.75	0.93	0.190	(0.098)	0.034	0.156
154	12.83	0.97	0.197	(0.097)	0.035	0.162
155	12.92	0.97	0.197	(0.097)	0.035	0.162
156	13.00	0.97	0.197	(0.096)	0.035	0.162
157	13.08	1.13	0.231	(0.096)	0.042	0.190

158	13.17	1.13	0.231	(0.095)	0.042	0.190
159	13.25	1.13	0.231	(0.095)	0.042	0.190
160	13.33	1.13	0.231	(0.094)	0.042	0.190
161	13.42	1.13	0.231	(0.094)	0.042	0.190
162	13.50	1.13	0.231	(0.093)	0.042	0.190
163	13.58	0.77	0.156	(0.093)	0.028	0.128
164	13.67	0.77	0.156	(0.092)	0.028	0.128
165	13.75	0.77	0.156	(0.092)	0.028	0.128
166	13.83	0.77	0.156	(0.092)	0.028	0.128
167	13.92	0.77	0.156	(0.091)	0.028	0.128
168	14.00	0.77	0.156	(0.091)	0.028	0.128
169	14.08	0.90	0.184	(0.090)	0.033	0.151
170	14.17	0.90	0.184	(0.090)	0.033	0.151
171	14.25	0.90	0.184	(0.089)	0.033	0.151
172	14.33	0.87	0.177	(0.089)	0.032	0.145
173	14.42	0.87	0.177	(0.088)	0.032	0.145
174	14.50	0.87	0.177	(0.088)	0.032	0.145
175	14.58	0.87	0.177	(0.087)	0.032	0.145
176	14.67	0.87	0.177	(0.087)	0.032	0.145
177	14.75	0.87	0.177	(0.086)	0.032	0.145
178	14.83	0.83	0.170	(0.086)	0.031	0.139
179	14.92	0.83	0.170	(0.086)	0.031	0.139
180	15.00	0.83	0.170	(0.085)	0.031	0.139
181	15.08	0.80	0.163	(0.085)	0.029	0.134
182	15.17	0.80	0.163	(0.084)	0.029	0.134
183	15.25	0.80	0.163	(0.084)	0.029	0.134
184	15.33	0.77	0.156	(0.083)	0.028	0.128
185	15.42	0.77	0.156	(0.083)	0.028	0.128
186	15.50	0.77	0.156	(0.083)	0.028	0.128
187	15.58	0.63	0.129	(0.082)	0.023	0.106
188	15.67	0.63	0.129	(0.082)	0.023	0.106
189	15.75	0.63	0.129	(0.081)	0.023	0.106
190	15.83	0.63	0.129	(0.081)	0.023	0.106
191	15.92	0.63	0.129	(0.080)	0.023	0.106
192	16.00	0.63	0.129	(0.080)	0.023	0.106
193	16.08	0.13	0.027	(0.080)	0.005	0.022
194	16.17	0.13	0.027	(0.079)	0.005	0.022
195	16.25	0.13	0.027	(0.079)	0.005	0.022
196	16.33	0.13	0.027	(0.078)	0.005	0.022
197	16.42	0.13	0.027	(0.078)	0.005	0.022
198	16.50	0.13	0.027	(0.078)	0.005	0.022
199	16.58	0.10	0.020	(0.077)	0.004	0.017
200	16.67	0.10	0.020	(0.077)	0.004	0.017
201	16.75	0.10	0.020	(0.076)	0.004	0.017

202	16.83	0.10	0.020	(0.076)	0.004	0.017
203	16.92	0.10	0.020	(0.076)	0.004	0.017
204	17.00	0.10	0.020	(0.075)	0.004	0.017
205	17.08	0.17	0.034	(0.075)	0.006	0.028
206	17.17	0.17	0.034	(0.075)	0.006	0.028
207	17.25	0.17	0.034	(0.074)	0.006	0.028
208	17.33	0.17	0.034	(0.074)	0.006	0.028
209	17.42	0.17	0.034	(0.073)	0.006	0.028
210	17.50	0.17	0.034	(0.073)	0.006	0.028
211	17.58	0.17	0.034	(0.073)	0.006	0.028
212	17.67	0.17	0.034	(0.072)	0.006	0.028
213	17.75	0.17	0.034	(0.072)	0.006	0.028
214	17.83	0.13	0.027	(0.072)	0.005	0.022
215	17.92	0.13	0.027	(0.071)	0.005	0.022
216	18.00	0.13	0.027	(0.071)	0.005	0.022
217	18.08	0.13	0.027	(0.071)	0.005	0.022
218	18.17	0.13	0.027	(0.070)	0.005	0.022
219	18.25	0.13	0.027	(0.070)	0.005	0.022
220	18.33	0.13	0.027	(0.070)	0.005	0.022
221	18.42	0.13	0.027	(0.069)	0.005	0.022
222	18.50	0.13	0.027	(0.069)	0.005	0.022
223	18.58	0.10	0.020	(0.069)	0.004	0.017
224	18.67	0.10	0.020	(0.068)	0.004	0.017
225	18.75	0.10	0.020	(0.068)	0.004	0.017
226	18.83	0.07	0.014	(0.068)	0.002	0.011
227	18.92	0.07	0.014	(0.067)	0.002	0.011
228	19.00	0.07	0.014	(0.067)	0.002	0.011
229	19.08	0.10	0.020	(0.067)	0.004	0.017
230	19.17	0.10	0.020	(0.066)	0.004	0.017
231	19.25	0.10	0.020	(0.066)	0.004	0.017
232	19.33	0.13	0.027	(0.066)	0.005	0.022
233	19.42	0.13	0.027	(0.065)	0.005	0.022
234	19.50	0.13	0.027	(0.065)	0.005	0.022
235	19.58	0.10	0.020	(0.065)	0.004	0.017
236	19.67	0.10	0.020	(0.064)	0.004	0.017
237	19.75	0.10	0.020	(0.064)	0.004	0.017
238	19.83	0.07	0.014	(0.064)	0.002	0.011
239	19.92	0.07	0.014	(0.064)	0.002	0.011
240	20.00	0.07	0.014	(0.063)	0.002	0.011
241	20.08	0.10	0.020	(0.063)	0.004	0.017
242	20.17	0.10	0.020	(0.063)	0.004	0.017
243	20.25	0.10	0.020	(0.062)	0.004	0.017
244	20.33	0.10	0.020	(0.062)	0.004	0.017
245	20.42	0.10	0.020	(0.062)	0.004	0.017

246	20.50	0.10	0.020	(0.062)	0.004	0.017
247	20.58	0.10	0.020	(0.061)	0.004	0.017
248	20.67	0.10	0.020	(0.061)	0.004	0.017
249	20.75	0.10	0.020	(0.061)	0.004	0.017
250	20.83	0.07	0.014	(0.061)	0.002	0.011
251	20.92	0.07	0.014	(0.060)	0.002	0.011
252	21.00	0.07	0.014	(0.060)	0.002	0.011
253	21.08	0.10	0.020	(0.060)	0.004	0.017
254	21.17	0.10	0.020	(0.060)	0.004	0.017
255	21.25	0.10	0.020	(0.059)	0.004	0.017
256	21.33	0.07	0.014	(0.059)	0.002	0.011
257	21.42	0.07	0.014	(0.059)	0.002	0.011
258	21.50	0.07	0.014	(0.059)	0.002	0.011
259	21.58	0.10	0.020	(0.059)	0.004	0.017
260	21.67	0.10	0.020	(0.058)	0.004	0.017
261	21.75	0.10	0.020	(0.058)	0.004	0.017
262	21.83	0.07	0.014	(0.058)	0.002	0.011
263	21.92	0.07	0.014	(0.058)	0.002	0.011
264	22.00	0.07	0.014	(0.058)	0.002	0.011
265	22.08	0.10	0.020	(0.057)	0.004	0.017
266	22.17	0.10	0.020	(0.057)	0.004	0.017
267	22.25	0.10	0.020	(0.057)	0.004	0.017
268	22.33	0.07	0.014	(0.057)	0.002	0.011
269	22.42	0.07	0.014	(0.057)	0.002	0.011
270	22.50	0.07	0.014	(0.057)	0.002	0.011
271	22.58	0.07	0.014	(0.056)	0.002	0.011
272	22.67	0.07	0.014	(0.056)	0.002	0.011
273	22.75	0.07	0.014	(0.056)	0.002	0.011
274	22.83	0.07	0.014	(0.056)	0.002	0.011
275	22.92	0.07	0.014	(0.056)	0.002	0.011
276	23.00	0.07	0.014	(0.056)	0.002	0.011
277	23.08	0.07	0.014	(0.055)	0.002	0.011
278	23.17	0.07	0.014	(0.055)	0.002	0.011
279	23.25	0.07	0.014	(0.055)	0.002	0.011
280	23.33	0.07	0.014	(0.055)	0.002	0.011
281	23.42	0.07	0.014	(0.055)	0.002	0.011
282	23.50	0.07	0.014	(0.055)	0.002	0.011
283	23.58	0.07	0.014	(0.055)	0.002	0.011
284	23.67	0.07	0.014	(0.055)	0.002	0.011
285	23.75	0.07	0.014	(0.055)	0.002	0.011
286	23.83	0.07	0.014	(0.055)	0.002	0.011
287	23.92	0.07	0.014	(0.055)	0.002	0.011
288	24.00	0.07	0.014	(0.055)	0.002	0.011

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.7

Flood volume = Effective rainfall 1.39(In)
times area 14.8(Ac.)/[(In)/(Ft.)] = 1.7(Ac.Ft)
Total soil loss = 0.31(In)
Total soil loss = 0.377(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 74889.1 Cubic Feet
Total soil loss = 16439.1 Cubic Feet

Peak flow rate of this hydrograph = 2.829(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004	0.06 Q	|	|	|	|	
0+10	0.0013	0.13 Q	|	|	|	|	
0+15	0.0024	0.15 Q	|	|	|	|	
0+20	0.0037	0.19 Q	|	|	|	|	
0+25	0.0053	0.23 Q	|	|	|	|	
0+30	0.0070	0.24 Q	|	|	|	|	
0+35	0.0087	0.25 Q	|	|	|	|	
0+40	0.0104	0.25 Q	|	|	|	|	
0+45	0.0121	0.25 Q	|	|	|	|	
0+50	0.0140	0.28 VQ	|	|	|	|	
0+55	0.0162	0.32 VQ	|	|	|	|	
1+ 0	0.0184	0.33 VQ	|	|	|	|	
1+ 5	0.0205	0.30 VQ	|	|	|	|	
1+10	0.0223	0.26 VQ	|	|	|	|	
1+15	0.0241	0.26 VQ	|	|	|	|	
1+20	0.0258	0.25 VQ	|	|	|	|	
1+25	0.0276	0.25 VQ	|	|	|	|	
1+30	0.0293	0.25 Q	|	|	|	|	
1+35	0.0310	0.25 Q	|	|	|	|	
1+40	0.0327	0.25 Q	|	|	|	|	
1+45	0.0344	0.25 Q	|	|	|	|	
1+50	0.0364	0.28 VQ	|	|	|	|	
1+55	0.0385	0.32 VQ	|	|	|	|	
2+ 0	0.0408	0.33 VQ	|	|	|	|	

2+ 5	0.0431	0.33	|Q	|	|	|	|
2+10	0.0453	0.33	|Q	|	|	|	|
2+15	0.0476	0.33	|Q	|	|	|	|
2+20	0.0499	0.33	|Q	|	|	|	|
2+25	0.0522	0.33	|Q	|	|	|	|
2+30	0.0545	0.33	|Q	|	|	|	|
2+35	0.0570	0.36	|Q	|	|	|	|
2+40	0.0598	0.40	|Q	|	|	|	|
2+45	0.0626	0.41	|Q	|	|	|	|
2+50	0.0654	0.41	|Q	|	|	|	|
2+55	0.0683	0.42	|Q	|	|	|	|
3+ 0	0.0712	0.42	|Q	|	|	|	|
3+ 5	0.0740	0.42	|Q	|	|	|	|
3+10	0.0769	0.42	|Q	|	|	|	|
3+15	0.0798	0.42	|Q	|	|	|	|
3+20	0.0826	0.42	|Q	|	|	|	|
3+25	0.0855	0.42	|Q	|	|	|	|
3+30	0.0883	0.42	|QV	|	|	|	|
3+35	0.0912	0.42	|QV	|	|	|	|
3+40	0.0941	0.42	|QV	|	|	|	|
3+45	0.0969	0.42	|QV	|	|	|	|
3+50	0.1000	0.44	|QV	|	|	|	|
3+55	0.1033	0.48	|QV	|	|	|	|
4+ 0	0.1067	0.49	|QV	|	|	|	|
4+ 5	0.1101	0.50	|QV	|	|	|	|
4+10	0.1136	0.50	|QV	|	|	|	|
4+15	0.1170	0.50	|QV	|	|	|	|
4+20	0.1207	0.53	| Q	|	|	|	|
4+25	0.1246	0.57	| Q	|	|	|	|
4+30	0.1285	0.58	| Q	|	|	|	|
4+35	0.1325	0.58	| QV	|	|	|	|
4+40	0.1365	0.58	| QV	|	|	|	|
4+45	0.1405	0.58	| QV	|	|	|	|
4+50	0.1447	0.61	| QV	|	|	|	|
4+55	0.1492	0.65	| QV	|	|	|	|
5+ 0	0.1538	0.66	| QV	|	|	|	|
5+ 5	0.1579	0.61	| QV	|	|	|	|
5+10	0.1616	0.53	| QV	|	|	|	|
5+15	0.1651	0.51	| QV	|	|	|	|
5+20	0.1688	0.53	| QV	|	|	|	|
5+25	0.1727	0.57	| Q V	|	|	|	|
5+30	0.1767	0.58	| Q V	|	|	|	|
5+35	0.1809	0.61	| Q V	|	|	|	|
5+40	0.1853	0.65	| Q V	|	|	|	|

5+45	0.1899	0.66	Q V				
5+50	0.1944	0.66	Q V				
5+55	0.1990	0.66	Q V				
6+ 0	0.2036	0.67	Q V				
6+ 5	0.2084	0.69	Q V				
6+10	0.2134	0.73	Q V				
6+15	0.2185	0.74	Q V				
6+20	0.2237	0.75	Q V				
6+25	0.2288	0.75	Q V				
6+30	0.2340	0.75	Q V				
6+35	0.2393	0.78	Q V				
6+40	0.2450	0.82	Q V				
6+45	0.2506	0.83	Q V				
6+50	0.2564	0.83	Q V				
6+55	0.2621	0.83	Q V				
7+ 0	0.2678	0.83	Q V				
7+ 5	0.2735	0.83	Q V				
7+10	0.2793	0.83	Q V				
7+15	0.2850	0.83	Q V				
7+20	0.2909	0.86	Q V				
7+25	0.2971	0.90	Q V				
7+30	0.3034	0.91	Q V				
7+35	0.3099	0.94	Q V				
7+40	0.3166	0.98	Q V				
7+45	0.3235	0.99	Q V				
7+50	0.3305	1.02	Q V				
7+55	0.3379	1.07	Q V				
8+ 0	0.3453	1.08	Q V				
8+ 5	0.3531	1.14	Q V				
8+10	0.3615	1.22	Q V				
8+15	0.3700	1.23	Q V				
8+20	0.3785	1.24	Q V				
8+25	0.3871	1.25	Q V				
8+30	0.3957	1.25	Q V				
8+35	0.4045	1.28	Q V				
8+40	0.4136	1.32	Q V				
8+45	0.4227	1.32	Q V				
8+50	0.4320	1.36	Q V				
8+55	0.4417	1.40	Q V				
9+ 0	0.4514	1.41	Q V				
9+ 5	0.4615	1.47	Q V				
9+10	0.4721	1.55	Q V				
9+15	0.4829	1.57	Q V				
9+20	0.4940	1.60	Q V				

9+25	0.5053	1.65	Q	V			
9+30	0.5167	1.66	Q	V			
9+35	0.5284	1.69	Q	V			
9+40	0.5403	1.73	Q	V			
9+45	0.5523	1.74	Q	V			
9+50	0.5645	1.77	Q	V			
9+55	0.5770	1.81	Q	V			
10+ 0	0.5896	1.82	Q	V			
10+ 5	0.6008	1.63	Q	V			
10+10	0.6101	1.36	Q	V			
10+15	0.6190	1.29	Q	V			
10+20	0.6278	1.27	Q	V			
10+25	0.6364	1.25	Q	V			
10+30	0.6450	1.25	Q	V			
10+35	0.6546	1.39	Q	V			
10+40	0.6655	1.59	Q	V			
10+45	0.6767	1.63	Q	V			
10+50	0.6881	1.65	Q	V			
10+55	0.6995	1.66	Q	V			
11+ 0	0.7110	1.66	Q	V			
11+ 5	0.7223	1.64	Q	V			
11+10	0.7332	1.60	Q	V			
11+15	0.7442	1.59	Q	V			
11+20	0.7551	1.58	Q	V			
11+25	0.7660	1.58	Q	V			
11+30	0.7769	1.58	Q	V			
11+35	0.7874	1.52	Q	V			
11+40	0.7973	1.45	Q	V			
11+45	0.8072	1.43	Q	V			
11+50	0.8171	1.45	Q	V			
11+55	0.8274	1.48	Q	V			
12+ 0	0.8376	1.49	Q	V			
12+ 5	0.8493	1.70	Q	V			
12+10	0.8629	1.97	Q	V			
12+15	0.8769	2.03	Q	V			
12+20	0.8913	2.09	Q	V			
12+25	0.9060	2.14	Q	V			
12+30	0.9209	2.16	Q	V			
12+35	0.9361	2.22	Q	V			
12+40	0.9520	2.30	Q	V			
12+45	0.9679	2.32	Q	V			
12+50	0.9841	2.35	Q	V			
12+55	1.0006	2.40	Q	V			
13+ 0	1.0172	2.41	Q	V			

13+ 5	1.0348	2.55	Q	V		
13+10	1.0537	2.75	Q	V		
13+15	1.0730	2.80	Q	V		
13+20	1.0924	2.82	Q	V		
13+25	1.1118	2.82	Q	V		
13+30	1.1313	2.83	Q	V		
13+35	1.1486	2.51	Q	V		
13+40	1.1630	2.09	Q	V		
13+45	1.1767	1.99	Q	V		
13+50	1.1901	1.94	Q	V		
13+55	1.2033	1.92	Q	V		
14+ 0	1.2165	1.91	Q	V		
14+ 5	1.2305	2.03	Q	V		
14+10	1.2455	2.18	Q	V		
14+15	1.2608	2.22	Q	V		
14+20	1.2760	2.21	Q	V		
14+25	1.2910	2.18	Q	V		
14+30	1.3059	2.17	Q	V		
14+35	1.3208	2.17	Q	V		
14+40	1.3357	2.16	Q	V		
14+45	1.3506	2.16	Q	V		
14+50	1.3654	2.13	Q	V		
14+55	1.3798	2.10	Q	V		
15+ 0	1.3942	2.09	Q	V		
15+ 5	1.4083	2.05	Q	V		
15+10	1.4222	2.01	Q	V		
15+15	1.4360	2.00	Q	V		
15+20	1.4495	1.97	Q	V		
15+25	1.4628	1.93	Q	V		
15+30	1.4761	1.92	Q	V		
15+35	1.4885	1.80	Q	V		
15+40	1.4998	1.64	Q	V		
15+45	1.5109	1.61	Q	V		
15+50	1.5218	1.59	Q	V		
15+55	1.5328	1.58	Q	V		
16+ 0	1.5436	1.58	Q	V		
16+ 5	1.5516	1.15	Q	V		
16+10	1.5555	0.57	Q	V		
16+15	1.5585	0.43	Q	V		
16+20	1.5610	0.37	Q	V		
16+25	1.5634	0.35	Q	V		
16+30	1.5657	0.33	Q	V		
16+35	1.5678	0.30	Q	V		
16+40	1.5696	0.27	Q	V		

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16+45    1.5714   0.26 |Q     |       |       |   V   |
16+50    1.5731   0.25 |Q     |       |       |   V   |
16+55    1.5749   0.25 |Q     |       |       |   V   |
17+ 0    1.5766   0.25  Q     |       |       |   V   |
17+ 5    1.5787   0.31 |Q     |       |       |   V   |
17+10    1.5813   0.38 |Q     |       |       |   V   |
17+15    1.5841   0.40 |Q     |       |       |   V   |
17+20    1.5869   0.41 |Q     |       |       |   V   |
17+25    1.5898   0.41 |Q     |       |       |   V   |
17+30    1.5927   0.42 |Q     |       |       |   V   |
17+35    1.5955   0.42 |Q     |       |       |   V   |
17+40    1.5984   0.42 |Q     |       |       |   V   |
17+45    1.6013   0.42 |Q     |       |       |   V   |
17+50    1.6039   0.39 |Q     |       |       |   V   |
17+55    1.6063   0.35 |Q     |       |       |   V   |
18+ 0    1.6087   0.34 |Q     |       |       |   V   |
18+ 5    1.6110   0.34 |Q     |       |       |   V   |
18+10    1.6133   0.33 |Q     |       |       |   V   |
18+15    1.6156   0.33 |Q     |       |       |   V   |
18+20    1.6179   0.33 |Q     |       |       |   V   |
18+25    1.6202   0.33 |Q     |       |       |   V   |
18+30    1.6224   0.33 |Q     |       |       |   V   |
18+35    1.6245   0.30 |Q     |       |       |   V   |
18+40    1.6264   0.27 |Q     |       |       |   V   |
18+45    1.6281   0.26 |Q     |       |       |   V   |
18+50    1.6297   0.22  Q     |       |       |   V   |
18+55    1.6309   0.18  Q     |       |       |   V   |
19+ 0    1.6321   0.17  Q     |       |       |   V   |
19+ 5    1.6335   0.20  Q     |       |       |   V   |
19+10    1.6351   0.23  Q     |       |       |   V   |
19+15    1.6368   0.24  Q     |       |       |   V   |
19+20    1.6387   0.28 |Q     |       |       |   V   |
19+25    1.6409   0.32 |Q     |       |       |   V   |
19+30    1.6431   0.33 |Q     |       |       |   V   |
19+35    1.6452   0.30 |Q     |       |       |   V   |
19+40    1.6470   0.26 |Q     |       |       |   V   |
19+45    1.6488   0.26 |Q     |       |       |   V   |
19+50    1.6503   0.22  Q     |       |       |   V   |
19+55    1.6516   0.18  Q     |       |       |   V   |
20+ 0    1.6528   0.17  Q     |       |       |   V   |
20+ 5    1.6541   0.20  Q     |       |       |   V   |
20+10    1.6557   0.23  Q     |       |       |   V   |
20+15    1.6574   0.24  Q     |       |       |   V   |
20+20    1.6591   0.25  Q     |       |       |   V   |
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20+25	1.6608	0.25	Q	|	|	V |
20+30	1.6625	0.25	Q	|	|	V |
20+35	1.6643	0.25	Q	|	|	V |
20+40	1.6660	0.25	Q	|	|	V |
20+45	1.6677	0.25	Q	|	|	V |
20+50	1.6692	0.22	Q	|	|	V |
20+55	1.6705	0.18	Q	|	|	V |
21+ 0	1.6717	0.17	Q	|	|	V |
21+ 5	1.6730	0.20	Q	|	|	V |
21+10	1.6746	0.23	Q	|	|	V |
21+15	1.6763	0.24	Q	|	|	V|
21+20	1.6778	0.22	Q	|	|	V|
21+25	1.6791	0.18	Q	|	|	V|
21+30	1.6803	0.17	Q	|	|	V|
21+35	1.6816	0.20	Q	|	|	V|
21+40	1.6832	0.23	Q	|	|	V|
21+45	1.6849	0.24	Q	|	|	V|
21+50	1.6864	0.22	Q	|	|	V|
21+55	1.6877	0.18	Q	|	|	V|
22+ 0	1.6889	0.17	Q	|	|	V|
22+ 5	1.6902	0.20	Q	|	|	V|
22+10	1.6918	0.23	Q	|	|	V|
22+15	1.6935	0.24	Q	|	|	V|
22+20	1.6950	0.22	Q	|	|	V|
22+25	1.6963	0.18	Q	|	|	V|
22+30	1.6975	0.17	Q	|	|	V|
22+35	1.6986	0.17	Q	|	|	V|
22+40	1.6998	0.17	Q	|	|	V|
22+45	1.7009	0.17	Q	|	|	V|
22+50	1.7021	0.17	Q	|	|	V|
22+55	1.7032	0.17	Q	|	|	V|
23+ 0	1.7044	0.17	Q	|	|	V|
23+ 5	1.7055	0.17	Q	|	|	V|
23+10	1.7066	0.17	Q	|	|	V|
23+15	1.7078	0.17	Q	|	|	V|
23+20	1.7089	0.17	Q	|	|	V|
23+25	1.7101	0.17	Q	|	|	V|
23+30	1.7112	0.17	Q	|	|	V|
23+35	1.7124	0.17	Q	|	|	V|
23+40	1.7135	0.17	Q	|	|	V|
23+45	1.7147	0.17	Q	|	|	V|
23+50	1.7158	0.17	Q	|	|	V|
23+55	1.7170	0.17	Q	|	|	V|
24+ 0	1.7181	0.17	Q	|	|	V|

24+ 5	1.7189	0.11	Q	|	|	| V|
24+10	1.7191	0.03	Q	|	|	| V|
24+15	1.7192	0.01	Q	|	|	| V|
24+20	1.7192	0.01	Q	|	|	| V|
24+25	1.7192	0.00	Q	|	|	| V|

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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P2YR24HRB242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
2 YEAR 24 HOUR
AREA B

Drainage Area = 15.37(Ac.) = 0.024 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.37(Ac.) = 0.024 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	1.70	26.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	3.90	59.94

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.370	69.00	0.900

Total Area Entered = 15.37(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109

Sum (F) = 0.109
Area averaged mean soil loss (F) (In/Hr) = 0.109
Minimum soil loss rate ((In/Hr)) = 0.055
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	155.690	34.524	5.348
2 0.167	311.381	46.590	7.217
3 0.250	467.071	10.860	1.682
4 0.333	622.762	4.712	0.730
5 0.417	778.452	2.311	0.358
6 0.500	934.142	1.003	0.155
	Sum = 100.000	Sum=	15.490

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1 0.08	0.07	0.014	(0.193)	0.002	0.011
2 0.17	0.07	0.014	(0.193)	0.002	0.011
3 0.25	0.07	0.014	(0.192)	0.002	0.011
4 0.33	0.10	0.020	(0.191)	0.004	0.017
5 0.42	0.10	0.020	(0.190)	0.004	0.017
6 0.50	0.10	0.020	(0.190)	0.004	0.017
7 0.58	0.10	0.020	(0.189)	0.004	0.017
8 0.67	0.10	0.020	(0.188)	0.004	0.017
9 0.75	0.10	0.020	(0.187)	0.004	0.017
10 0.83	0.13	0.027	(0.187)	0.005	0.022
11 0.92	0.13	0.027	(0.186)	0.005	0.022
12 1.00	0.13	0.027	(0.185)	0.005	0.022
13 1.08	0.10	0.020	(0.184)	0.004	0.017
14 1.17	0.10	0.020	(0.184)	0.004	0.017
15 1.25	0.10	0.020	(0.183)	0.004	0.017
16 1.33	0.10	0.020	(0.182)	0.004	0.017
17 1.42	0.10	0.020	(0.182)	0.004	0.017
18 1.50	0.10	0.020	(0.181)	0.004	0.017
19 1.58	0.10	0.020	(0.180)	0.004	0.017
20 1.67	0.10	0.020	(0.179)	0.004	0.017
21 1.75	0.10	0.020	(0.179)	0.004	0.017
22 1.83	0.13	0.027	(0.178)	0.005	0.022
23 1.92	0.13	0.027	(0.177)	0.005	0.022
24 2.00	0.13	0.027	(0.176)	0.005	0.022
25 2.08	0.13	0.027	(0.176)	0.005	0.022

26	2.17	0.13	0.027	(0.175)	0.005	0.022
27	2.25	0.13	0.027	(0.174)	0.005	0.022
28	2.33	0.13	0.027	(0.174)	0.005	0.022
29	2.42	0.13	0.027	(0.173)	0.005	0.022
30	2.50	0.13	0.027	(0.172)	0.005	0.022
31	2.58	0.17	0.034	(0.172)	0.006	0.028
32	2.67	0.17	0.034	(0.171)	0.006	0.028
33	2.75	0.17	0.034	(0.170)	0.006	0.028
34	2.83	0.17	0.034	(0.169)	0.006	0.028
35	2.92	0.17	0.034	(0.169)	0.006	0.028
36	3.00	0.17	0.034	(0.168)	0.006	0.028
37	3.08	0.17	0.034	(0.167)	0.006	0.028
38	3.17	0.17	0.034	(0.167)	0.006	0.028
39	3.25	0.17	0.034	(0.166)	0.006	0.028
40	3.33	0.17	0.034	(0.165)	0.006	0.028
41	3.42	0.17	0.034	(0.165)	0.006	0.028
42	3.50	0.17	0.034	(0.164)	0.006	0.028
43	3.58	0.17	0.034	(0.163)	0.006	0.028
44	3.67	0.17	0.034	(0.162)	0.006	0.028
45	3.75	0.17	0.034	(0.162)	0.006	0.028
46	3.83	0.20	0.041	(0.161)	0.007	0.033
47	3.92	0.20	0.041	(0.160)	0.007	0.033
48	4.00	0.20	0.041	(0.160)	0.007	0.033
49	4.08	0.20	0.041	(0.159)	0.007	0.033
50	4.17	0.20	0.041	(0.158)	0.007	0.033
51	4.25	0.20	0.041	(0.158)	0.007	0.033
52	4.33	0.23	0.048	(0.157)	0.009	0.039
53	4.42	0.23	0.048	(0.156)	0.009	0.039
54	4.50	0.23	0.048	(0.156)	0.009	0.039
55	4.58	0.23	0.048	(0.155)	0.009	0.039
56	4.67	0.23	0.048	(0.154)	0.009	0.039
57	4.75	0.23	0.048	(0.154)	0.009	0.039
58	4.83	0.27	0.054	(0.153)	0.010	0.045
59	4.92	0.27	0.054	(0.152)	0.010	0.045
60	5.00	0.27	0.054	(0.152)	0.010	0.045
61	5.08	0.20	0.041	(0.151)	0.007	0.033
62	5.17	0.20	0.041	(0.150)	0.007	0.033
63	5.25	0.20	0.041	(0.150)	0.007	0.033
64	5.33	0.23	0.048	(0.149)	0.009	0.039
65	5.42	0.23	0.048	(0.148)	0.009	0.039
66	5.50	0.23	0.048	(0.148)	0.009	0.039
67	5.58	0.27	0.054	(0.147)	0.010	0.045
68	5.67	0.27	0.054	(0.147)	0.010	0.045
69	5.75	0.27	0.054	(0.146)	0.010	0.045

70	5.83	0.27	0.054	(0.145)	0.010	0.045
71	5.92	0.27	0.054	(0.145)	0.010	0.045
72	6.00	0.27	0.054	(0.144)	0.010	0.045
73	6.08	0.30	0.061	(0.143)	0.011	0.050
74	6.17	0.30	0.061	(0.143)	0.011	0.050
75	6.25	0.30	0.061	(0.142)	0.011	0.050
76	6.33	0.30	0.061	(0.141)	0.011	0.050
77	6.42	0.30	0.061	(0.141)	0.011	0.050
78	6.50	0.30	0.061	(0.140)	0.011	0.050
79	6.58	0.33	0.068	(0.140)	0.012	0.056
80	6.67	0.33	0.068	(0.139)	0.012	0.056
81	6.75	0.33	0.068	(0.138)	0.012	0.056
82	6.83	0.33	0.068	(0.138)	0.012	0.056
83	6.92	0.33	0.068	(0.137)	0.012	0.056
84	7.00	0.33	0.068	(0.136)	0.012	0.056
85	7.08	0.33	0.068	(0.136)	0.012	0.056
86	7.17	0.33	0.068	(0.135)	0.012	0.056
87	7.25	0.33	0.068	(0.135)	0.012	0.056
88	7.33	0.37	0.075	(0.134)	0.013	0.061
89	7.42	0.37	0.075	(0.133)	0.013	0.061
90	7.50	0.37	0.075	(0.133)	0.013	0.061
91	7.58	0.40	0.082	(0.132)	0.015	0.067
92	7.67	0.40	0.082	(0.131)	0.015	0.067
93	7.75	0.40	0.082	(0.131)	0.015	0.067
94	7.83	0.43	0.088	(0.130)	0.016	0.072
95	7.92	0.43	0.088	(0.130)	0.016	0.072
96	8.00	0.43	0.088	(0.129)	0.016	0.072
97	8.08	0.50	0.102	(0.128)	0.018	0.084
98	8.17	0.50	0.102	(0.128)	0.018	0.084
99	8.25	0.50	0.102	(0.127)	0.018	0.084
100	8.33	0.50	0.102	(0.127)	0.018	0.084
101	8.42	0.50	0.102	(0.126)	0.018	0.084
102	8.50	0.50	0.102	(0.125)	0.018	0.084
103	8.58	0.53	0.109	(0.125)	0.020	0.089
104	8.67	0.53	0.109	(0.124)	0.020	0.089
105	8.75	0.53	0.109	(0.124)	0.020	0.089
106	8.83	0.57	0.116	(0.123)	0.021	0.095
107	8.92	0.57	0.116	(0.123)	0.021	0.095
108	9.00	0.57	0.116	(0.122)	0.021	0.095
109	9.08	0.63	0.129	(0.121)	0.023	0.106
110	9.17	0.63	0.129	(0.121)	0.023	0.106
111	9.25	0.63	0.129	(0.120)	0.023	0.106
112	9.33	0.67	0.136	(0.120)	0.024	0.112
113	9.42	0.67	0.136	(0.119)	0.024	0.112

114	9.50	0.67	0.136	(0.119)	0.024	0.112
115	9.58	0.70	0.143	(0.118)	0.026	0.117
116	9.67	0.70	0.143	(0.117)	0.026	0.117
117	9.75	0.70	0.143	(0.117)	0.026	0.117
118	9.83	0.73	0.150	(0.116)	0.027	0.123
119	9.92	0.73	0.150	(0.116)	0.027	0.123
120	10.00	0.73	0.150	(0.115)	0.027	0.123
121	10.08	0.50	0.102	(0.115)	0.018	0.084
122	10.17	0.50	0.102	(0.114)	0.018	0.084
123	10.25	0.50	0.102	(0.113)	0.018	0.084
124	10.33	0.50	0.102	(0.113)	0.018	0.084
125	10.42	0.50	0.102	(0.112)	0.018	0.084
126	10.50	0.50	0.102	(0.112)	0.018	0.084
127	10.58	0.67	0.136	(0.111)	0.024	0.112
128	10.67	0.67	0.136	(0.111)	0.024	0.112
129	10.75	0.67	0.136	(0.110)	0.024	0.112
130	10.83	0.67	0.136	(0.110)	0.024	0.112
131	10.92	0.67	0.136	(0.109)	0.024	0.112
132	11.00	0.67	0.136	(0.109)	0.024	0.112
133	11.08	0.63	0.129	(0.108)	0.023	0.106
134	11.17	0.63	0.129	(0.108)	0.023	0.106
135	11.25	0.63	0.129	(0.107)	0.023	0.106
136	11.33	0.63	0.129	(0.106)	0.023	0.106
137	11.42	0.63	0.129	(0.106)	0.023	0.106
138	11.50	0.63	0.129	(0.105)	0.023	0.106
139	11.58	0.57	0.116	(0.105)	0.021	0.095
140	11.67	0.57	0.116	(0.104)	0.021	0.095
141	11.75	0.57	0.116	(0.104)	0.021	0.095
142	11.83	0.60	0.122	(0.103)	0.022	0.100
143	11.92	0.60	0.122	(0.103)	0.022	0.100
144	12.00	0.60	0.122	(0.102)	0.022	0.100
145	12.08	0.83	0.170	(0.102)	0.031	0.139
146	12.17	0.83	0.170	(0.101)	0.031	0.139
147	12.25	0.83	0.170	(0.101)	0.031	0.139
148	12.33	0.87	0.177	(0.100)	0.032	0.145
149	12.42	0.87	0.177	(0.100)	0.032	0.145
150	12.50	0.87	0.177	(0.099)	0.032	0.145
151	12.58	0.93	0.190	(0.099)	0.034	0.156
152	12.67	0.93	0.190	(0.098)	0.034	0.156
153	12.75	0.93	0.190	(0.098)	0.034	0.156
154	12.83	0.97	0.197	(0.097)	0.035	0.162
155	12.92	0.97	0.197	(0.097)	0.035	0.162
156	13.00	0.97	0.197	(0.096)	0.035	0.162
157	13.08	1.13	0.231	(0.096)	0.042	0.190

158	13.17	1.13	0.231	(0.095)	0.042	0.190
159	13.25	1.13	0.231	(0.095)	0.042	0.190
160	13.33	1.13	0.231	(0.094)	0.042	0.190
161	13.42	1.13	0.231	(0.094)	0.042	0.190
162	13.50	1.13	0.231	(0.093)	0.042	0.190
163	13.58	0.77	0.156	(0.093)	0.028	0.128
164	13.67	0.77	0.156	(0.092)	0.028	0.128
165	13.75	0.77	0.156	(0.092)	0.028	0.128
166	13.83	0.77	0.156	(0.092)	0.028	0.128
167	13.92	0.77	0.156	(0.091)	0.028	0.128
168	14.00	0.77	0.156	(0.091)	0.028	0.128
169	14.08	0.90	0.184	(0.090)	0.033	0.151
170	14.17	0.90	0.184	(0.090)	0.033	0.151
171	14.25	0.90	0.184	(0.089)	0.033	0.151
172	14.33	0.87	0.177	(0.089)	0.032	0.145
173	14.42	0.87	0.177	(0.088)	0.032	0.145
174	14.50	0.87	0.177	(0.088)	0.032	0.145
175	14.58	0.87	0.177	(0.087)	0.032	0.145
176	14.67	0.87	0.177	(0.087)	0.032	0.145
177	14.75	0.87	0.177	(0.086)	0.032	0.145
178	14.83	0.83	0.170	(0.086)	0.031	0.139
179	14.92	0.83	0.170	(0.086)	0.031	0.139
180	15.00	0.83	0.170	(0.085)	0.031	0.139
181	15.08	0.80	0.163	(0.085)	0.029	0.134
182	15.17	0.80	0.163	(0.084)	0.029	0.134
183	15.25	0.80	0.163	(0.084)	0.029	0.134
184	15.33	0.77	0.156	(0.083)	0.028	0.128
185	15.42	0.77	0.156	(0.083)	0.028	0.128
186	15.50	0.77	0.156	(0.083)	0.028	0.128
187	15.58	0.63	0.129	(0.082)	0.023	0.106
188	15.67	0.63	0.129	(0.082)	0.023	0.106
189	15.75	0.63	0.129	(0.081)	0.023	0.106
190	15.83	0.63	0.129	(0.081)	0.023	0.106
191	15.92	0.63	0.129	(0.080)	0.023	0.106
192	16.00	0.63	0.129	(0.080)	0.023	0.106
193	16.08	0.13	0.027	(0.080)	0.005	0.022
194	16.17	0.13	0.027	(0.079)	0.005	0.022
195	16.25	0.13	0.027	(0.079)	0.005	0.022
196	16.33	0.13	0.027	(0.078)	0.005	0.022
197	16.42	0.13	0.027	(0.078)	0.005	0.022
198	16.50	0.13	0.027	(0.078)	0.005	0.022
199	16.58	0.10	0.020	(0.077)	0.004	0.017
200	16.67	0.10	0.020	(0.077)	0.004	0.017
201	16.75	0.10	0.020	(0.076)	0.004	0.017

202	16.83	0.10	0.020	(0.076)	0.004	0.017
203	16.92	0.10	0.020	(0.076)	0.004	0.017
204	17.00	0.10	0.020	(0.075)	0.004	0.017
205	17.08	0.17	0.034	(0.075)	0.006	0.028
206	17.17	0.17	0.034	(0.075)	0.006	0.028
207	17.25	0.17	0.034	(0.074)	0.006	0.028
208	17.33	0.17	0.034	(0.074)	0.006	0.028
209	17.42	0.17	0.034	(0.073)	0.006	0.028
210	17.50	0.17	0.034	(0.073)	0.006	0.028
211	17.58	0.17	0.034	(0.073)	0.006	0.028
212	17.67	0.17	0.034	(0.072)	0.006	0.028
213	17.75	0.17	0.034	(0.072)	0.006	0.028
214	17.83	0.13	0.027	(0.072)	0.005	0.022
215	17.92	0.13	0.027	(0.071)	0.005	0.022
216	18.00	0.13	0.027	(0.071)	0.005	0.022
217	18.08	0.13	0.027	(0.071)	0.005	0.022
218	18.17	0.13	0.027	(0.070)	0.005	0.022
219	18.25	0.13	0.027	(0.070)	0.005	0.022
220	18.33	0.13	0.027	(0.070)	0.005	0.022
221	18.42	0.13	0.027	(0.069)	0.005	0.022
222	18.50	0.13	0.027	(0.069)	0.005	0.022
223	18.58	0.10	0.020	(0.069)	0.004	0.017
224	18.67	0.10	0.020	(0.068)	0.004	0.017
225	18.75	0.10	0.020	(0.068)	0.004	0.017
226	18.83	0.07	0.014	(0.068)	0.002	0.011
227	18.92	0.07	0.014	(0.067)	0.002	0.011
228	19.00	0.07	0.014	(0.067)	0.002	0.011
229	19.08	0.10	0.020	(0.067)	0.004	0.017
230	19.17	0.10	0.020	(0.066)	0.004	0.017
231	19.25	0.10	0.020	(0.066)	0.004	0.017
232	19.33	0.13	0.027	(0.066)	0.005	0.022
233	19.42	0.13	0.027	(0.065)	0.005	0.022
234	19.50	0.13	0.027	(0.065)	0.005	0.022
235	19.58	0.10	0.020	(0.065)	0.004	0.017
236	19.67	0.10	0.020	(0.064)	0.004	0.017
237	19.75	0.10	0.020	(0.064)	0.004	0.017
238	19.83	0.07	0.014	(0.064)	0.002	0.011
239	19.92	0.07	0.014	(0.064)	0.002	0.011
240	20.00	0.07	0.014	(0.063)	0.002	0.011
241	20.08	0.10	0.020	(0.063)	0.004	0.017
242	20.17	0.10	0.020	(0.063)	0.004	0.017
243	20.25	0.10	0.020	(0.062)	0.004	0.017
244	20.33	0.10	0.020	(0.062)	0.004	0.017
245	20.42	0.10	0.020	(0.062)	0.004	0.017

246	20.50	0.10	0.020	(0.062)	0.004	0.017
247	20.58	0.10	0.020	(0.061)	0.004	0.017
248	20.67	0.10	0.020	(0.061)	0.004	0.017
249	20.75	0.10	0.020	(0.061)	0.004	0.017
250	20.83	0.07	0.014	(0.061)	0.002	0.011
251	20.92	0.07	0.014	(0.060)	0.002	0.011
252	21.00	0.07	0.014	(0.060)	0.002	0.011
253	21.08	0.10	0.020	(0.060)	0.004	0.017
254	21.17	0.10	0.020	(0.060)	0.004	0.017
255	21.25	0.10	0.020	(0.059)	0.004	0.017
256	21.33	0.07	0.014	(0.059)	0.002	0.011
257	21.42	0.07	0.014	(0.059)	0.002	0.011
258	21.50	0.07	0.014	(0.059)	0.002	0.011
259	21.58	0.10	0.020	(0.059)	0.004	0.017
260	21.67	0.10	0.020	(0.058)	0.004	0.017
261	21.75	0.10	0.020	(0.058)	0.004	0.017
262	21.83	0.07	0.014	(0.058)	0.002	0.011
263	21.92	0.07	0.014	(0.058)	0.002	0.011
264	22.00	0.07	0.014	(0.058)	0.002	0.011
265	22.08	0.10	0.020	(0.057)	0.004	0.017
266	22.17	0.10	0.020	(0.057)	0.004	0.017
267	22.25	0.10	0.020	(0.057)	0.004	0.017
268	22.33	0.07	0.014	(0.057)	0.002	0.011
269	22.42	0.07	0.014	(0.057)	0.002	0.011
270	22.50	0.07	0.014	(0.057)	0.002	0.011
271	22.58	0.07	0.014	(0.056)	0.002	0.011
272	22.67	0.07	0.014	(0.056)	0.002	0.011
273	22.75	0.07	0.014	(0.056)	0.002	0.011
274	22.83	0.07	0.014	(0.056)	0.002	0.011
275	22.92	0.07	0.014	(0.056)	0.002	0.011
276	23.00	0.07	0.014	(0.056)	0.002	0.011
277	23.08	0.07	0.014	(0.055)	0.002	0.011
278	23.17	0.07	0.014	(0.055)	0.002	0.011
279	23.25	0.07	0.014	(0.055)	0.002	0.011
280	23.33	0.07	0.014	(0.055)	0.002	0.011
281	23.42	0.07	0.014	(0.055)	0.002	0.011
282	23.50	0.07	0.014	(0.055)	0.002	0.011
283	23.58	0.07	0.014	(0.055)	0.002	0.011
284	23.67	0.07	0.014	(0.055)	0.002	0.011
285	23.75	0.07	0.014	(0.055)	0.002	0.011
286	23.83	0.07	0.014	(0.055)	0.002	0.011
287	23.92	0.07	0.014	(0.055)	0.002	0.011
288	24.00	0.07	0.014	(0.055)	0.002	0.011

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.7

Flood volume = Effective rainfall 1.39(In)
times area 15.4(Ac.)/[(In)/(Ft.)] = 1.8(Ac.Ft)
Total soil loss = 0.31(In)
Total soil loss = 0.392(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 77773.2 Cubic Feet
Total soil loss = 17072.2 Cubic Feet

Peak flow rate of this hydrograph = 2.938(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0004	0.06 Q					
0+10	0.0014	0.14 Q					
0+15	0.0025	0.16 Q					
0+20	0.0038	0.20 Q					
0+25	0.0055	0.24 Q					
0+30	0.0072	0.25 VQ					
0+35	0.0090	0.26 VQ					
0+40	0.0108	0.26 VQ					
0+45	0.0126	0.26 VQ					
0+50	0.0145	0.29 VQ					
0+55	0.0168	0.33 VQ					
1+ 0	0.0191	0.34 VQ					
1+ 5	0.0213	0.31 VQ					
1+10	0.0232	0.27 VQ					
1+15	0.0250	0.27 VQ					
1+20	0.0268	0.26 VQ					
1+25	0.0286	0.26 VQ					
1+30	0.0304	0.26 VQ					
1+35	0.0322	0.26 VQ					
1+40	0.0340	0.26 VQ					
1+45	0.0358	0.26 VQ					
1+50	0.0378	0.29 VQ					
1+55	0.0400	0.33 VQ					
2+ 0	0.0424	0.34 VQ					

2+ 5	0.0447	0.34	|Q	|	|	|	|
2+10	0.0471	0.34	|Q	|	|	|	|
2+15	0.0495	0.35	|Q	|	|	|	|
2+20	0.0519	0.35	|Q	|	|	|	|
2+25	0.0542	0.35	|Q	|	|	|	|
2+30	0.0566	0.35	|Q	|	|	|	|
2+35	0.0592	0.38	|Q	|	|	|	|
2+40	0.0621	0.42	|Q	|	|	|	|
2+45	0.0650	0.43	|Q	|	|	|	|
2+50	0.0680	0.43	|Q	|	|	|	|
2+55	0.0709	0.43	|Q	|	|	|	|
3+ 0	0.0739	0.43	|Q	|	|	|	|
3+ 5	0.0769	0.43	|Q	|	|	|	|
3+10	0.0798	0.43	|Q	|	|	|	|
3+15	0.0828	0.43	|Q	|	|	|	|
3+20	0.0858	0.43	|Q	|	|	|	|
3+25	0.0888	0.43	|Q	|	|	|	|
3+30	0.0917	0.43	|QV	|	|	|	|
3+35	0.0947	0.43	|QV	|	|	|	|
3+40	0.0977	0.43	|QV	|	|	|	|
3+45	0.1007	0.43	|QV	|	|	|	|
3+50	0.1039	0.46	|QV	|	|	|	|
3+55	0.1073	0.50	| Q	|	|	|	|
4+ 0	0.1108	0.51	| Q	|	|	|	|
4+ 5	0.1144	0.52	| Q	|	|	|	|
4+10	0.1180	0.52	| Q	|	|	|	|
4+15	0.1215	0.52	| Q	|	|	|	|
4+20	0.1253	0.55	| Q	|	|	|	|
4+25	0.1294	0.59	| Q	|	|	|	|
4+30	0.1335	0.60	| Q	|	|	|	|
4+35	0.1376	0.60	| QV	|	|	|	|
4+40	0.1418	0.60	| QV	|	|	|	|
4+45	0.1459	0.60	| QV	|	|	|	|
4+50	0.1503	0.63	| QV	|	|	|	|
4+55	0.1550	0.67	| QV	|	|	|	|
5+ 0	0.1597	0.68	| QV	|	|	|	|
5+ 5	0.1640	0.63	| QV	|	|	|	|
5+10	0.1678	0.55	| QV	|	|	|	|
5+15	0.1715	0.53	| QV	|	|	|	|
5+20	0.1753	0.55	| QV	|	|	|	|
5+25	0.1793	0.59	| Q V	|	|	|	|
5+30	0.1835	0.60	| Q V	|	|	|	|
5+35	0.1878	0.63	| Q V	|	|	|	|
5+40	0.1925	0.67	| Q V	|	|	|	|

5+45	0.1972	0.68	| Q V	|	|	|
5+50	0.2019	0.69	| Q V	|	|	|
5+55	0.2067	0.69	| Q V	|	|	|
6+ 0	0.2114	0.69	| Q V	|	|	|
6+ 5	0.2164	0.72	| Q V	|	|	|
6+10	0.2216	0.76	| QV	|	|	|
6+15	0.2270	0.77	| Q V	|	|	|
6+20	0.2323	0.77	| Q V	|	|	|
6+25	0.2376	0.78	| Q V	|	|	|
6+30	0.2430	0.78	| Q V	|	|	|
6+35	0.2486	0.81	| Q V	|	|	|
6+40	0.2544	0.85	| Q V	|	|	|
6+45	0.2603	0.86	| Q V	|	|	|
6+50	0.2662	0.86	| Q V	|	|	|
6+55	0.2722	0.86	| Q V	|	|	|
7+ 0	0.2781	0.86	| Q V	|	|	|
7+ 5	0.2841	0.86	| Q V	|	|	|
7+10	0.2900	0.86	| Q V	|	|	|
7+15	0.2960	0.86	| Q V	|	|	|
7+20	0.3021	0.89	| Q V	|	|	|
7+25	0.3086	0.93	| Q V	|	|	|
7+30	0.3151	0.94	| Q V	|	|	|
7+35	0.3218	0.98	| Q V	|	|	|
7+40	0.3288	1.02	| Q V	|	|	|
7+45	0.3359	1.03	| Q V	|	|	|
7+50	0.3432	1.06	| Q V	|	|	|
7+55	0.3509	1.11	| Q V	|	|	|
8+ 0	0.3586	1.12	| Q V |		|	|
8+ 5	0.3667	1.18	| Q V |		|	|
8+10	0.3754	1.26	| Q V |		|	|
8+15	0.3842	1.28	| Q V |		|	|
8+20	0.3931	1.29	| Q V |		|	|
8+25	0.4020	1.29	| Q V|		|	|
8+30	0.4109	1.30	| Q V|		|	|
8+35	0.4201	1.33	| Q V|		|	|
8+40	0.4295	1.37	| Q V|		|	|
8+45	0.4390	1.38	| Q V|		|	|
8+50	0.4487	1.41	| Q V	|	|	|
8+55	0.4587	1.45	| Q V	|	|	|
9+ 0	0.4687	1.46	| Q V	|	|	|
9+ 5	0.4792	1.53	| Q V	|	|	|
9+10	0.4903	1.61	| Q V	|	|	|
9+15	0.5015	1.63	| Q |V	|	|	|
9+20	0.5130	1.67	| Q |V	|	|	|

9+25	0.5248	1.71	Q	V			
9+30	0.5366	1.72	Q	V			
9+35	0.5487	1.76	Q	V			
9+40	0.5611	1.80	Q	V			
9+45	0.5736	1.81	Q	V			
9+50	0.5862	1.84	Q	V			
9+55	0.5992	1.88	Q	V			
10+ 0	0.6123	1.89	Q	V			
10+ 5	0.6239	1.69	Q	V			
10+10	0.6336	1.41	Q	V			
10+15	0.6429	1.34	Q	V			
10+20	0.6519	1.32	Q	V			
10+25	0.6609	1.30	Q	V			
10+30	0.6698	1.30	Q	V			
10+35	0.6798	1.45	Q	V			
10+40	0.6911	1.65	Q	V			
10+45	0.7028	1.69	Q	V			
10+50	0.7146	1.71	Q	V			
10+55	0.7265	1.72	Q	V			
11+ 0	0.7384	1.73	Q	V			
11+ 5	0.7501	1.70	Q	V			
11+10	0.7615	1.66	Q	V			
11+15	0.7728	1.65	Q	V			
11+20	0.7842	1.64	Q	V			
11+25	0.7955	1.64	Q	V			
11+30	0.8068	1.64	Q	V			
11+35	0.8177	1.58	Q	V			
11+40	0.8280	1.50	Q	V			
11+45	0.8382	1.48	Q	V			
11+50	0.8486	1.50	Q	V			
11+55	0.8592	1.54	Q	V			
12+ 0	0.8699	1.55	Q	V			
12+ 5	0.8820	1.76	Q	V			
12+10	0.8961	2.05	Q	V			
12+15	0.9106	2.11	Q	V			
12+20	0.9256	2.17	Q	V			
12+25	0.9409	2.22	Q	V			
12+30	0.9563	2.24	Q	V			
12+35	0.9722	2.30	Q	V			
12+40	0.9886	2.39	Q	V			
12+45	1.0052	2.41	Q	V			
12+50	1.0220	2.44	Q	V			
12+55	1.0392	2.49	Q	V			
13+ 0	1.0564	2.50	Q	V			

13+ 5	1.0746	2.65	Q	V		
13+10	1.0943	2.86	Q	V		
13+15	1.1143	2.90	Q	V		
13+20	1.1344	2.92	Q	V		
13+25	1.1546	2.93	Q	V		
13+30	1.1749	2.94	Q	V		
13+35	1.1929	2.61	Q	V		
13+40	1.2078	2.17	Q	V		
13+45	1.2220	2.06	Q	V		
13+50	1.2359	2.02	Q	V		
13+55	1.2497	2.00	Q	V		
14+ 0	1.2633	1.99	Q	V		
14+ 5	1.2779	2.11	Q	V		
14+10	1.2935	2.27	Q	V		
14+15	1.3094	2.31	Q	V		
14+20	1.3251	2.29	Q	V		
14+25	1.3407	2.26	Q	V		
14+30	1.3562	2.25	Q	V		
14+35	1.3717	2.25	Q	V		
14+40	1.3872	2.25	Q	V		
14+45	1.4027	2.25	Q	V		
14+50	1.4179	2.22	Q	V		
14+55	1.4329	2.18	Q	V		
15+ 0	1.4479	2.17	Q	V		
15+ 5	1.4625	2.13	Q	V		
15+10	1.4769	2.09	Q	V		
15+15	1.4913	2.08	Q	V		
15+20	1.5054	2.05	Q	V		
15+25	1.5192	2.00	Q	V		
15+30	1.5329	1.99	Q	V		
15+35	1.5458	1.87	Q	V		
15+40	1.5576	1.71	Q	V		
15+45	1.5691	1.67	Q	V		
15+50	1.5805	1.65	Q	V		
15+55	1.5918	1.65	Q	V		
16+ 0	1.6031	1.64	Q	V		
16+ 5	1.6113	1.19	Q	V		
16+10	1.6154	0.59	Q	V		
16+15	1.6185	0.45	Q	V		
16+20	1.6212	0.39	Q	V		
16+25	1.6236	0.36	Q	V		
16+30	1.6260	0.35	Q	V		
16+35	1.6282	0.32	Q	V		
16+40	1.6301	0.28	Q	V		

16+45	1.6319	0.27	Q	|	|	|	V |
16+50	1.6337	0.26	Q	|	|	|	V |
16+55	1.6355	0.26	Q	|	|	|	V |
17+ 0	1.6373	0.26	Q	|	|	|	V |
17+ 5	1.6395	0.32	Q	|	|	|	V |
17+10	1.6422	0.40	Q	|	|	|	V |
17+15	1.6451	0.42	Q	|	|	|	V |
17+20	1.6481	0.43	Q	|	|	|	V |
17+25	1.6510	0.43	Q	|	|	|	V |
17+30	1.6540	0.43	Q	|	|	|	V |
17+35	1.6570	0.43	Q	|	|	|	V |
17+40	1.6600	0.43	Q	|	|	|	V |
17+45	1.6629	0.43	Q	|	|	|	V |
17+50	1.6657	0.40	Q	|	|	|	V |
17+55	1.6682	0.36	Q	|	|	|	V |
18+ 0	1.6706	0.35	Q	|	|	|	V |
18+ 5	1.6730	0.35	Q	|	|	|	V |
18+10	1.6754	0.35	Q	|	|	|	V |
18+15	1.6778	0.35	Q	|	|	|	V |
18+20	1.6802	0.35	Q	|	|	|	V |
18+25	1.6825	0.35	Q	|	|	|	V |
18+30	1.6849	0.35	Q	|	|	|	V |
18+35	1.6871	0.32	Q	|	|	|	V |
18+40	1.6890	0.28	Q	|	|	|	V |
18+45	1.6908	0.27	Q	|	|	|	V |
18+50	1.6924	0.23	Q	|	|	|	V |
18+55	1.6937	0.19	Q	|	|	|	V |
19+ 0	1.6950	0.18	Q	|	|	|	V |
19+ 5	1.6964	0.21	Q	|	|	|	V |
19+10	1.6981	0.24	Q	|	|	|	V |
19+15	1.6998	0.25	Q	|	|	|	V |
19+20	1.7018	0.29	Q	|	|	|	V |
19+25	1.7040	0.33	Q	|	|	|	V |
19+30	1.7064	0.34	Q	|	|	|	V |
19+35	1.7085	0.31	Q	|	|	|	V |
19+40	1.7104	0.27	Q	|	|	|	V |
19+45	1.7123	0.27	Q	|	|	|	V |
19+50	1.7139	0.23	Q	|	|	|	V |
19+55	1.7152	0.19	Q	|	|	|	V |
20+ 0	1.7164	0.18	Q	|	|	|	V |
20+ 5	1.7178	0.21	Q	|	|	|	V |
20+10	1.7195	0.24	Q	|	|	|	V |
20+15	1.7212	0.25	Q	|	|	|	V |
20+20	1.7230	0.26	Q	|	|	|	V |

20+25	1.7248	0.26	|Q	|	|	|	V |
20+30	1.7266	0.26	|Q	|	|	|	V |
20+35	1.7284	0.26	|Q	|	|	|	V |
20+40	1.7301	0.26	|Q	|	|	|	V |
20+45	1.7319	0.26	|Q	|	|	|	V |
20+50	1.7335	0.23	Q	|	|	|	V |
20+55	1.7348	0.19	Q	|	|	|	V |
21+ 0	1.7360	0.18	Q	|	|	|	V |
21+ 5	1.7375	0.21	Q	|	|	|	V |
21+10	1.7391	0.24	Q	|	|	|	V |
21+15	1.7409	0.25	|Q	|	|	|	V|
21+20	1.7424	0.23	Q	|	|	|	V|
21+25	1.7437	0.19	Q	|	|	|	V|
21+30	1.7450	0.18	Q	|	|	|	V|
21+35	1.7464	0.21	Q	|	|	|	V|
21+40	1.7481	0.24	Q	|	|	|	V|
21+45	1.7498	0.25	|Q	|	|	|	V|
21+50	1.7514	0.23	Q	|	|	|	V|
21+55	1.7527	0.19	Q	|	|	|	V|
22+ 0	1.7539	0.18	Q	|	|	|	V|
22+ 5	1.7553	0.21	Q	|	|	|	V|
22+10	1.7570	0.24	Q	|	|	|	V|
22+15	1.7587	0.25	|Q	|	|	|	V|
22+20	1.7603	0.23	Q	|	|	|	V|
22+25	1.7616	0.19	Q	|	|	|	V|
22+30	1.7628	0.18	Q	|	|	|	V|
22+35	1.7640	0.18	Q	|	|	|	V|
22+40	1.7652	0.17	Q	|	|	|	V|
22+45	1.7664	0.17	Q	|	|	|	V|
22+50	1.7676	0.17	Q	|	|	|	V|
22+55	1.7688	0.17	Q	|	|	|	V|
23+ 0	1.7700	0.17	Q	|	|	|	V|
23+ 5	1.7712	0.17	Q	|	|	|	V|
23+10	1.7724	0.17	Q	|	|	|	V|
23+15	1.7736	0.17	Q	|	|	|	V|
23+20	1.7748	0.17	Q	|	|	|	V|
23+25	1.7759	0.17	Q	|	|	|	V|
23+30	1.7771	0.17	Q	|	|	|	V|
23+35	1.7783	0.17	Q	|	|	|	V|
23+40	1.7795	0.17	Q	|	|	|	V|
23+45	1.7807	0.17	Q	|	|	|	V|
23+50	1.7819	0.17	Q	|	|	|	V|
23+55	1.7831	0.17	Q	|	|	|	V|
24+ 0	1.7843	0.17	Q	|	|	|	V|

24+ 5	1.7851	0.11	Q	|	|	| V|
24+10	1.7853	0.03	Q	|	|	| V|
24+15	1.7854	0.01	Q	|	|	| V|
24+20	1.7854	0.01	Q	|	|	| V|
24+25	1.7854	0.00	Q	|	|	| V

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P2YR24HRC242.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
2 YEAR 24 HOUR
AREA C

Drainage Area = 2.42(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.42(Ac.) = 0.004 Sq. Mi.
Length along longest watercourse = 658.00(Ft.)
Length along longest watercourse measured to centroid = 311.00(Ft.)
Length along longest watercourse = 0.125 Mi.
Length along longest watercourse measured to centroid = 0.059 Mi.
Difference in elevation = 5.13(Ft.)
Slope along watercourse = 41.1647 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.027 Hr.
Lag time = 1.65 Min.
25% of lag time = 0.41 Min.
40% of lag time = 0.66 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	1.70	4.11

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	3.90	9.44

STORM EVENT (YEAR) = 2.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 1.700(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.700(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.420	69.00	0.900

Total Area Entered = 2.42(Ac.)

RI AMC2	RI AMC-1	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	49.8	0.574	0.900	0.109	1.000	0.109

Sum (F) = 0.109
Area averaged mean soil loss (F) (In/Hr) = 0.109
Minimum soil loss rate ((In/Hr)) = 0.055
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	303.601	57.047	1.391
2	0.167	607.202	36.931	0.901
3	0.250	910.803	6.022	0.147
		Sum = 100.000	Sum=	2.439

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time		Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.07	0.014	(0.193)	0.002	0.011
2	0.17	0.07	0.014	(0.193)	0.002	0.011
3	0.25	0.07	0.014	(0.192)	0.002	0.011
4	0.33	0.10	0.020	(0.191)	0.004	0.017
5	0.42	0.10	0.020	(0.190)	0.004	0.017
6	0.50	0.10	0.020	(0.190)	0.004	0.017
7	0.58	0.10	0.020	(0.189)	0.004	0.017
8	0.67	0.10	0.020	(0.188)	0.004	0.017
9	0.75	0.10	0.020	(0.187)	0.004	0.017
10	0.83	0.13	0.027	(0.187)	0.005	0.022
11	0.92	0.13	0.027	(0.186)	0.005	0.022
12	1.00	0.13	0.027	(0.185)	0.005	0.022
13	1.08	0.10	0.020	(0.184)	0.004	0.017
14	1.17	0.10	0.020	(0.184)	0.004	0.017
15	1.25	0.10	0.020	(0.183)	0.004	0.017
16	1.33	0.10	0.020	(0.182)	0.004	0.017
17	1.42	0.10	0.020	(0.182)	0.004	0.017
18	1.50	0.10	0.020	(0.181)	0.004	0.017
19	1.58	0.10	0.020	(0.180)	0.004	0.017
20	1.67	0.10	0.020	(0.179)	0.004	0.017
21	1.75	0.10	0.020	(0.179)	0.004	0.017
22	1.83	0.13	0.027	(0.178)	0.005	0.022
23	1.92	0.13	0.027	(0.177)	0.005	0.022
24	2.00	0.13	0.027	(0.176)	0.005	0.022
25	2.08	0.13	0.027	(0.176)	0.005	0.022
26	2.17	0.13	0.027	(0.175)	0.005	0.022
27	2.25	0.13	0.027	(0.174)	0.005	0.022
28	2.33	0.13	0.027	(0.174)	0.005	0.022

29	2.42	0.13	0.027	(0.173)	0.005	0.022
30	2.50	0.13	0.027	(0.172)	0.005	0.022
31	2.58	0.17	0.034	(0.172)	0.006	0.028
32	2.67	0.17	0.034	(0.171)	0.006	0.028
33	2.75	0.17	0.034	(0.170)	0.006	0.028
34	2.83	0.17	0.034	(0.169)	0.006	0.028
35	2.92	0.17	0.034	(0.169)	0.006	0.028
36	3.00	0.17	0.034	(0.168)	0.006	0.028
37	3.08	0.17	0.034	(0.167)	0.006	0.028
38	3.17	0.17	0.034	(0.167)	0.006	0.028
39	3.25	0.17	0.034	(0.166)	0.006	0.028
40	3.33	0.17	0.034	(0.165)	0.006	0.028
41	3.42	0.17	0.034	(0.165)	0.006	0.028
42	3.50	0.17	0.034	(0.164)	0.006	0.028
43	3.58	0.17	0.034	(0.163)	0.006	0.028
44	3.67	0.17	0.034	(0.162)	0.006	0.028
45	3.75	0.17	0.034	(0.162)	0.006	0.028
46	3.83	0.20	0.041	(0.161)	0.007	0.033
47	3.92	0.20	0.041	(0.160)	0.007	0.033
48	4.00	0.20	0.041	(0.160)	0.007	0.033
49	4.08	0.20	0.041	(0.159)	0.007	0.033
50	4.17	0.20	0.041	(0.158)	0.007	0.033
51	4.25	0.20	0.041	(0.158)	0.007	0.033
52	4.33	0.23	0.048	(0.157)	0.009	0.039
53	4.42	0.23	0.048	(0.156)	0.009	0.039
54	4.50	0.23	0.048	(0.156)	0.009	0.039
55	4.58	0.23	0.048	(0.155)	0.009	0.039
56	4.67	0.23	0.048	(0.154)	0.009	0.039
57	4.75	0.23	0.048	(0.154)	0.009	0.039
58	4.83	0.27	0.054	(0.153)	0.010	0.045
59	4.92	0.27	0.054	(0.152)	0.010	0.045
60	5.00	0.27	0.054	(0.152)	0.010	0.045
61	5.08	0.20	0.041	(0.151)	0.007	0.033
62	5.17	0.20	0.041	(0.150)	0.007	0.033
63	5.25	0.20	0.041	(0.150)	0.007	0.033
64	5.33	0.23	0.048	(0.149)	0.009	0.039
65	5.42	0.23	0.048	(0.148)	0.009	0.039
66	5.50	0.23	0.048	(0.148)	0.009	0.039
67	5.58	0.27	0.054	(0.147)	0.010	0.045
68	5.67	0.27	0.054	(0.147)	0.010	0.045
69	5.75	0.27	0.054	(0.146)	0.010	0.045
70	5.83	0.27	0.054	(0.145)	0.010	0.045
71	5.92	0.27	0.054	(0.145)	0.010	0.045
72	6.00	0.27	0.054	(0.144)	0.010	0.045

73	6.08	0.30	0.061	(0.143)	0.011	0.050
74	6.17	0.30	0.061	(0.143)	0.011	0.050
75	6.25	0.30	0.061	(0.142)	0.011	0.050
76	6.33	0.30	0.061	(0.141)	0.011	0.050
77	6.42	0.30	0.061	(0.141)	0.011	0.050
78	6.50	0.30	0.061	(0.140)	0.011	0.050
79	6.58	0.33	0.068	(0.140)	0.012	0.056
80	6.67	0.33	0.068	(0.139)	0.012	0.056
81	6.75	0.33	0.068	(0.138)	0.012	0.056
82	6.83	0.33	0.068	(0.138)	0.012	0.056
83	6.92	0.33	0.068	(0.137)	0.012	0.056
84	7.00	0.33	0.068	(0.136)	0.012	0.056
85	7.08	0.33	0.068	(0.136)	0.012	0.056
86	7.17	0.33	0.068	(0.135)	0.012	0.056
87	7.25	0.33	0.068	(0.135)	0.012	0.056
88	7.33	0.37	0.075	(0.134)	0.013	0.061
89	7.42	0.37	0.075	(0.133)	0.013	0.061
90	7.50	0.37	0.075	(0.133)	0.013	0.061
91	7.58	0.40	0.082	(0.132)	0.015	0.067
92	7.67	0.40	0.082	(0.131)	0.015	0.067
93	7.75	0.40	0.082	(0.131)	0.015	0.067
94	7.83	0.43	0.088	(0.130)	0.016	0.072
95	7.92	0.43	0.088	(0.130)	0.016	0.072
96	8.00	0.43	0.088	(0.129)	0.016	0.072
97	8.08	0.50	0.102	(0.128)	0.018	0.084
98	8.17	0.50	0.102	(0.128)	0.018	0.084
99	8.25	0.50	0.102	(0.127)	0.018	0.084
100	8.33	0.50	0.102	(0.127)	0.018	0.084
101	8.42	0.50	0.102	(0.126)	0.018	0.084
102	8.50	0.50	0.102	(0.125)	0.018	0.084
103	8.58	0.53	0.109	(0.125)	0.020	0.089
104	8.67	0.53	0.109	(0.124)	0.020	0.089
105	8.75	0.53	0.109	(0.124)	0.020	0.089
106	8.83	0.57	0.116	(0.123)	0.021	0.095
107	8.92	0.57	0.116	(0.123)	0.021	0.095
108	9.00	0.57	0.116	(0.122)	0.021	0.095
109	9.08	0.63	0.129	(0.121)	0.023	0.106
110	9.17	0.63	0.129	(0.121)	0.023	0.106
111	9.25	0.63	0.129	(0.120)	0.023	0.106
112	9.33	0.67	0.136	(0.120)	0.024	0.112
113	9.42	0.67	0.136	(0.119)	0.024	0.112
114	9.50	0.67	0.136	(0.119)	0.024	0.112
115	9.58	0.70	0.143	(0.118)	0.026	0.117
116	9.67	0.70	0.143	(0.117)	0.026	0.117

117	9.75	0.70	0.143	(0.117)	0.026	0.117
118	9.83	0.73	0.150	(0.116)	0.027	0.123
119	9.92	0.73	0.150	(0.116)	0.027	0.123
120	10.00	0.73	0.150	(0.115)	0.027	0.123
121	10.08	0.50	0.102	(0.115)	0.018	0.084
122	10.17	0.50	0.102	(0.114)	0.018	0.084
123	10.25	0.50	0.102	(0.113)	0.018	0.084
124	10.33	0.50	0.102	(0.113)	0.018	0.084
125	10.42	0.50	0.102	(0.112)	0.018	0.084
126	10.50	0.50	0.102	(0.112)	0.018	0.084
127	10.58	0.67	0.136	(0.111)	0.024	0.112
128	10.67	0.67	0.136	(0.111)	0.024	0.112
129	10.75	0.67	0.136	(0.110)	0.024	0.112
130	10.83	0.67	0.136	(0.110)	0.024	0.112
131	10.92	0.67	0.136	(0.109)	0.024	0.112
132	11.00	0.67	0.136	(0.109)	0.024	0.112
133	11.08	0.63	0.129	(0.108)	0.023	0.106
134	11.17	0.63	0.129	(0.108)	0.023	0.106
135	11.25	0.63	0.129	(0.107)	0.023	0.106
136	11.33	0.63	0.129	(0.106)	0.023	0.106
137	11.42	0.63	0.129	(0.106)	0.023	0.106
138	11.50	0.63	0.129	(0.105)	0.023	0.106
139	11.58	0.57	0.116	(0.105)	0.021	0.095
140	11.67	0.57	0.116	(0.104)	0.021	0.095
141	11.75	0.57	0.116	(0.104)	0.021	0.095
142	11.83	0.60	0.122	(0.103)	0.022	0.100
143	11.92	0.60	0.122	(0.103)	0.022	0.100
144	12.00	0.60	0.122	(0.102)	0.022	0.100
145	12.08	0.83	0.170	(0.102)	0.031	0.139
146	12.17	0.83	0.170	(0.101)	0.031	0.139
147	12.25	0.83	0.170	(0.101)	0.031	0.139
148	12.33	0.87	0.177	(0.100)	0.032	0.145
149	12.42	0.87	0.177	(0.100)	0.032	0.145
150	12.50	0.87	0.177	(0.099)	0.032	0.145
151	12.58	0.93	0.190	(0.099)	0.034	0.156
152	12.67	0.93	0.190	(0.098)	0.034	0.156
153	12.75	0.93	0.190	(0.098)	0.034	0.156
154	12.83	0.97	0.197	(0.097)	0.035	0.162
155	12.92	0.97	0.197	(0.097)	0.035	0.162
156	13.00	0.97	0.197	(0.096)	0.035	0.162
157	13.08	1.13	0.231	(0.096)	0.042	0.190
158	13.17	1.13	0.231	(0.095)	0.042	0.190
159	13.25	1.13	0.231	(0.095)	0.042	0.190
160	13.33	1.13	0.231	(0.094)	0.042	0.190

161	13.42	1.13	0.231	(0.094)	0.042	0.190
162	13.50	1.13	0.231	(0.093)	0.042	0.190
163	13.58	0.77	0.156	(0.093)	0.028	0.128
164	13.67	0.77	0.156	(0.092)	0.028	0.128
165	13.75	0.77	0.156	(0.092)	0.028	0.128
166	13.83	0.77	0.156	(0.092)	0.028	0.128
167	13.92	0.77	0.156	(0.091)	0.028	0.128
168	14.00	0.77	0.156	(0.091)	0.028	0.128
169	14.08	0.90	0.184	(0.090)	0.033	0.151
170	14.17	0.90	0.184	(0.090)	0.033	0.151
171	14.25	0.90	0.184	(0.089)	0.033	0.151
172	14.33	0.87	0.177	(0.089)	0.032	0.145
173	14.42	0.87	0.177	(0.088)	0.032	0.145
174	14.50	0.87	0.177	(0.088)	0.032	0.145
175	14.58	0.87	0.177	(0.087)	0.032	0.145
176	14.67	0.87	0.177	(0.087)	0.032	0.145
177	14.75	0.87	0.177	(0.086)	0.032	0.145
178	14.83	0.83	0.170	(0.086)	0.031	0.139
179	14.92	0.83	0.170	(0.086)	0.031	0.139
180	15.00	0.83	0.170	(0.085)	0.031	0.139
181	15.08	0.80	0.163	(0.085)	0.029	0.134
182	15.17	0.80	0.163	(0.084)	0.029	0.134
183	15.25	0.80	0.163	(0.084)	0.029	0.134
184	15.33	0.77	0.156	(0.083)	0.028	0.128
185	15.42	0.77	0.156	(0.083)	0.028	0.128
186	15.50	0.77	0.156	(0.083)	0.028	0.128
187	15.58	0.63	0.129	(0.082)	0.023	0.106
188	15.67	0.63	0.129	(0.082)	0.023	0.106
189	15.75	0.63	0.129	(0.081)	0.023	0.106
190	15.83	0.63	0.129	(0.081)	0.023	0.106
191	15.92	0.63	0.129	(0.080)	0.023	0.106
192	16.00	0.63	0.129	(0.080)	0.023	0.106
193	16.08	0.13	0.027	(0.080)	0.005	0.022
194	16.17	0.13	0.027	(0.079)	0.005	0.022
195	16.25	0.13	0.027	(0.079)	0.005	0.022
196	16.33	0.13	0.027	(0.078)	0.005	0.022
197	16.42	0.13	0.027	(0.078)	0.005	0.022
198	16.50	0.13	0.027	(0.078)	0.005	0.022
199	16.58	0.10	0.020	(0.077)	0.004	0.017
200	16.67	0.10	0.020	(0.077)	0.004	0.017
201	16.75	0.10	0.020	(0.076)	0.004	0.017
202	16.83	0.10	0.020	(0.076)	0.004	0.017
203	16.92	0.10	0.020	(0.076)	0.004	0.017
204	17.00	0.10	0.020	(0.075)	0.004	0.017

205	17.08	0.17	0.034	(0.075)	0.006	0.028
206	17.17	0.17	0.034	(0.075)	0.006	0.028
207	17.25	0.17	0.034	(0.074)	0.006	0.028
208	17.33	0.17	0.034	(0.074)	0.006	0.028
209	17.42	0.17	0.034	(0.073)	0.006	0.028
210	17.50	0.17	0.034	(0.073)	0.006	0.028
211	17.58	0.17	0.034	(0.073)	0.006	0.028
212	17.67	0.17	0.034	(0.072)	0.006	0.028
213	17.75	0.17	0.034	(0.072)	0.006	0.028
214	17.83	0.13	0.027	(0.072)	0.005	0.022
215	17.92	0.13	0.027	(0.071)	0.005	0.022
216	18.00	0.13	0.027	(0.071)	0.005	0.022
217	18.08	0.13	0.027	(0.071)	0.005	0.022
218	18.17	0.13	0.027	(0.070)	0.005	0.022
219	18.25	0.13	0.027	(0.070)	0.005	0.022
220	18.33	0.13	0.027	(0.070)	0.005	0.022
221	18.42	0.13	0.027	(0.069)	0.005	0.022
222	18.50	0.13	0.027	(0.069)	0.005	0.022
223	18.58	0.10	0.020	(0.069)	0.004	0.017
224	18.67	0.10	0.020	(0.068)	0.004	0.017
225	18.75	0.10	0.020	(0.068)	0.004	0.017
226	18.83	0.07	0.014	(0.068)	0.002	0.011
227	18.92	0.07	0.014	(0.067)	0.002	0.011
228	19.00	0.07	0.014	(0.067)	0.002	0.011
229	19.08	0.10	0.020	(0.067)	0.004	0.017
230	19.17	0.10	0.020	(0.066)	0.004	0.017
231	19.25	0.10	0.020	(0.066)	0.004	0.017
232	19.33	0.13	0.027	(0.066)	0.005	0.022
233	19.42	0.13	0.027	(0.065)	0.005	0.022
234	19.50	0.13	0.027	(0.065)	0.005	0.022
235	19.58	0.10	0.020	(0.065)	0.004	0.017
236	19.67	0.10	0.020	(0.064)	0.004	0.017
237	19.75	0.10	0.020	(0.064)	0.004	0.017
238	19.83	0.07	0.014	(0.064)	0.002	0.011
239	19.92	0.07	0.014	(0.064)	0.002	0.011
240	20.00	0.07	0.014	(0.063)	0.002	0.011
241	20.08	0.10	0.020	(0.063)	0.004	0.017
242	20.17	0.10	0.020	(0.063)	0.004	0.017
243	20.25	0.10	0.020	(0.062)	0.004	0.017
244	20.33	0.10	0.020	(0.062)	0.004	0.017
245	20.42	0.10	0.020	(0.062)	0.004	0.017
246	20.50	0.10	0.020	(0.062)	0.004	0.017
247	20.58	0.10	0.020	(0.061)	0.004	0.017
248	20.67	0.10	0.020	(0.061)	0.004	0.017

249	20.75	0.10	0.020	(0.061)	0.004	0.017
250	20.83	0.07	0.014	(0.061)	0.002	0.011
251	20.92	0.07	0.014	(0.060)	0.002	0.011
252	21.00	0.07	0.014	(0.060)	0.002	0.011
253	21.08	0.10	0.020	(0.060)	0.004	0.017
254	21.17	0.10	0.020	(0.060)	0.004	0.017
255	21.25	0.10	0.020	(0.059)	0.004	0.017
256	21.33	0.07	0.014	(0.059)	0.002	0.011
257	21.42	0.07	0.014	(0.059)	0.002	0.011
258	21.50	0.07	0.014	(0.059)	0.002	0.011
259	21.58	0.10	0.020	(0.059)	0.004	0.017
260	21.67	0.10	0.020	(0.058)	0.004	0.017
261	21.75	0.10	0.020	(0.058)	0.004	0.017
262	21.83	0.07	0.014	(0.058)	0.002	0.011
263	21.92	0.07	0.014	(0.058)	0.002	0.011
264	22.00	0.07	0.014	(0.058)	0.002	0.011
265	22.08	0.10	0.020	(0.057)	0.004	0.017
266	22.17	0.10	0.020	(0.057)	0.004	0.017
267	22.25	0.10	0.020	(0.057)	0.004	0.017
268	22.33	0.07	0.014	(0.057)	0.002	0.011
269	22.42	0.07	0.014	(0.057)	0.002	0.011
270	22.50	0.07	0.014	(0.057)	0.002	0.011
271	22.58	0.07	0.014	(0.056)	0.002	0.011
272	22.67	0.07	0.014	(0.056)	0.002	0.011
273	22.75	0.07	0.014	(0.056)	0.002	0.011
274	22.83	0.07	0.014	(0.056)	0.002	0.011
275	22.92	0.07	0.014	(0.056)	0.002	0.011
276	23.00	0.07	0.014	(0.056)	0.002	0.011
277	23.08	0.07	0.014	(0.055)	0.002	0.011
278	23.17	0.07	0.014	(0.055)	0.002	0.011
279	23.25	0.07	0.014	(0.055)	0.002	0.011
280	23.33	0.07	0.014	(0.055)	0.002	0.011
281	23.42	0.07	0.014	(0.055)	0.002	0.011
282	23.50	0.07	0.014	(0.055)	0.002	0.011
283	23.58	0.07	0.014	(0.055)	0.002	0.011
284	23.67	0.07	0.014	(0.055)	0.002	0.011
285	23.75	0.07	0.014	(0.055)	0.002	0.011
286	23.83	0.07	0.014	(0.055)	0.002	0.011
287	23.92	0.07	0.014	(0.055)	0.002	0.011
288	24.00	0.07	0.014	(0.055)	0.002	0.011

(Loss Rate Not Used)

Sum = 100.0 Sum = 16.7

Flood volume = Effective rainfall 1.39(In)

times area 2.4(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)

Total soil loss = 0.31(In)
Total soil loss = 0.062(Ac.Ft)
Total rainfall = 1.70(In)
Flood volume = 12245.7 Cubic Feet
Total soil loss = 2688.1 Cubic Feet

Peak flow rate of this hydrograph = 0.463(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.02 Q	|	|	|	|	
0+10	0.0003	0.03 Q	|	|	|	|	
0+15	0.0005	0.03 Q	|	|	|	|	
0+20	0.0007	0.03 Q	|	|	|	|	
0+25	0.0010	0.04 Q	|	|	|	|	
0+30	0.0013	0.04 Q	|	|	|	|	
0+35	0.0015	0.04 Q	|	|	|	|	
0+40	0.0018	0.04 Q	|	|	|	|	
0+45	0.0021	0.04 Q	|	|	|	|	
0+50	0.0024	0.05 Q	|	|	|	|	
0+55	0.0028	0.05 Q	|	|	|	|	
1+ 0	0.0032	0.05 Q	|	|	|	|	
1+ 5	0.0035	0.05 Q	|	|	|	|	
1+10	0.0038	0.04 Q	|	|	|	|	
1+15	0.0041	0.04 Q	|	|	|	|	
1+20	0.0044	0.04 Q	|	|	|	|	
1+25	0.0046	0.04 Q	|	|	|	|	
1+30	0.0049	0.04 Q	|	|	|	|	
1+35	0.0052	0.04 Q	|	|	|	|	
1+40	0.0055	0.04 Q	|	|	|	|	
1+45	0.0058	0.04 Q	|	|	|	|	
1+50	0.0061	0.05 Q	|	|	|	|	
1+55	0.0065	0.05 Q	|	|	|	|	
2+ 0	0.0068	0.05 Q	|	|	|	|	
2+ 5	0.0072	0.05 QV	|	|	|	|	
2+10	0.0076	0.05 QV	|	|	|	|	
2+15	0.0080	0.05 QV	|	|	|	|	

2+20	0.0083	0.05	QV	|	|	|	|
2+25	0.0087	0.05	QV	|	|	|	|
2+30	0.0091	0.05	QV	|	|	|	|
2+35	0.0095	0.06	QV	|	|	|	|
2+40	0.0100	0.07	QV	|	|	|	|
2+45	0.0105	0.07	QV	|	|	|	|
2+50	0.0109	0.07	QV	|	|	|	|
2+55	0.0114	0.07	QV	|	|	|	|
3+ 0	0.0119	0.07	QV	|	|	|	|
3+ 5	0.0123	0.07	QV	|	|	|	|
3+10	0.0128	0.07	QV	|	|	|	|
3+15	0.0133	0.07	QV	|	|	|	|
3+20	0.0137	0.07	QV	|	|	|	|
3+25	0.0142	0.07	Q V	|	|	|	|
3+30	0.0147	0.07	Q V	|	|	|	|
3+35	0.0151	0.07	Q V	|	|	|	|
3+40	0.0156	0.07	Q V	|	|	|	|
3+45	0.0161	0.07	Q V	|	|	|	|
3+50	0.0166	0.08	Q V	|	|	|	|
3+55	0.0172	0.08	Q V	|	|	|	|
4+ 0	0.0177	0.08	Q V	|	|	|	|
4+ 5	0.0183	0.08	Q V	|	|	|	|
4+10	0.0188	0.08	Q V	|	|	|	|
4+15	0.0194	0.08	Q V	|	|	|	|
4+20	0.0200	0.09	Q V	|	|	|	|
4+25	0.0207	0.09	Q V	|	|	|	|
4+30	0.0213	0.10	Q V	|	|	|	|
4+35	0.0220	0.10	Q V	|	|	|	|
4+40	0.0226	0.10	Q V	|	|	|	|
4+45	0.0233	0.10	Q V	|	|	|	|
4+50	0.0240	0.10	Q V	|	|	|	|
4+55	0.0247	0.11	Q V	|	|	|	|
5+ 0	0.0255	0.11	Q V	|	|	|	|
5+ 5	0.0261	0.09	Q V	|	|	|	|
5+10	0.0267	0.08	Q V	|	|	|	|
5+15	0.0273	0.08	Q V	|	|	|	|
5+20	0.0279	0.09	Q V	|	|	|	|
5+25	0.0285	0.09	Q V	|	|	|	|
5+30	0.0292	0.10	Q V	|	|	|	|
5+35	0.0299	0.10	Q V	|	|	|	|
5+40	0.0306	0.11	Q V	|	|	|	|
5+45	0.0314	0.11	Q V	|	|	|	|
5+50	0.0321	0.11	Q V	|	|	|	|
5+55	0.0329	0.11	Q V	|	|	|	|

6+ 0	0.0336	0.11	Q V	|	|	|	|
6+ 5	0.0345	0.12	Q V	|	|	|	|
6+10	0.0353	0.12	Q V	|	|	|	|
6+15	0.0361	0.12	Q V	|	|	|	|
6+20	0.0370	0.12	Q V	|	|	|	|
6+25	0.0378	0.12	Q V	|	|	|	|
6+30	0.0387	0.12	Q V	|	|	|	|
6+35	0.0396	0.13	Q V	|	|	|	|
6+40	0.0405	0.14	Q V	|	|	|	|
6+45	0.0414	0.14	Q V	|	|	|	|
6+50	0.0424	0.14	Q V	|	|	|	|
6+55	0.0433	0.14	Q V	|	|	|	|
7+ 0	0.0442	0.14	Q V	|	|	|	|
7+ 5	0.0452	0.14	Q V	|	|	|	|
7+10	0.0461	0.14	Q V	|	|	|	|
7+15	0.0471	0.14	Q V	|	|	|	|
7+20	0.0480	0.14	Q V	|	|	|	|
7+25	0.0491	0.15	Q V	|	|	|	|
7+30	0.0501	0.15	Q V	|	|	|	|
7+35	0.0512	0.16	Q V	|	|	|	|
7+40	0.0523	0.16	Q V	|	|	|	|
7+45	0.0534	0.16	Q V	|	|	|	|
7+50	0.0546	0.17	Q V	|	|	|	|
7+55	0.0558	0.18	Q V	|	|	|	|
8+ 0	0.0570	0.18	Q V	|	|	|	|
8+ 5	0.0584	0.19	Q V	|	|	|	|
8+10	0.0598	0.20	Q V	|	|	|	|
8+15	0.0612	0.20	Q V	|	|	|	|
8+20	0.0626	0.20	Q V	|	|	|	|
8+25	0.0640	0.20	Q V	|	|	|	|
8+30	0.0654	0.20	Q V	|	|	|	|
8+35	0.0668	0.21	Q V	|	|	|	|
8+40	0.0683	0.22	Q V	|	|	|	|
8+45	0.0698	0.22	Q V	|	|	|	|
8+50	0.0714	0.23	Q V	|	|	|	|
8+55	0.0730	0.23	Q V	|	|	|	|
9+ 0	0.0746	0.23	Q V	|	|	|	|
9+ 5	0.0763	0.25	Q V	|	|	|	|
9+10	0.0780	0.26	|Q |V	|	|	|	|
9+15	0.0798	0.26	|Q |V	|	|	|	|
9+20	0.0816	0.27	|Q |V	|	|	|	|
9+25	0.0835	0.27	|Q |V	|	|	|	|
9+30	0.0854	0.27	|Q | V	|	|	|	|
9+35	0.0873	0.28	|Q | V	|	|	|	|

9+40	0.0893	0.28	|Q	| V	|	|	|
9+45	0.0912	0.29	|Q	| V	|	|	|
9+50	0.0933	0.29	|Q	| V	|	|	|
9+55	0.0953	0.30	|Q	| V	|	|	|
10+ 0	0.0974	0.30	|Q	| V	|	|	|
10+ 5	0.0991	0.25	Q	| V	|	|	|
10+10	0.1005	0.21	Q	| V	|	|	|
10+15	0.1019	0.20	Q	| V	|	|	|
10+20	0.1033	0.20	Q	| V	|	|	|
10+25	0.1047	0.20	Q	| V	|	|	|
10+30	0.1061	0.20	Q	| V	|	|	|
10+35	0.1078	0.24	Q	| V	|	|	|
10+40	0.1097	0.27	|Q	| V	|	|	|
10+45	0.1115	0.27	|Q	| V	|	|	|
10+50	0.1134	0.27	|Q	| V	|	|	|
10+55	0.1153	0.27	|Q	| V	|	|	|
11+ 0	0.1172	0.27	|Q	| V	|	|	|
11+ 5	0.1190	0.26	|Q	| V	|	|	|
11+10	0.1208	0.26	|Q	| V	|	|	|
11+15	0.1225	0.26	|Q	| V	|	|	|
11+20	0.1243	0.26	|Q	| V	|	|	|
11+25	0.1261	0.26	|Q	| V	|	|	|
11+30	0.1279	0.26	|Q	| V	|	|	|
11+35	0.1296	0.24	Q	| V	|	|	|
11+40	0.1312	0.23	Q	| V	|	|	|
11+45	0.1328	0.23	Q	| V	|	|	|
11+50	0.1344	0.24	Q	| V	|	|	|
11+55	0.1361	0.24	Q	| V	|	|	|
12+ 0	0.1378	0.24	Q	| V	|	|	|
12+ 5	0.1398	0.30	|Q	| V	|	|	|
12+10	0.1421	0.33	|Q	| V	|	|	|
12+15	0.1445	0.34	|Q	| V	|	|	|
12+20	0.1469	0.35	|Q	| V	|	|	|
12+25	0.1493	0.35	|Q	| |V	|	|	|
12+30	0.1517	0.35	|Q	| |V	|	|	|
12+35	0.1543	0.37	|Q	| |V	|	|	|
12+40	0.1569	0.38	|Q	| | V	|	|	|
12+45	0.1595	0.38	|Q	| | V	|	|	|
12+50	0.1622	0.39	|Q	| | V	|	|	|
12+55	0.1649	0.39	|Q	| | V	|	|	|
13+ 0	0.1676	0.39	|Q	| | V	|	|	|
13+ 5	0.1706	0.43	|Q	| | V	|	|	|
13+10	0.1738	0.46	|Q	| | V	|	|	|
13+15	0.1770	0.46	|Q	| | V	|	|	|

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13+20    0.1801    0.46 |Q     |      |  V   |      |
13+25    0.1833    0.46 |Q     |      |  V   |      |
13+30    0.1865    0.46 |Q     |      |  V   |      |
13+35    0.1891    0.38 |Q     |      |  V   |      |
13+40    0.1913    0.32 |Q     |      |  V   |      |
13+45    0.1935    0.31 |Q     |      |  V   |      |
13+50    0.1956    0.31 |Q     |      |  V   |      |
13+55    0.1978    0.31 |Q     |      |  V   |      |
14+ 0    0.1999    0.31 |Q     |      |  V   |      |
14+ 5    0.2023    0.34 |Q     |      |  V   |      |
14+10    0.2048    0.36 |Q     |      |   V  |      |
14+15    0.2074    0.37 |Q     |      |   V  |      |
14+20    0.2098    0.36 |Q     |      |   V  |      |
14+25    0.2123    0.35 |Q     |      |   V      |
14+30    0.2147    0.35 |Q     |      |   V      |
14+35    0.2171    0.35 |Q     |      |   V      |
14+40    0.2196    0.35 |Q     |      |    V     |
14+45    0.2220    0.35 |Q     |      |    V     |
14+50    0.2244    0.35 |Q     |      |    V     |
14+55    0.2267    0.34 |Q     |      |    V     |
15+ 0    0.2291    0.34 |Q     |      |    V     |
15+ 5    0.2314    0.33 |Q     |      |    V     |
15+10    0.2336    0.33 |Q     |      |     V    |
15+15    0.2359    0.33 |Q     |      |     V    |
15+20    0.2381    0.32 |Q     |      |     V    |
15+25    0.2402    0.31 |Q     |      |     V    |
15+30    0.2424    0.31 |Q     |      |     V    |
15+35    0.2443    0.28 |Q     |      |     V    |
15+40    0.2461    0.26 |Q     |      |     V    |
15+45    0.2479    0.26 |Q     |      |     V    |
15+50    0.2497    0.26 |Q     |      |     V    |
15+55    0.2515    0.26 |Q     |      |     V    |
16+ 0    0.2533    0.26 |Q     |      |     V    |
16+ 5    0.2542    0.14 Q     |      |     V    |
16+10    0.2547    0.07 Q     |      |     V    |
16+15    0.2551    0.05 Q     |      |     V    |
16+20    0.2555    0.05 Q     |      |     V    |
16+25    0.2558    0.05 Q     |      |     V    |
16+30    0.2562    0.05 Q     |      |     V    |
16+35    0.2565    0.05 Q     |      |     V    |
16+40    0.2568    0.04 Q     |      |     V    |
16+45    0.2571    0.04 Q     |      |     V    |
16+50    0.2574    0.04 Q     |      |     V    |
16+55    0.2577    0.04 Q     |      |     V    |
```

17+ 0	0.2579	0.04	Q	|	|	V |
17+ 5	0.2583	0.06	Q	|	|	V |
17+10	0.2588	0.07	Q	|	|	V |
17+15	0.2592	0.07	Q	|	|	V |
17+20	0.2597	0.07	Q	|	|	V |
17+25	0.2602	0.07	Q	|	|	V |
17+30	0.2607	0.07	Q	|	|	V |
17+35	0.2611	0.07	Q	|	|	V |
17+40	0.2616	0.07	Q	|	|	V |
17+45	0.2621	0.07	Q	|	|	V |
17+50	0.2625	0.06	Q	|	|	V |
17+55	0.2629	0.06	Q	|	|	V |
18+ 0	0.2632	0.05	Q	|	|	V |
18+ 5	0.2636	0.05	Q	|	|	V |
18+10	0.2640	0.05	Q	|	|	V |
18+15	0.2644	0.05	Q	|	|	V |
18+20	0.2647	0.05	Q	|	|	V |
18+25	0.2651	0.05	Q	|	|	V |
18+30	0.2655	0.05	Q	|	|	V |
18+35	0.2658	0.05	Q	|	|	V |
18+40	0.2661	0.04	Q	|	|	V |
18+45	0.2664	0.04	Q	|	|	V |
18+50	0.2666	0.03	Q	|	|	V |
18+55	0.2668	0.03	Q	|	|	V |
19+ 0	0.2670	0.03	Q	|	|	V |
19+ 5	0.2672	0.03	Q	|	|	V |
19+10	0.2675	0.04	Q	|	|	V |
19+15	0.2678	0.04	Q	|	|	V |
19+20	0.2681	0.05	Q	|	|	V |
19+25	0.2685	0.05	Q	|	|	V |
19+30	0.2689	0.05	Q	|	|	V |
19+35	0.2692	0.05	Q	|	|	V |
19+40	0.2695	0.04	Q	|	|	V |
19+45	0.2697	0.04	Q	|	|	V |
19+50	0.2700	0.03	Q	|	|	V |
19+55	0.2702	0.03	Q	|	|	V |
20+ 0	0.2703	0.03	Q	|	|	V |
20+ 5	0.2706	0.03	Q	|	|	V |
20+10	0.2709	0.04	Q	|	|	V |
20+15	0.2711	0.04	Q	|	|	V |
20+20	0.2714	0.04	Q	|	|	V |
20+25	0.2717	0.04	Q	|	|	V |
20+30	0.2720	0.04	Q	|	|	V |
20+35	0.2723	0.04	Q	|	|	V |

20+40	0.2726	0.04	Q	|	|	V |
20+45	0.2728	0.04	Q	|	|	V |
20+50	0.2731	0.03	Q	|	|	V |
20+55	0.2733	0.03	Q	|	|	V |
21+ 0	0.2734	0.03	Q	|	|	V |
21+ 5	0.2737	0.03	Q	|	|	V |
21+10	0.2740	0.04	Q	|	|	V |
21+15	0.2742	0.04	Q	|	|	V|
21+20	0.2745	0.03	Q	|	|	V|
21+25	0.2747	0.03	Q	|	|	V|
21+30	0.2748	0.03	Q	|	|	V|
21+35	0.2751	0.03	Q	|	|	V|
21+40	0.2754	0.04	Q	|	|	V|
21+45	0.2756	0.04	Q	|	|	V|
21+50	0.2759	0.03	Q	|	|	V|
21+55	0.2761	0.03	Q	|	|	V|
22+ 0	0.2763	0.03	Q	|	|	V|
22+ 5	0.2765	0.03	Q	|	|	V|
22+10	0.2768	0.04	Q	|	|	V|
22+15	0.2770	0.04	Q	|	|	V|
22+20	0.2773	0.03	Q	|	|	V|
22+25	0.2775	0.03	Q	|	|	V|
22+30	0.2777	0.03	Q	|	|	V|
22+35	0.2778	0.03	Q	|	|	V|
22+40	0.2780	0.03	Q	|	|	V|
22+45	0.2782	0.03	Q	|	|	V|
22+50	0.2784	0.03	Q	|	|	V|
22+55	0.2786	0.03	Q	|	|	V|
23+ 0	0.2788	0.03	Q	|	|	V|
23+ 5	0.2790	0.03	Q	|	|	V|
23+10	0.2792	0.03	Q	|	|	V|
23+15	0.2793	0.03	Q	|	|	V|
23+20	0.2795	0.03	Q	|	|	V|
23+25	0.2797	0.03	Q	|	|	V|
23+30	0.2799	0.03	Q	|	|	V|
23+35	0.2801	0.03	Q	|	|	V|
23+40	0.2803	0.03	Q	|	|	V|
23+45	0.2805	0.03	Q	|	|	V|
23+50	0.2807	0.03	Q	|	|	V|
23+55	0.2808	0.03	Q	|	|	V|
24+ 0	0.2810	0.03	Q	|	|	V|
24+ 5	0.2811	0.01	Q	|	|	V|
24+10	0.2811	0.00	Q	|	|	V

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR1HRA1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 1 HOUR
AREA A

Drainage Area = 14.95(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.95(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 696.00(Ft.)
Length along longest watercourse measured to centroid = 373.00(Ft.)
Length along longest watercourse = 0.132 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 4.70(Ft.)
Slope along watercourse = 35.6552 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.062 Hr.
Lag time = 3.71 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	0.40	5.98

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	1.10	16.45

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.950	85.00	0.000

Total Area Entered = 14.95(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	134.943	29.353	4.423
2	0.167	269.886	48.019	7.235
3	0.250	404.829	12.148	1.830
4	0.333	539.772	5.387	0.812
5	0.417	674.715	2.930	0.441
6	0.500	809.658	2.163	0.326
		Sum = 100.000	Sum=	15.067

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.554	0.078	(0.499)	0.476
2	0.17	4.30	0.568	0.078	(0.511)	0.490
3	0.25	5.00	0.660	0.078	(0.594)	0.582
4	0.33	5.00	0.660	0.078	(0.594)	0.582
5	0.42	5.80	0.765	0.078	(0.689)	0.687
6	0.50	6.50	0.858	0.078	(0.772)	0.780
7	0.58	7.40	0.977	0.078	(0.879)	0.899
8	0.67	8.60	1.135	0.078	(1.022)	1.057
9	0.75	12.30	1.623	0.078	(1.461)	1.545
10	0.83	29.10	3.841	0.078	(3.457)	3.763
11	0.92	6.80	0.897	0.078	(0.808)	0.819
12	1.00	5.00	0.660	0.078	(0.594)	0.582
			(Loss Rate Not Used)			
Sum =		100.0		Sum =		12.3

Flood volume = Effective rainfall 1.02(In)
times area 14.9(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.08(In)
Total soil loss = 0.097(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 55454.3 Cubic Feet
Total soil loss = 4232.9 Cubic Feet

Peak flow rate of this hydrograph = 35.202(CFS)

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1-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0145	2.11	V Q | | | |
0+10	0.0532	5.61	|V Q | | | |
0+15	0.1013	6.99	| V Q | | | |
0+20	0.1569	8.07	| V Q | | | |
0+25	0.2184	8.93	| V Q | | | |
0+30	0.2896	10.34	| VQ | | |
0+35	0.3706	11.77	| |Q | | |
0+40	0.4644	13.62	| | QV | | |
0+45	0.5833	17.26	| | QV | | |
0+50	0.7973	31.07	| | | V |Q |
0+55	1.0397	35.20	| | | | V Q |
1+ 0	1.1596	17.41	| | Q | | V |
1+ 5	1.2271	9.80	| Q| | | V |
1+10	1.2539	3.90	| Q | | | V|
1+15	1.2681	2.06	| Q | | | V|
1+20	1.2717	0.52	Q | | | V|
1+25	1.2731	0.19	Q | | | V|

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR3HRA3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 3 HOUR
AREA A

Drainage Area = 14.95(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.95(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 696.00(Ft.)
Length along longest watercourse measured to centroid = 373.00(Ft.)
Length along longest watercourse = 0.132 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 4.70(Ft.)
Slope along watercourse = 35.6552 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.062 Hr.
Lag time = 3.71 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.

Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	0.70	10.46

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	1.90	28.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.950	85.00	0.000

Total Area Entered = 14.95(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time	% of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	134.943	29.353	4.423
2	0.167	269.886	48.019	7.235
3	0.250	404.829	12.148	1.830
4	0.333	539.772	5.387	0.812
5	0.417	674.715	2.930	0.441
6	0.500	809.658	2.163	0.326
		Sum = 100.000	Sum=	15.067

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	0.078	(0.267)	0.218
2	0.17	1.30	0.296	0.078	(0.267)	0.218
3	0.25	1.10	0.251	0.078	(0.226)	0.173
4	0.33	1.50	0.342	0.078	(0.308)	0.264
5	0.42	1.50	0.342	0.078	(0.308)	0.264
6	0.50	1.80	0.410	0.078	(0.369)	0.332
7	0.58	1.50	0.342	0.078	(0.308)	0.264
8	0.67	1.80	0.410	0.078	(0.369)	0.332
9	0.75	1.80	0.410	0.078	(0.369)	0.332
10	0.83	1.50	0.342	0.078	(0.308)	0.264
11	0.92	1.60	0.365	0.078	(0.328)	0.287
12	1.00	1.80	0.410	0.078	(0.369)	0.332
13	1.08	2.20	0.502	0.078	(0.451)	0.424
14	1.17	2.20	0.502	0.078	(0.451)	0.424
15	1.25	2.20	0.502	0.078	(0.451)	0.424
16	1.33	2.00	0.456	0.078	(0.410)	0.378
17	1.42	2.60	0.593	0.078	(0.533)	0.515
18	1.50	2.70	0.616	0.078	(0.554)	0.538
19	1.58	2.40	0.547	0.078	(0.492)	0.469
20	1.67	2.70	0.616	0.078	(0.554)	0.538
21	1.75	3.30	0.752	0.078	(0.677)	0.674
22	1.83	3.10	0.707	0.078	(0.636)	0.629
23	1.92	2.90	0.661	0.078	(0.595)	0.583
24	2.00	3.00	0.684	0.078	(0.616)	0.606
25	2.08	3.10	0.707	0.078	(0.636)	0.629

26	2.17	4.20	0.958	0.078	(0.862)	0.880
27	2.25	5.00	1.140	0.078	(1.026)	1.062
28	2.33	3.50	0.798	0.078	(0.718)	0.720
29	2.42	6.80	1.550	0.078	(1.395)	1.472
30	2.50	7.30	1.664	0.078	(1.498)	1.586
31	2.58	8.20	1.869	0.078	(1.683)	1.791
32	2.67	5.90	1.345	0.078	(1.211)	1.267
33	2.75	2.00	0.456	0.078	(0.410)	0.378
34	2.83	1.80	0.410	0.078	(0.369)	0.332
35	2.92	1.80	0.410	0.078	(0.369)	0.332
36	3.00	0.60	0.137	0.078	(0.123)	0.059

(Loss Rate Not Used)

Sum = 100.0 Sum = 20.0

Flood volume = Effective rainfall 1.67(In)
times area 14.9(Ac.)/[(In)/(Ft.)] = 2.1(Ac.Ft)
Total soil loss = 0.23(In)
Total soil loss = 0.292(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 90404.6 Cubic Feet
Total soil loss = 12698.8 Cubic Feet

Peak flow rate of this hydrograph = 23.446(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0067	0.97	VQ	|	|	|	|
0+10	0.0242	2.55	V Q	|	|	|	|
0+15	0.0431	2.75	V Q	|	|	|	|
0+20	0.0637	3.00	|V Q	|	|	|	|
0+25	0.0890	3.67	|V Q	|	|	|	|
0+30	0.1177	4.17	| V Q	|	|	|	|
0+35	0.1482	4.42	| V Q	|	|	|	|
0+40	0.1783	4.38	| V Q	|	|	|	|
0+45	0.2116	4.83	| V Q	|	|	|	|
0+50	0.2435	4.63	| V Q	|	|	|	|
0+55	0.2730	4.28	| Q	|	|	|	|
1+ 0	0.3042	4.53	| VQ	|	|	|	|

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1+ 5    0.3405    5.27 |   VQ |      |      |      |
1+10    0.3819    6.01 |   VQ |      |      |      |
1+15    0.4246    6.20 |    Q |      |      |      |
1+20    0.4666    6.10 |    Q |      |      |      |
1+25    0.5109    6.43 |   QV |      |      |      |
1+30    0.5623    7.47 |   QV      |      |      |
1+35    0.6142    7.54 |   QV      |      |      |
1+40    0.6658    7.48 |   Q| V     |      |      |
1+45    0.7245    8.52 |    |Q V     |      |      |
1+50    0.7894    9.43 |    | Q V    |      |      |
1+55    0.8527    9.19 |    | Q  V   |      |      |
2+ 0    0.9146    8.99 |    |Q   V   |      |      |
2+ 5    0.9781    9.22 |    | Q   V  |      |      |
2+10    1.0506   10.52 |    |  Q   V      |      |
2+15    1.1413   13.17 |    |    Q |V     |      |
2+20    1.2340   13.45 |    |    Q | V     |      |
2+25    1.3363   14.86 |    |     Q|  V    |      |
2+30    1.4771   20.45 |    |      |   QV  |      |
2+35    1.6386   23.45 |    |      |     |Q     |
2+40    1.7994   23.34 |    |      |     |Q V   |
2+45    1.9116   16.30 |    |      |Q    |   V  |
2+50    1.9747    9.16 |    | Q    |     |    V |
2+55    2.0223    6.91 |   Q|      |     |    V |
3+ 0    2.0548    4.73 |  Q |      |     |    V|
3+ 5    2.0678    1.88 | Q  |      |     |    V|
3+10    2.0723    0.65 Q     |      |     |    V|
3+15    2.0743    0.30 Q     |      |     |    V|
3+20    2.0753    0.13 Q     |      |     |    V|
3+25    2.0754    0.02 Q     |      |     |    V|
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Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR6HRA6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 6 HOUR
AREA A

Drainage Area = 14.95(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.95(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 696.00(Ft.)
Length along longest watercourse measured to centroid = 373.00(Ft.)
Length along longest watercourse = 0.132 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 4.70(Ft.)
Slope along watercourse = 35.6552 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.062 Hr.
Lag time = 3.71 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	1.00	14.95

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	2.50	37.38

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.950	85.00	0.000

Total Area Entered = 14.95(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	134.943	29.353	4.423
2	0.167	269.886	48.019	7.235
3	0.250	404.829	12.148	1.830
4	0.333	539.772	5.387	0.812
5	0.417	674.715	2.930	0.441
6	0.500	809.658	2.163	0.326
		Sum = 100.000	Sum=	15.067

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1	0.08	0.50	0.150	0.078	(0.135)	0.072
2	0.17	0.60	0.180	0.078	(0.162)	0.102
3	0.25	0.60	0.180	0.078	(0.162)	0.102
4	0.33	0.60	0.180	0.078	(0.162)	0.102
5	0.42	0.60	0.180	0.078	(0.162)	0.102
6	0.50	0.70	0.210	0.078	(0.189)	0.132
7	0.58	0.70	0.210	0.078	(0.189)	0.132
8	0.67	0.70	0.210	0.078	(0.189)	0.132
9	0.75	0.70	0.210	0.078	(0.189)	0.132
10	0.83	0.70	0.210	0.078	(0.189)	0.132
11	0.92	0.70	0.210	0.078	(0.189)	0.132
12	1.00	0.80	0.240	0.078	(0.216)	0.162
13	1.08	0.80	0.240	0.078	(0.216)	0.162
14	1.17	0.80	0.240	0.078	(0.216)	0.162
15	1.25	0.80	0.240	0.078	(0.216)	0.162
16	1.33	0.80	0.240	0.078	(0.216)	0.162
17	1.42	0.80	0.240	0.078	(0.216)	0.162
18	1.50	0.80	0.240	0.078	(0.216)	0.162
19	1.58	0.80	0.240	0.078	(0.216)	0.162
20	1.67	0.80	0.240	0.078	(0.216)	0.162
21	1.75	0.80	0.240	0.078	(0.216)	0.162
22	1.83	0.80	0.240	0.078	(0.216)	0.162
23	1.92	0.80	0.240	0.078	(0.216)	0.162
24	2.00	0.90	0.270	0.078	(0.243)	0.192
25	2.08	0.80	0.240	0.078	(0.216)	0.162

26	2.17	0.90	0.270	0.078	(0.243)	0.192
27	2.25	0.90	0.270	0.078	(0.243)	0.192
28	2.33	0.90	0.270	0.078	(0.243)	0.192
29	2.42	0.90	0.270	0.078	(0.243)	0.192
30	2.50	0.90	0.270	0.078	(0.243)	0.192
31	2.58	0.90	0.270	0.078	(0.243)	0.192
32	2.67	0.90	0.270	0.078	(0.243)	0.192
33	2.75	1.00	0.300	0.078	(0.270)	0.222
34	2.83	1.00	0.300	0.078	(0.270)	0.222
35	2.92	1.00	0.300	0.078	(0.270)	0.222
36	3.00	1.00	0.300	0.078	(0.270)	0.222
37	3.08	1.00	0.300	0.078	(0.270)	0.222
38	3.17	1.10	0.330	0.078	(0.297)	0.252
39	3.25	1.10	0.330	0.078	(0.297)	0.252
40	3.33	1.10	0.330	0.078	(0.297)	0.252
41	3.42	1.20	0.360	0.078	(0.324)	0.282
42	3.50	1.30	0.390	0.078	(0.351)	0.312
43	3.58	1.40	0.420	0.078	(0.378)	0.342
44	3.67	1.40	0.420	0.078	(0.378)	0.342
45	3.75	1.50	0.450	0.078	(0.405)	0.372
46	3.83	1.50	0.450	0.078	(0.405)	0.372
47	3.92	1.60	0.480	0.078	(0.432)	0.402
48	4.00	1.60	0.480	0.078	(0.432)	0.402
49	4.08	1.70	0.510	0.078	(0.459)	0.432
50	4.17	1.80	0.540	0.078	(0.486)	0.462
51	4.25	1.90	0.570	0.078	(0.513)	0.492
52	4.33	2.00	0.600	0.078	(0.540)	0.522
53	4.42	2.10	0.630	0.078	(0.567)	0.552
54	4.50	2.10	0.630	0.078	(0.567)	0.552
55	4.58	2.20	0.660	0.078	(0.594)	0.582
56	4.67	2.30	0.690	0.078	(0.621)	0.612
57	4.75	2.40	0.720	0.078	(0.648)	0.642
58	4.83	2.40	0.720	0.078	(0.648)	0.642
59	4.92	2.50	0.750	0.078	(0.675)	0.672
60	5.00	2.60	0.780	0.078	(0.702)	0.702
61	5.08	3.10	0.930	0.078	(0.837)	0.852
62	5.17	3.60	1.080	0.078	(0.972)	1.002
63	5.25	3.90	1.170	0.078	(1.053)	1.092
64	5.33	4.20	1.260	0.078	(1.134)	1.182
65	5.42	4.70	1.410	0.078	(1.269)	1.332
66	5.50	5.60	1.680	0.078	(1.512)	1.602
67	5.58	1.90	0.570	0.078	(0.513)	0.492
68	5.67	0.90	0.270	0.078	(0.243)	0.192
69	5.75	0.60	0.180	0.078	(0.162)	0.102

70	5.83	0.50	0.150	0.078	(0.135)	0.072
71	5.92	0.30	0.090	0.078	(0.081)	0.012
72	6.00	0.20	0.060	(0.078)	0.054	0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.4

Flood volume = Effective rainfall 2.03(In)
times area 14.9(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 0.47(In)
Total soil loss = 0.581(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 110375.2 Cubic Feet
Total soil loss = 25289.1 Cubic Feet

Peak flow rate of this hydrograph = 20.501(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 7.5 15.0 22.5 30.0
0+ 5	0.0022	0.32	Q | | | |
0+10	0.0089	0.97	VQ | | | |
0+15	0.0180	1.32	VQ | | | |
0+20	0.0279	1.43	VQ | | | |
0+25	0.0381	1.49	VQ | | | |
0+30	0.0496	1.66	V Q | | | |
0+35	0.0626	1.89	V Q | | | |
0+40	0.0760	1.94	|VQ | | | |
0+45	0.0895	1.97	|VQ | | | |
0+50	0.1031	1.98	|VQ | | | |
0+55	0.1168	1.99	|VQ | | | |
1+ 0	0.1315	2.12	| Q | | | |
1+ 5	0.1476	2.34	| VQ | | | |
1+10	0.1641	2.39	| VQ | | | |
1+15	0.1807	2.42	| VQ | | | |
1+20	0.1975	2.43	| Q | | | |
1+25	0.2143	2.44	| Q | | | |
1+30	0.2311	2.44	| Q | | | |
1+35	0.2479	2.44	| Q | | | |
1+40	0.2647	2.44	| QV | | | |

1+45	0.2816	2.44	QV				
1+50	0.2984	2.44	QV				
1+55	0.3152	2.44	QV				
2+ 0	0.3329	2.57	Q V				
2+ 5	0.3512	2.66	Q V				
2+10	0.3693	2.63	Q V				
2+15	0.3887	2.82	Q V				
2+20	0.4084	2.86	Q V				
2+25	0.4283	2.88	Q V				
2+30	0.4481	2.88	Q V				
2+35	0.4681	2.89	Q V				
2+40	0.4880	2.89	Q V				
2+45	0.5088	3.03	Q V				
2+50	0.5312	3.24	Q V				
2+55	0.5539	3.30	Q V				
3+ 0	0.5768	3.32	Q V				
3+ 5	0.5998	3.34	Q V				
3+10	0.6237	3.48	Q V				
3+15	0.6492	3.70	Q V				
3+20	0.6750	3.75	Q V				
3+25	0.7019	3.91	Q V				
3+30	0.7314	4.27	Q V				
3+35	0.7636	4.69	Q V				
3+40	0.7979	4.98	Q V				
3+45	0.8338	5.21	Q V				
3+50	0.8715	5.47	Q V				
3+55	0.9106	5.68	Q V				
4+ 0	0.9515	5.93	Q V				
4+ 5	0.9938	6.14	Q V				
4+10	1.0387	6.52	Q V				
4+15	1.0864	6.94	Q V				
4+20	1.1372	7.38	Q V				
4+25	1.1911	7.82	Q V				
4+30	1.2471	8.14	Q V				
4+35	1.3048	8.37	Q V				
4+40	1.3652	8.77	Q V				
4+45	1.4286	9.20	Q V				
4+50	1.4940	9.50	Q V				
4+55	1.5610	9.73	Q V				
5+ 0	1.6308	10.13	Q V				
5+ 5	1.7071	11.09	Q V				
5+10	1.7961	12.92	Q V				
5+15	1.8975	14.72	Q V				
5+20	2.0090	16.19	Q V				

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 5+25    2.1321   17.87 |      |      | Q    | V    |
 5+30    2.2733   20.50 |      |      |    Q | V    |
 5+35    2.3971   17.98 |      |      | Q    |   V  |
 5+40    2.4612    9.30 |      | Q    |      |   V  |
 5+45    2.4957    5.02 |    Q |      |      |   V  |
 5+50    2.5160    2.95 |  Q   |      |      |   V  |
 5+55    2.5274    1.66 |  Q   |      |      |   V  |
 6+ 0    2.5314    0.57 Q       |      |      |   V  |
 6+ 5    2.5330    0.23 Q       |      |      |   V  |
 6+10    2.5336    0.09 Q       |      |      |   V  |
 6+15    2.5338    0.03 Q       |      |      |   V  |
 6+20    2.5339    0.01 Q       |      |      |   V  |
 6+25    2.5339    0.00 Q       |      |      |   V
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Unit Hydrograph Analysis

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Program License Serial Number 6310

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English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 24 HOUR
AREA A

Drainage Area = 14.95(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.95(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 696.00(Ft.)
Length along longest watercourse measured to centroid = 373.00(Ft.)
Length along longest watercourse = 0.132 Mi.
Length along longest watercourse measured to centroid = 0.071 Mi.
Difference in elevation = 4.70(Ft.)
Slope along watercourse = 35.6552 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.062 Hr.
Lag time = 3.71 Min.
25% of lag time = 0.93 Min.
40% of lag time = 1.48 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	1.70	25.41

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.95	3.80	56.81

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.800(In)

Point rain (area averaged) = 3.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.950	85.00	0.000

Total Area Entered = 14.95(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	134.943	29.353	4.423
2	0.167	269.886	48.019	7.235
3	0.250	404.829	12.148	1.830
4	0.333	539.772	5.387	0.812
5	0.417	674.715	2.930	0.441
6	0.500	809.658	2.163	0.326
		Sum = 100.000	Sum=	15.067

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.138)	0.027	0.003
2	0.17	0.07	0.030	(0.138)	0.027	0.003
3	0.25	0.07	0.030	(0.137)	0.027	0.003
4	0.33	0.10	0.046	(0.137)	0.041	0.005
5	0.42	0.10	0.046	(0.136)	0.041	0.005
6	0.50	0.10	0.046	(0.136)	0.041	0.005
7	0.58	0.10	0.046	(0.135)	0.041	0.005
8	0.67	0.10	0.046	(0.135)	0.041	0.005
9	0.75	0.10	0.046	(0.134)	0.041	0.005
10	0.83	0.13	0.061	(0.133)	0.055	0.006
11	0.92	0.13	0.061	(0.133)	0.055	0.006
12	1.00	0.13	0.061	(0.132)	0.055	0.006
13	1.08	0.10	0.046	(0.132)	0.041	0.005
14	1.17	0.10	0.046	(0.131)	0.041	0.005
15	1.25	0.10	0.046	(0.131)	0.041	0.005
16	1.33	0.10	0.046	(0.130)	0.041	0.005
17	1.42	0.10	0.046	(0.130)	0.041	0.005
18	1.50	0.10	0.046	(0.129)	0.041	0.005
19	1.58	0.10	0.046	(0.129)	0.041	0.005
20	1.67	0.10	0.046	(0.128)	0.041	0.005
21	1.75	0.10	0.046	(0.128)	0.041	0.005
22	1.83	0.13	0.061	(0.127)	0.055	0.006
23	1.92	0.13	0.061	(0.127)	0.055	0.006
24	2.00	0.13	0.061	(0.126)	0.055	0.006
25	2.08	0.13	0.061	(0.126)	0.055	0.006

26	2.17	0.13	0.061	(0.125)	0.055	0.006
27	2.25	0.13	0.061	(0.125)	0.055	0.006
28	2.33	0.13	0.061	(0.124)	0.055	0.006
29	2.42	0.13	0.061	(0.124)	0.055	0.006
30	2.50	0.13	0.061	(0.123)	0.055	0.006
31	2.58	0.17	0.076	(0.123)	0.068	0.008
32	2.67	0.17	0.076	(0.122)	0.068	0.008
33	2.75	0.17	0.076	(0.122)	0.068	0.008
34	2.83	0.17	0.076	(0.121)	0.068	0.008
35	2.92	0.17	0.076	(0.121)	0.068	0.008
36	3.00	0.17	0.076	(0.120)	0.068	0.008
37	3.08	0.17	0.076	(0.120)	0.068	0.008
38	3.17	0.17	0.076	(0.119)	0.068	0.008
39	3.25	0.17	0.076	(0.119)	0.068	0.008
40	3.33	0.17	0.076	(0.118)	0.068	0.008
41	3.42	0.17	0.076	(0.118)	0.068	0.008
42	3.50	0.17	0.076	(0.117)	0.068	0.008
43	3.58	0.17	0.076	(0.117)	0.068	0.008
44	3.67	0.17	0.076	(0.116)	0.068	0.008
45	3.75	0.17	0.076	(0.116)	0.068	0.008
46	3.83	0.20	0.091	(0.115)	0.082	0.009
47	3.92	0.20	0.091	(0.115)	0.082	0.009
48	4.00	0.20	0.091	(0.114)	0.082	0.009
49	4.08	0.20	0.091	(0.114)	0.082	0.009
50	4.17	0.20	0.091	(0.113)	0.082	0.009
51	4.25	0.20	0.091	(0.113)	0.082	0.009
52	4.33	0.23	0.106	(0.112)	0.096	0.011
53	4.42	0.23	0.106	(0.112)	0.096	0.011
54	4.50	0.23	0.106	(0.111)	0.096	0.011
55	4.58	0.23	0.106	(0.111)	0.096	0.011
56	4.67	0.23	0.106	(0.110)	0.096	0.011
57	4.75	0.23	0.106	(0.110)	0.096	0.011
58	4.83	0.27	0.122	(0.109)	0.109	0.012
59	4.92	0.27	0.122	0.109	(0.109)	0.013
60	5.00	0.27	0.122	0.109	(0.109)	0.013
61	5.08	0.20	0.091	(0.108)	0.082	0.009
62	5.17	0.20	0.091	(0.108)	0.082	0.009
63	5.25	0.20	0.091	(0.107)	0.082	0.009
64	5.33	0.23	0.106	(0.107)	0.096	0.011
65	5.42	0.23	0.106	(0.106)	0.096	0.011
66	5.50	0.23	0.106	(0.106)	0.096	0.011
67	5.58	0.27	0.122	0.105	(0.109)	0.016
68	5.67	0.27	0.122	0.105	(0.109)	0.017
69	5.75	0.27	0.122	0.104	(0.109)	0.017

70	5.83	0.27	0.122	0.104	(0.109)	0.018
71	5.92	0.27	0.122	0.103	(0.109)	0.018
72	6.00	0.27	0.122	0.103	(0.109)	0.019
73	6.08	0.30	0.137	0.103	(0.123)	0.034
74	6.17	0.30	0.137	0.102	(0.123)	0.035
75	6.25	0.30	0.137	0.102	(0.123)	0.035
76	6.33	0.30	0.137	0.101	(0.123)	0.036
77	6.42	0.30	0.137	0.101	(0.123)	0.036
78	6.50	0.30	0.137	0.100	(0.123)	0.037
79	6.58	0.33	0.152	0.100	(0.137)	0.052
80	6.67	0.33	0.152	0.099	(0.137)	0.053
81	6.75	0.33	0.152	0.099	(0.137)	0.053
82	6.83	0.33	0.152	0.098	(0.137)	0.054
83	6.92	0.33	0.152	0.098	(0.137)	0.054
84	7.00	0.33	0.152	0.098	(0.137)	0.054
85	7.08	0.33	0.152	0.097	(0.137)	0.055
86	7.17	0.33	0.152	0.097	(0.137)	0.055
87	7.25	0.33	0.152	0.096	(0.137)	0.056
88	7.33	0.37	0.167	0.096	(0.150)	0.071
89	7.42	0.37	0.167	0.095	(0.150)	0.072
90	7.50	0.37	0.167	0.095	(0.150)	0.072
91	7.58	0.40	0.182	0.094	(0.164)	0.088
92	7.67	0.40	0.182	0.094	(0.164)	0.088
93	7.75	0.40	0.182	0.094	(0.164)	0.089
94	7.83	0.43	0.198	0.093	(0.178)	0.104
95	7.92	0.43	0.198	0.093	(0.178)	0.105
96	8.00	0.43	0.198	0.092	(0.178)	0.105
97	8.08	0.50	0.228	0.092	(0.205)	0.136
98	8.17	0.50	0.228	0.091	(0.205)	0.137
99	8.25	0.50	0.228	0.091	(0.205)	0.137
100	8.33	0.50	0.228	0.091	(0.205)	0.137
101	8.42	0.50	0.228	0.090	(0.205)	0.138
102	8.50	0.50	0.228	0.090	(0.205)	0.138
103	8.58	0.53	0.243	0.089	(0.219)	0.154
104	8.67	0.53	0.243	0.089	(0.219)	0.154
105	8.75	0.53	0.243	0.088	(0.219)	0.155
106	8.83	0.57	0.258	0.088	(0.233)	0.170
107	8.92	0.57	0.258	0.088	(0.233)	0.171
108	9.00	0.57	0.258	0.087	(0.233)	0.171
109	9.08	0.63	0.289	0.087	(0.260)	0.202
110	9.17	0.63	0.289	0.086	(0.260)	0.202
111	9.25	0.63	0.289	0.086	(0.260)	0.203
112	9.33	0.67	0.304	0.086	(0.274)	0.218
113	9.42	0.67	0.304	0.085	(0.274)	0.219

114	9.50	0.67	0.304	0.085	(0.274)	0.219
115	9.58	0.70	0.319	0.084	(0.287)	0.235
116	9.67	0.70	0.319	0.084	(0.287)	0.235
117	9.75	0.70	0.319	0.084	(0.287)	0.236
118	9.83	0.73	0.334	0.083	(0.301)	0.251
119	9.92	0.73	0.334	0.083	(0.301)	0.252
120	10.00	0.73	0.334	0.082	(0.301)	0.252
121	10.08	0.50	0.228	0.082	(0.205)	0.146
122	10.17	0.50	0.228	0.082	(0.205)	0.146
123	10.25	0.50	0.228	0.081	(0.205)	0.147
124	10.33	0.50	0.228	0.081	(0.205)	0.147
125	10.42	0.50	0.228	0.080	(0.205)	0.148
126	10.50	0.50	0.228	0.080	(0.205)	0.148
127	10.58	0.67	0.304	0.080	(0.274)	0.224
128	10.67	0.67	0.304	0.079	(0.274)	0.225
129	10.75	0.67	0.304	0.079	(0.274)	0.225
130	10.83	0.67	0.304	0.078	(0.274)	0.226
131	10.92	0.67	0.304	0.078	(0.274)	0.226
132	11.00	0.67	0.304	0.078	(0.274)	0.226
133	11.08	0.63	0.289	0.077	(0.260)	0.211
134	11.17	0.63	0.289	0.077	(0.260)	0.212
135	11.25	0.63	0.289	0.077	(0.260)	0.212
136	11.33	0.63	0.289	0.076	(0.260)	0.213
137	11.42	0.63	0.289	0.076	(0.260)	0.213
138	11.50	0.63	0.289	0.075	(0.260)	0.213
139	11.58	0.57	0.258	0.075	(0.233)	0.183
140	11.67	0.57	0.258	0.075	(0.233)	0.184
141	11.75	0.57	0.258	0.074	(0.233)	0.184
142	11.83	0.60	0.274	0.074	(0.246)	0.200
143	11.92	0.60	0.274	0.074	(0.246)	0.200
144	12.00	0.60	0.274	0.073	(0.246)	0.200
145	12.08	0.83	0.380	0.073	(0.342)	0.307
146	12.17	0.83	0.380	0.072	(0.342)	0.308
147	12.25	0.83	0.380	0.072	(0.342)	0.308
148	12.33	0.87	0.395	0.072	(0.356)	0.323
149	12.42	0.87	0.395	0.071	(0.356)	0.324
150	12.50	0.87	0.395	0.071	(0.356)	0.324
151	12.58	0.93	0.426	0.071	(0.383)	0.355
152	12.67	0.93	0.426	0.070	(0.383)	0.355
153	12.75	0.93	0.426	0.070	(0.383)	0.356
154	12.83	0.97	0.441	0.070	(0.397)	0.371
155	12.92	0.97	0.441	0.069	(0.397)	0.372
156	13.00	0.97	0.441	0.069	(0.397)	0.372
157	13.08	1.13	0.517	0.069	(0.465)	0.448

158	13.17	1.13	0.517	0.068	(0.465)	0.449
159	13.25	1.13	0.517	0.068	(0.465)	0.449
160	13.33	1.13	0.517	0.067	(0.465)	0.449
161	13.42	1.13	0.517	0.067	(0.465)	0.450
162	13.50	1.13	0.517	0.067	(0.465)	0.450
163	13.58	0.77	0.350	0.066	(0.315)	0.283
164	13.67	0.77	0.350	0.066	(0.315)	0.283
165	13.75	0.77	0.350	0.066	(0.315)	0.284
166	13.83	0.77	0.350	0.065	(0.315)	0.284
167	13.92	0.77	0.350	0.065	(0.315)	0.284
168	14.00	0.77	0.350	0.065	(0.315)	0.285
169	14.08	0.90	0.410	0.064	(0.369)	0.346
170	14.17	0.90	0.410	0.064	(0.369)	0.346
171	14.25	0.90	0.410	0.064	(0.369)	0.347
172	14.33	0.87	0.395	0.063	(0.356)	0.332
173	14.42	0.87	0.395	0.063	(0.356)	0.332
174	14.50	0.87	0.395	0.063	(0.356)	0.332
175	14.58	0.87	0.395	0.063	(0.356)	0.333
176	14.67	0.87	0.395	0.062	(0.356)	0.333
177	14.75	0.87	0.395	0.062	(0.356)	0.333
178	14.83	0.83	0.380	0.062	(0.342)	0.318
179	14.92	0.83	0.380	0.061	(0.342)	0.319
180	15.00	0.83	0.380	0.061	(0.342)	0.319
181	15.08	0.80	0.365	0.061	(0.328)	0.304
182	15.17	0.80	0.365	0.060	(0.328)	0.304
183	15.25	0.80	0.365	0.060	(0.328)	0.305
184	15.33	0.77	0.350	0.060	(0.315)	0.290
185	15.42	0.77	0.350	0.059	(0.315)	0.290
186	15.50	0.77	0.350	0.059	(0.315)	0.291
187	15.58	0.63	0.289	0.059	(0.260)	0.230
188	15.67	0.63	0.289	0.058	(0.260)	0.230
189	15.75	0.63	0.289	0.058	(0.260)	0.231
190	15.83	0.63	0.289	0.058	(0.260)	0.231
191	15.92	0.63	0.289	0.058	(0.260)	0.231
192	16.00	0.63	0.289	0.057	(0.260)	0.232
193	16.08	0.13	0.061	(0.057)	0.055	0.006
194	16.17	0.13	0.061	(0.057)	0.055	0.006
195	16.25	0.13	0.061	(0.056)	0.055	0.006
196	16.33	0.13	0.061	(0.056)	0.055	0.006
197	16.42	0.13	0.061	(0.056)	0.055	0.006
198	16.50	0.13	0.061	(0.056)	0.055	0.006
199	16.58	0.10	0.046	(0.055)	0.041	0.005
200	16.67	0.10	0.046	(0.055)	0.041	0.005
201	16.75	0.10	0.046	(0.055)	0.041	0.005

202	16.83	0.10	0.046	(0.054)	0.041	0.005
203	16.92	0.10	0.046	(0.054)	0.041	0.005
204	17.00	0.10	0.046	(0.054)	0.041	0.005
205	17.08	0.17	0.076	0.054	(0.068)	0.022
206	17.17	0.17	0.076	0.053	(0.068)	0.023
207	17.25	0.17	0.076	0.053	(0.068)	0.023
208	17.33	0.17	0.076	0.053	(0.068)	0.023
209	17.42	0.17	0.076	0.053	(0.068)	0.023
210	17.50	0.17	0.076	0.052	(0.068)	0.024
211	17.58	0.17	0.076	0.052	(0.068)	0.024
212	17.67	0.17	0.076	0.052	(0.068)	0.024
213	17.75	0.17	0.076	0.051	(0.068)	0.025
214	17.83	0.13	0.061	0.051	(0.055)	0.010
215	17.92	0.13	0.061	0.051	(0.055)	0.010
216	18.00	0.13	0.061	0.051	(0.055)	0.010
217	18.08	0.13	0.061	0.050	(0.055)	0.010
218	18.17	0.13	0.061	0.050	(0.055)	0.011
219	18.25	0.13	0.061	0.050	(0.055)	0.011
220	18.33	0.13	0.061	0.050	(0.055)	0.011
221	18.42	0.13	0.061	0.050	(0.055)	0.011
222	18.50	0.13	0.061	0.049	(0.055)	0.012
223	18.58	0.10	0.046	(0.049)	0.041	0.005
224	18.67	0.10	0.046	(0.049)	0.041	0.005
225	18.75	0.10	0.046	(0.049)	0.041	0.005
226	18.83	0.07	0.030	(0.048)	0.027	0.003
227	18.92	0.07	0.030	(0.048)	0.027	0.003
228	19.00	0.07	0.030	(0.048)	0.027	0.003
229	19.08	0.10	0.046	(0.048)	0.041	0.005
230	19.17	0.10	0.046	(0.047)	0.041	0.005
231	19.25	0.10	0.046	(0.047)	0.041	0.005
232	19.33	0.13	0.061	0.047	(0.055)	0.014
233	19.42	0.13	0.061	0.047	(0.055)	0.014
234	19.50	0.13	0.061	0.047	(0.055)	0.014
235	19.58	0.10	0.046	(0.046)	0.041	0.005
236	19.67	0.10	0.046	(0.046)	0.041	0.005
237	19.75	0.10	0.046	(0.046)	0.041	0.005
238	19.83	0.07	0.030	(0.046)	0.027	0.003
239	19.92	0.07	0.030	(0.045)	0.027	0.003
240	20.00	0.07	0.030	(0.045)	0.027	0.003
241	20.08	0.10	0.046	(0.045)	0.041	0.005
242	20.17	0.10	0.046	(0.045)	0.041	0.005
243	20.25	0.10	0.046	(0.045)	0.041	0.005
244	20.33	0.10	0.046	(0.045)	0.041	0.005
245	20.42	0.10	0.046	(0.044)	0.041	0.005

246	20.50	0.10	0.046	(0.044)	0.041	0.005
247	20.58	0.10	0.046	(0.044)	0.041	0.005
248	20.67	0.10	0.046	(0.044)	0.041	0.005
249	20.75	0.10	0.046	(0.044)	0.041	0.005
250	20.83	0.07	0.030	(0.043)	0.027	0.003
251	20.92	0.07	0.030	(0.043)	0.027	0.003
252	21.00	0.07	0.030	(0.043)	0.027	0.003
253	21.08	0.10	0.046	(0.043)	0.041	0.005
254	21.17	0.10	0.046	(0.043)	0.041	0.005
255	21.25	0.10	0.046	(0.043)	0.041	0.005
256	21.33	0.07	0.030	(0.042)	0.027	0.003
257	21.42	0.07	0.030	(0.042)	0.027	0.003
258	21.50	0.07	0.030	(0.042)	0.027	0.003
259	21.58	0.10	0.046	(0.042)	0.041	0.005
260	21.67	0.10	0.046	(0.042)	0.041	0.005
261	21.75	0.10	0.046	(0.042)	0.041	0.005
262	21.83	0.07	0.030	(0.041)	0.027	0.003
263	21.92	0.07	0.030	(0.041)	0.027	0.003
264	22.00	0.07	0.030	(0.041)	0.027	0.003
265	22.08	0.10	0.046	(0.041)	0.041	0.005
266	22.17	0.10	0.046	0.041	(0.041)	0.005
267	22.25	0.10	0.046	0.041	(0.041)	0.005
268	22.33	0.07	0.030	(0.041)	0.027	0.003
269	22.42	0.07	0.030	(0.041)	0.027	0.003
270	22.50	0.07	0.030	(0.040)	0.027	0.003
271	22.58	0.07	0.030	(0.040)	0.027	0.003
272	22.67	0.07	0.030	(0.040)	0.027	0.003
273	22.75	0.07	0.030	(0.040)	0.027	0.003
274	22.83	0.07	0.030	(0.040)	0.027	0.003
275	22.92	0.07	0.030	(0.040)	0.027	0.003
276	23.00	0.07	0.030	(0.040)	0.027	0.003
277	23.08	0.07	0.030	(0.040)	0.027	0.003
278	23.17	0.07	0.030	(0.040)	0.027	0.003
279	23.25	0.07	0.030	(0.040)	0.027	0.003
280	23.33	0.07	0.030	(0.039)	0.027	0.003
281	23.42	0.07	0.030	(0.039)	0.027	0.003
282	23.50	0.07	0.030	(0.039)	0.027	0.003
283	23.58	0.07	0.030	(0.039)	0.027	0.003
284	23.67	0.07	0.030	(0.039)	0.027	0.003
285	23.75	0.07	0.030	(0.039)	0.027	0.003
286	23.83	0.07	0.030	(0.039)	0.027	0.003
287	23.92	0.07	0.030	(0.039)	0.027	0.003
288	24.00	0.07	0.030	(0.039)	0.027	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.5

Flood volume = Effective rainfall 2.29(In)
times area 14.9(Ac.)/[(In)/(Ft.)] = 2.9(Ac.Ft)
Total soil loss = 1.51(In)
Total soil loss = 1.875(Ac.Ft)
Total rainfall = 3.80(In)
Flood volume = 124537.8 Cubic Feet
Total soil loss = 81676.5 Cubic Feet

Peak flow rate of this hydrograph = 6.777(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01 Q	|	|	|	|	
0+10	0.0003	0.04 Q	|	|	|	|	
0+15	0.0006	0.04 Q	|	|	|	|	
0+20	0.0010	0.05 Q	|	|	|	|	
0+25	0.0014	0.06 Q	|	|	|	|	
0+30	0.0019	0.07 Q	|	|	|	|	
0+35	0.0023	0.07 Q	|	|	|	|	
0+40	0.0028	0.07 Q	|	|	|	|	
0+45	0.0033	0.07 Q	|	|	|	|	
0+50	0.0038	0.08 Q	|	|	|	|	
0+55	0.0044	0.09 Q	|	|	|	|	
1+ 0	0.0050	0.09 Q	|	|	|	|	
1+ 5	0.0056	0.08 Q	|	|	|	|	
1+10	0.0061	0.07 Q	|	|	|	|	
1+15	0.0066	0.07 Q	|	|	|	|	
1+20	0.0070	0.07 Q	|	|	|	|	
1+25	0.0075	0.07 Q	|	|	|	|	
1+30	0.0080	0.07 Q	|	|	|	|	
1+35	0.0085	0.07 Q	|	|	|	|	
1+40	0.0089	0.07 Q	|	|	|	|	
1+45	0.0094	0.07 Q	|	|	|	|	
1+50	0.0099	0.08 Q	|	|	|	|	
1+55	0.0105	0.09 Q	|	|	|	|	
2+ 0	0.0111	0.09 Q	|	|	|	|	

2+ 5	0.0118	0.09	Q	|	|	|	|
2+10	0.0124	0.09	Q	|	|	|	|
2+15	0.0130	0.09	Q	|	|	|	|
2+20	0.0137	0.09	Q	|	|	|	|
2+25	0.0143	0.09	Q	|	|	|	|
2+30	0.0149	0.09	Q	|	|	|	|
2+35	0.0156	0.10	Q	|	|	|	|
2+40	0.0164	0.11	Q	|	|	|	|
2+45	0.0171	0.11	Q	|	|	|	|
2+50	0.0179	0.11	Q	|	|	|	|
2+55	0.0187	0.11	Q	|	|	|	|
3+ 0	0.0195	0.11	Q	|	|	|	|
3+ 5	0.0203	0.11	Q	|	|	|	|
3+10	0.0211	0.11	Q	|	|	|	|
3+15	0.0218	0.11	Q	|	|	|	|
3+20	0.0226	0.11	Q	|	|	|	|
3+25	0.0234	0.11	Q	|	|	|	|
3+30	0.0242	0.11	Q	|	|	|	|
3+35	0.0250	0.11	Q	|	|	|	|
3+40	0.0258	0.11	Q	|	|	|	|
3+45	0.0266	0.11	Q	|	|	|	|
3+50	0.0274	0.12	Q	|	|	|	|
3+55	0.0283	0.13	Q	|	|	|	|
4+ 0	0.0293	0.14	Q	|	|	|	|
4+ 5	0.0302	0.14	Q	|	|	|	|
4+10	0.0311	0.14	Q	|	|	|	|
4+15	0.0321	0.14	Q	|	|	|	|
4+20	0.0331	0.14	Q	|	|	|	|
4+25	0.0341	0.16	Q	|	|	|	|
4+30	0.0352	0.16	Q	|	|	|	|
4+35	0.0363	0.16	Q	|	|	|	|
4+40	0.0374	0.16	Q	|	|	|	|
4+45	0.0385	0.16	Q	|	|	|	|
4+50	0.0397	0.17	Q	|	|	|	|
4+55	0.0409	0.18	Q	|	|	|	|
5+ 0	0.0422	0.19	Q	|	|	|	|
5+ 5	0.0434	0.18	Q	|	|	|	|
5+10	0.0445	0.15	Q	|	|	|	|
5+15	0.0455	0.14	Q	|	|	|	|
5+20	0.0465	0.15	Q	|	|	|	|
5+25	0.0475	0.16	Q	|	|	|	|
5+30	0.0486	0.16	Q	|	|	|	|
5+35	0.0499	0.18	Q	|	|	|	|
5+40	0.0515	0.23	Q	|	|	|	|

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5+45    0.0532    0.24  Q      |       |       |       |
5+50    0.0549    0.26  VQ     |       |       |       |
5+55    0.0567    0.26  VQ     |       |       |       |
6+ 0    0.0586    0.27  VQ     |       |       |       |
6+ 5    0.0610    0.35  VQ     |       |       |       |
6+10    0.0642    0.46  VQ     |       |       |       |
6+15    0.0677    0.50  VQ     |       |       |       |
6+20    0.0712    0.52  V Q    |       |       |       |
6+25    0.0749    0.53  |VQ     |       |       |       |
6+30    0.0786    0.54  |VQ     |       |       |       |
6+35    0.0829    0.62  |VQ     |       |       |       |
6+40    0.0879    0.73  |VQ     |       |       |       |
6+45    0.0932    0.77  |V Q    |       |       |       |
6+50    0.0987    0.79  |V Q    |       |       |       |
6+55    0.1042    0.80  |V Q    |       |       |       |
7+ 0    0.1098    0.81  |V Q    |       |       |       |
7+ 5    0.1154    0.82  |V Q    |       |       |       |
7+10    0.1211    0.83  |V Q    |       |       |       |
7+15    0.1269    0.83  |V Q    |       |       |       |
7+20    0.1331    0.91  |V Q    |       |       |       |
7+25    0.1402    1.02  |V  Q   |       |       |       |
7+30    0.1475    1.06  | V Q   |       |       |       |
7+35    0.1553    1.14  | V Q   |       |       |       |
7+40    0.1641    1.27  | V  Q  |       |       |       |
7+45    0.1731    1.31  | V  Q  |       |       |       |
7+50    0.1827    1.39  | V  Q  |       |       |       |
7+55    0.1931    1.52  | V   Q |       |       |       |
8+ 0    0.2038    1.56  | V   Q |       |       |       |
8+ 5    0.2156    1.71  |  V Q  |       |       |       |
8+10    0.2290    1.94  |  V  Q |       |       |       |
8+15    0.2428    2.01  |  V   Q|       |       |       |
8+20    0.2569    2.04  |  V   Q|       |       |       |
8+25    0.2711    2.06  |  V   Q|       |       |       |
8+30    0.2854    2.08  |  V   Q|       |       |       |
8+35    0.3002    2.15  |  V  Q |       |       |       |
8+40    0.3158    2.27  |  V   Q|       |       |       |
8+45    0.3316    2.30  |  V   Q|       |       |       |
8+50    0.3481    2.39  |  V   Q|       |       |       |
8+55    0.3654    2.51  |  V   Q       |       |       |
9+ 0    0.3829    2.55  |  V   Q       |       |       |
9+ 5    0.4015    2.70  |  V   Q       |       |       |
9+10    0.4217    2.94  |  V   |Q      |       |       |
9+15    0.4424    3.00  |   V  | Q     |       |       |
9+20    0.4638    3.10  |   V  | Q     |       |       |
```

9+25	0.4860	3.23	V	Q			
9+30	0.5086	3.27	V	Q			
9+35	0.5317	3.36	V	Q			
9+40	0.5557	3.48	V	Q			
9+45	0.5799	3.52	V	Q			
9+50	0.6048	3.61	V	Q			
9+55	0.6304	3.73	V	Q			
10+ 0	0.6564	3.77	V	Q			
10+ 5	0.6792	3.32	V	Q			
10+10	0.6969	2.56	VQ				
10+15	0.7132	2.37	Q				
10+20	0.7290	2.29	QV				
10+25	0.7445	2.25	QV				
10+30	0.7598	2.22	Q V				
10+35	0.7775	2.57	Q				
10+40	0.7990	3.12	VQ				
10+45	0.8215	3.27	V Q				
10+50	0.8445	3.34	V Q				
10+55	0.8677	3.37	VQ				
11+ 0	0.8912	3.41	VQ				
11+ 5	0.9142	3.34	VQ				
11+10	0.9365	3.24	QV				
11+15	0.9587	3.22	QV				
11+20	0.9808	3.21	QV				
11+25	1.0029	3.21	Q V				
11+30	1.0250	3.21	Q V				
11+35	1.0462	3.08	Q V				
11+40	1.0660	2.87	Q V				
11+45	1.0854	2.82	Q V				
11+50	1.1051	2.87	Q V				
11+55	1.1256	2.97	Q V				
12+ 0	1.1462	2.99	Q V				
12+ 5	1.1701	3.48	Q V				
12+10	1.1995	4.26	VQ				
12+15	1.2302	4.47	Q				
12+20	1.2621	4.63	VQ				
12+25	1.2951	4.79	VQ				
12+30	1.3285	4.86	VQ				
12+35	1.3630	5.01	VQ				
12+40	1.3991	5.24	VQ				
12+45	1.4357	5.31	VQ				
12+50	1.4729	5.40	VQ				
12+55	1.5110	5.53	VQ				
13+ 0	1.5494	5.58	VQ				

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13+ 5    1.5903   5.93 |      |      | VQ    |      |
13+10    1.6350   6.49 |      |      | V Q   |      |
13+15    1.6807   6.64 |      |      | V Q   |      |
13+20    1.7269   6.71 |      |      |  V Q  |      |
13+25    1.7734   6.75 |      |      |  V Q  |      |
13+30    1.8201   6.78 |      |      |   V Q |      |
13+35    1.8617   6.04 |      |      |   Q V |      |
13+40    1.8950   4.84 |      |      Q|    V  |      |
13+45    1.9263   4.54 |      |     Q |    V  |      |
13+50    1.9566   4.41 |      |     Q |    V  |      |
13+55    1.9865   4.34 |      |     Q |    V  |      |
14+ 0    2.0160   4.29 |      |     Q |    V  |      |
14+ 5    2.0474   4.56 |      |     Q |    V  |      |
14+10    2.0819   5.01 |      |      Q     V|      |
14+15    2.1172   5.12 |      |      Q     V|      |
14+20    2.1524   5.11 |      |      Q     V      |
14+25    2.1870   5.03 |      |      Q     V      |
14+30    2.2217   5.03 |      |      Q     |V     |
14+35    2.2562   5.02 |      |      Q     |V     |
14+40    2.2908   5.02 |      |      Q     | V    |
14+45    2.3254   5.02 |      |      Q     | V    |
14+50    2.3595   4.96 |      |     Q|     |  V   |
14+55    2.3929   4.85 |      |     Q|     |  V   |
15+ 0    2.4262   4.83 |      |     Q|     |  V   |
15+ 5    2.4589   4.75 |      |     Q|     |  V   |
15+10    2.4909   4.64 |      |     Q |    |   V  |
15+15    2.5227   4.61 |      |     Q |    |   V  |
15+20    2.5539   4.54 |      |     Q |    |   V  |
15+25    2.5844   4.43 |      |     Q |    |   V  |
15+30    2.6147   4.40 |      |     Q |    |   V  |
15+35    2.6431   4.12 |      |     Q |    |   V  |
15+40    2.6684   3.68 |      |    Q  |    |   V  |
15+45    2.6930   3.57 |      |    Q  |    |   V  |
15+50    2.7173   3.52 |      |    Q  |    |   V  |
15+55    2.7414   3.50 |      |    Q  |    |   V  |
16+ 0    2.7654   3.49 |      |  Q    |    |   V  |
16+ 5    2.7825   2.49 |     Q|       |    |   V  |
16+10    2.7884   0.86 |  Q   |       |    |   V  |
16+15    2.7915   0.45 |Q     |       |    |   V  |
16+20    2.7933   0.26 |Q     |       |    |   V  |
16+25    2.7945   0.17 Q      |       |    |   V  |
16+30    2.7951   0.09 Q      |       |    |   V  |
16+35    2.7957   0.08 Q      |       |    |   V  |
16+40    2.7962   0.07 Q      |       |    |   V  |
```

16+45	2.7967	0.07	Q	|	|	V|
16+50	2.7972	0.07	Q	|	|	V|
16+55	2.7977	0.07	Q	|	|	V|
17+ 0	2.7981	0.07	Q	|	|	V|
17+ 5	2.7992	0.15	Q	|	|	V|
17+10	2.8011	0.28	|Q	|	|	V|
17+15	2.8032	0.31	|Q	|	|	V|
17+20	2.8055	0.33	|Q	|	|	V|
17+25	2.8079	0.34	|Q	|	|	V|
17+30	2.8103	0.35	|Q	|	|	V|
17+35	2.8128	0.36	|Q	|	|	V|
17+40	2.8153	0.36	|Q	|	|	V|
17+45	2.8178	0.37	|Q	|	|	V|
17+50	2.8198	0.30	|Q	|	|	V|
17+55	2.8212	0.20	Q	|	|	V|
18+ 0	2.8224	0.17	Q	|	|	V|
18+ 5	2.8235	0.16	Q	|	|	V|
18+10	2.8246	0.16	Q	|	|	V|
18+15	2.8257	0.16	Q	|	|	V|
18+20	2.8268	0.16	Q	|	|	V|
18+25	2.8280	0.17	Q	|	|	V|
18+30	2.8291	0.17	Q	|	|	V|
18+35	2.8301	0.14	Q	|	|	V|
18+40	2.8307	0.09	Q	|	|	V|
18+45	2.8313	0.08	Q	|	|	V|
18+50	2.8317	0.07	Q	|	|	V|
18+55	2.8321	0.05	Q	|	|	V|
19+ 0	2.8324	0.05	Q	|	|	V|
19+ 5	2.8328	0.05	Q	|	|	V|
19+10	2.8333	0.06	Q	|	|	V|
19+15	2.8337	0.07	Q	|	|	V|
19+20	2.8345	0.11	Q	|	|	V|
19+25	2.8357	0.18	Q	|	|	V|
19+30	2.8370	0.20	Q	|	|	V|
19+35	2.8382	0.16	Q	|	|	V|
19+40	2.8388	0.10	Q	|	|	V|
19+45	2.8394	0.08	Q	|	|	V|
19+50	2.8399	0.07	Q	|	|	V|
19+55	2.8403	0.05	Q	|	|	V|
20+ 0	2.8406	0.05	Q	|	|	V|
20+ 5	2.8410	0.05	Q	|	|	V|
20+10	2.8414	0.06	Q	|	|	V|
20+15	2.8419	0.07	Q	|	|	V|
20+20	2.8423	0.07	Q	|	|	V|

20+25	2.8428	0.07	Q	|	|	| V|
20+30	2.8433	0.07	Q	|	|	| V|
20+35	2.8438	0.07	Q	|	|	| V|
20+40	2.8442	0.07	Q	|	|	| V|
20+45	2.8447	0.07	Q	|	|	| V|
20+50	2.8451	0.06	Q	|	|	| V|
20+55	2.8455	0.05	Q	|	|	| V|
21+ 0	2.8458	0.05	Q	|	|	| V|
21+ 5	2.8462	0.05	Q	|	|	| V|
21+10	2.8466	0.06	Q	|	|	| V|
21+15	2.8471	0.07	Q	|	|	| V|
21+20	2.8475	0.06	Q	|	|	| V|
21+25	2.8478	0.05	Q	|	|	| V|
21+30	2.8482	0.05	Q	|	|	| V|
21+35	2.8485	0.05	Q	|	|	| V|
21+40	2.8490	0.06	Q	|	|	| V|
21+45	2.8494	0.07	Q	|	|	| V|
21+50	2.8499	0.06	Q	|	|	| V|
21+55	2.8502	0.05	Q	|	|	| V|
22+ 0	2.8505	0.05	Q	|	|	| V|
22+ 5	2.8509	0.05	Q	|	|	| V|
22+10	2.8514	0.06	Q	|	|	| V|
22+15	2.8518	0.07	Q	|	|	| V|
22+20	2.8523	0.06	Q	|	|	| V|
22+25	2.8526	0.05	Q	|	|	| V|
22+30	2.8530	0.05	Q	|	|	| V|
22+35	2.8533	0.05	Q	|	|	| V|
22+40	2.8536	0.05	Q	|	|	| V|
22+45	2.8539	0.05	Q	|	|	| V|
22+50	2.8542	0.05	Q	|	|	| V|
22+55	2.8545	0.05	Q	|	|	| V|
23+ 0	2.8549	0.05	Q	|	|	| V|
23+ 5	2.8552	0.05	Q	|	|	| V|
23+10	2.8555	0.05	Q	|	|	| V|
23+15	2.8558	0.05	Q	|	|	| V|
23+20	2.8561	0.05	Q	|	|	| V|
23+25	2.8564	0.05	Q	|	|	| V|
23+30	2.8568	0.05	Q	|	|	| V|
23+35	2.8571	0.05	Q	|	|	| V|
23+40	2.8574	0.05	Q	|	|	| V|
23+45	2.8577	0.05	Q	|	|	| V|
23+50	2.8580	0.05	Q	|	|	| V|
23+55	2.8583	0.05	Q	|	|	| V|
24+ 0	2.8586	0.05	Q	|	|	| V|

24+ 5	2.8589	0.03	Q	|	|	| V|
24+10	2.8589	0.01	Q	|	|	| V|
24+15	2.8590	0.00	Q	|	|	| V|
24+20	2.8590	0.00	Q	|	|	| V|
24+25	2.8590	0.00	Q	|	|	| V|

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR1HRA1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 1 HOUR
AREA A

Drainage Area = 14.80(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.80(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

17.57

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	0.40	5.92

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	1.10	16.28

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.800	69.00	0.900

Total Area Entered = 14.80(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	155.690	34.524	5.149
2 0.167	311.381	46.590	6.949
3 0.250	467.071	10.860	1.620
4 0.333	622.762	4.712	0.703
5 0.417	778.452	2.311	0.345
6 0.500	934.142	1.003	0.150
	Sum = 100.000	Sum=	14.916

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low	Effective (In/Hr)
1 0.08	4.20	0.554	0.037 (0.100)	0.517
2 0.17	4.30	0.568	0.037 (0.102)	0.531
3 0.25	5.00	0.660	0.037 (0.119)	0.623
4 0.33	5.00	0.660	0.037 (0.119)	0.623
5 0.42	5.80	0.765	0.037 (0.138)	0.729
6 0.50	6.50	0.858	0.037 (0.154)	0.821
7 0.58	7.40	0.977	0.037 (0.176)	0.940
8 0.67	8.60	1.135	0.037 (0.204)	1.098
9 0.75	12.30	1.623	0.037 (0.292)	1.587
10 0.83	29.10	3.841	0.037 (0.691)	3.804
11 0.92	6.80	0.897	0.037 (0.162)	0.861
12 1.00	5.00	0.660	0.037 (0.119)	0.623
		(Loss Rate Not Used)		
Sum =	100.0		Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 14.8(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.045(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 57109.8 Cubic Feet
Total soil loss = 1978.6 Cubic Feet

Peak flow rate of this hydrograph = 34.672(CFS)

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1-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0184	2.67	V Q | | | |
0+10	0.0620	6.33	|V Q | | | |
0+15	0.1153	7.74	| V Q | | | |
0+20	0.1756	8.77	| V Q | | | |
0+25	0.2421	9.65	| V Q| | | |
0+30	0.3179	11.00	| V|Q | | |
0+35	0.4037	12.46	| | Q | | |
0+40	0.5025	14.34	| | QV | | |
0+45	0.6282	18.25	| | QV| | |
0+50	0.8587	33.46	| | | V | Q |
0+55	1.0975	34.67	| | | | VQ |
1+ 0	1.2145	16.99	| | Q | | V |
1+ 5	1.2773	9.11	| Q| | | V |
1+10	1.2991	3.16	| Q | | | V|
1+15	1.3081	1.30	|Q | | | V|
1+20	1.3104	0.34	Q | | | V|
1+25	1.3111	0.09	Q | | | V

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR3HRA3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 3 HOUR
AREA A

Drainage Area = 14.80(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.80(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	0.70	10.36

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	1.90	28.12

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.800	69.00	0.900

Total Area Entered = 14.80(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

	Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.149
2	0.167	311.381	46.590	6.949
3	0.250	467.071	10.860	1.620
4	0.333	622.762	4.712	0.703
5	0.417	778.452	2.311	0.345
6	0.500	934.142	1.003	0.150
		Sum = 100.000	Sum=	14.916

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	0.037	(0.053)	0.260
2	0.17	1.30	0.296	0.037	(0.053)	0.260
3	0.25	1.10	0.251	0.037	(0.045)	0.214
4	0.33	1.50	0.342	0.037	(0.062)	0.305
5	0.42	1.50	0.342	0.037	(0.062)	0.305
6	0.50	1.80	0.410	0.037	(0.074)	0.374
7	0.58	1.50	0.342	0.037	(0.062)	0.305
8	0.67	1.80	0.410	0.037	(0.074)	0.374
9	0.75	1.80	0.410	0.037	(0.074)	0.374
10	0.83	1.50	0.342	0.037	(0.062)	0.305
11	0.92	1.60	0.365	0.037	(0.066)	0.328
12	1.00	1.80	0.410	0.037	(0.074)	0.374
13	1.08	2.20	0.502	0.037	(0.090)	0.465
14	1.17	2.20	0.502	0.037	(0.090)	0.465
15	1.25	2.20	0.502	0.037	(0.090)	0.465
16	1.33	2.00	0.456	0.037	(0.082)	0.419
17	1.42	2.60	0.593	0.037	(0.107)	0.556
18	1.50	2.70	0.616	0.037	(0.111)	0.579
19	1.58	2.40	0.547	0.037	(0.098)	0.510
20	1.67	2.70	0.616	0.037	(0.111)	0.579
21	1.75	3.30	0.752	0.037	(0.135)	0.716
22	1.83	3.10	0.707	0.037	(0.127)	0.670
23	1.92	2.90	0.661	0.037	(0.119)	0.624
24	2.00	3.00	0.684	0.037	(0.123)	0.647
25	2.08	3.10	0.707	0.037	(0.127)	0.670

26	2.17	4.20	0.958	0.037	(0.172)	0.921
27	2.25	5.00	1.140	0.037	(0.205)	1.103
28	2.33	3.50	0.798	0.037	(0.144)	0.761
29	2.42	6.80	1.550	0.037	(0.279)	1.513
30	2.50	7.30	1.664	0.037	(0.300)	1.627
31	2.58	8.20	1.869	0.037	(0.337)	1.833
32	2.67	5.90	1.345	0.037	(0.242)	1.308
33	2.75	2.00	0.456	0.037	(0.082)	0.419
34	2.83	1.80	0.410	0.037	(0.074)	0.374
35	2.92	1.80	0.410	0.037	(0.074)	0.374
36	3.00	0.60	0.137	(0.037)	0.025	0.112

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)
times area 14.8(Ac.)/[(In)/(Ft.)] = 2.2(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.135(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 96187.7 Cubic Feet
Total soil loss = 5881.2 Cubic Feet

Peak flow rate of this hydrograph = 24.264(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0092	1.34	VQ	|	|	|	|
0+10	0.0308	3.14	V Q	|	|	|	|
0+15	0.0538	3.33	V Q	|	|	|	|
0+20	0.0790	3.66	|V Q	|	|	|	|
0+25	0.1087	4.31	|V Q	|	|	|	|
0+30	0.1419	4.82	| V Q	|	|	|	|
0+35	0.1763	4.99	| V Q	|	|	|	|
0+40	0.2107	5.00	| V Q	|	|	|	|
0+45	0.2481	5.43	| V Q	|	|	|	|
0+50	0.2837	5.16	| VQ	|	|	|	|
0+55	0.3170	4.84	| VQ	|	|	|	|
1+ 0	0.3524	5.14	| Q	|	|	|	|

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 1+ 5    0.3932    5.92 |    Q |       |       |       |
 1+10    0.4388    6.62 |    VQ |      |       |       |
 1+15    0.4856    6.80 |    VQ|       |       |       |
 1+20    0.5314    6.65 |    QV|       |       |       |
 1+25    0.5801    7.07 |    QV        |       |       |
 1+30    0.6358    8.08 |     QV       |       |       |
 1+35    0.6914    8.08 |     Q V      |       |       |
 1+40    0.7470    8.07 |     Q  V     |       |       |
 1+45    0.8104    9.20 |      | Q V   |       |       |
 1+50    0.8793   10.01 |      |  Q V  |       |       |
 1+55    0.9461    9.70 |      | Q   V |       |       |
 2+ 0    1.0118    9.54 |      | Q   V |       |       |
 2+ 5    1.0791    9.77 |      | Q   V|       |       |
 2+10    1.1564   11.23 |      |  Q   V       |       |
 2+15    1.2524   13.94 |      |    Q | V     |       |
 2+20    1.3480   13.87 |      |    Q |  V    |       |
 2+25    1.4571   15.85 |      |     |Q   V   |       |
 2+30    1.6041   21.33 |      |     |    QV|       |
 2+35    1.7712   24.26 |      |     |      | Q     |
 2+40    1.9338   23.61 |      |     |      |Q  V   |
 2+45    2.0440   16.01 |      |     |Q     |   V   |
 2+50    2.1063    9.04 |      | Q   |      |    V  |
 2+55    2.1544    7.00 |     Q|     |      |     V|
 3+ 0    2.1875    4.80 |   Q  |     |      |     V|
 3+ 5    2.2012    1.99 | Q    |     |      |     V|
 3+10    2.2056    0.64 Q     |     |      |     V|
 3+15    2.2074    0.26 Q     |     |      |     V|
 3+20    2.2081    0.09 Q     |     |      |     V|
 3+25    2.2082    0.02 Q     |     |      |     V|
-------------------------------------------------------------------
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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR6HRA6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YR 6 HR
AREA A

Drainage Area = 14.80(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.80(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	1.00	14.80

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	2.50	37.00

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.800	69.00	0.900

Total Area Entered = 14.80(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	155.690	34.524	5.149
2 0.167	311.381	46.590	6.949
3 0.250	467.071	10.860	1.620
4 0.333	622.762	4.712	0.703
5 0.417	778.452	2.311	0.345
6 0.500	934.142	1.003	0.150
	Sum = 100.000	Sum=	14.916

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1 0.08	0.50	0.150	(0.037)	0.027	0.123
2 0.17	0.60	0.180	(0.037)	0.032	0.148
3 0.25	0.60	0.180	(0.037)	0.032	0.148
4 0.33	0.60	0.180	(0.037)	0.032	0.148
5 0.42	0.60	0.180	(0.037)	0.032	0.148
6 0.50	0.70	0.210	0.037	(0.038)	0.173
7 0.58	0.70	0.210	0.037	(0.038)	0.173
8 0.67	0.70	0.210	0.037	(0.038)	0.173
9 0.75	0.70	0.210	0.037	(0.038)	0.173
10 0.83	0.70	0.210	0.037	(0.038)	0.173
11 0.92	0.70	0.210	0.037	(0.038)	0.173
12 1.00	0.80	0.240	0.037	(0.043)	0.203
13 1.08	0.80	0.240	0.037	(0.043)	0.203
14 1.17	0.80	0.240	0.037	(0.043)	0.203
15 1.25	0.80	0.240	0.037	(0.043)	0.203
16 1.33	0.80	0.240	0.037	(0.043)	0.203
17 1.42	0.80	0.240	0.037	(0.043)	0.203
18 1.50	0.80	0.240	0.037	(0.043)	0.203
19 1.58	0.80	0.240	0.037	(0.043)	0.203
20 1.67	0.80	0.240	0.037	(0.043)	0.203
21 1.75	0.80	0.240	0.037	(0.043)	0.203
22 1.83	0.80	0.240	0.037	(0.043)	0.203
23 1.92	0.80	0.240	0.037	(0.043)	0.203
24 2.00	0.90	0.270	0.037	(0.049)	0.233
25 2.08	0.80	0.240	0.037	(0.043)	0.203

26	2.17	0.90	0.270	0.037	(0.049)	0.233
27	2.25	0.90	0.270	0.037	(0.049)	0.233
28	2.33	0.90	0.270	0.037	(0.049)	0.233
29	2.42	0.90	0.270	0.037	(0.049)	0.233
30	2.50	0.90	0.270	0.037	(0.049)	0.233
31	2.58	0.90	0.270	0.037	(0.049)	0.233
32	2.67	0.90	0.270	0.037	(0.049)	0.233
33	2.75	1.00	0.300	0.037	(0.054)	0.263
34	2.83	1.00	0.300	0.037	(0.054)	0.263
35	2.92	1.00	0.300	0.037	(0.054)	0.263
36	3.00	1.00	0.300	0.037	(0.054)	0.263
37	3.08	1.00	0.300	0.037	(0.054)	0.263
38	3.17	1.10	0.330	0.037	(0.059)	0.293
39	3.25	1.10	0.330	0.037	(0.059)	0.293
40	3.33	1.10	0.330	0.037	(0.059)	0.293
41	3.42	1.20	0.360	0.037	(0.065)	0.323
42	3.50	1.30	0.390	0.037	(0.070)	0.353
43	3.58	1.40	0.420	0.037	(0.076)	0.383
44	3.67	1.40	0.420	0.037	(0.076)	0.383
45	3.75	1.50	0.450	0.037	(0.081)	0.413
46	3.83	1.50	0.450	0.037	(0.081)	0.413
47	3.92	1.60	0.480	0.037	(0.086)	0.443
48	4.00	1.60	0.480	0.037	(0.086)	0.443
49	4.08	1.70	0.510	0.037	(0.092)	0.473
50	4.17	1.80	0.540	0.037	(0.097)	0.503
51	4.25	1.90	0.570	0.037	(0.103)	0.533
52	4.33	2.00	0.600	0.037	(0.108)	0.563
53	4.42	2.10	0.630	0.037	(0.113)	0.593
54	4.50	2.10	0.630	0.037	(0.113)	0.593
55	4.58	2.20	0.660	0.037	(0.119)	0.623
56	4.67	2.30	0.690	0.037	(0.124)	0.653
57	4.75	2.40	0.720	0.037	(0.130)	0.683
58	4.83	2.40	0.720	0.037	(0.130)	0.683
59	4.92	2.50	0.750	0.037	(0.135)	0.713
60	5.00	2.60	0.780	0.037	(0.140)	0.743
61	5.08	3.10	0.930	0.037	(0.167)	0.893
62	5.17	3.60	1.080	0.037	(0.194)	1.043
63	5.25	3.90	1.170	0.037	(0.211)	1.133
64	5.33	4.20	1.260	0.037	(0.227)	1.223
65	5.42	4.70	1.410	0.037	(0.254)	1.373
66	5.50	5.60	1.680	0.037	(0.302)	1.643
67	5.58	1.90	0.570	0.037	(0.103)	0.533
68	5.67	0.90	0.270	0.037	(0.049)	0.233
69	5.75	0.60	0.180	(0.037)	0.032	0.148

70	5.83	0.50	0.150	(0.037)	0.027	0.123
71	5.92	0.30	0.090	(0.037)	0.016	0.074
72	6.00	0.20	0.060	(0.037)	0.011	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.4

Flood volume = Effective rainfall 2.29(In)
times area 14.8(Ac.)/[(In)/(Ft.)] = 2.8(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.263(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 122827.5 Cubic Feet
Total soil loss = 11475.7 Cubic Feet

Peak flow rate of this hydrograph = 21.285(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0044	0.63	Q	|	|	|	|
0+10	0.0155	1.62	V Q	|	|	|	|
0+15	0.0292	1.99	V Q	|	|	|	|
0+20	0.0437	2.11	V Q	|	|	|	|
0+25	0.0587	2.17	V Q	|	|	|	|
0+30	0.0747	2.33	|V Q	|	|	|	|
0+35	0.0920	2.51	|V Q	|	|	|	|
0+40	0.1096	2.55	|V Q	|	|	|	|
0+45	0.1273	2.57	|V Q	|	|	|	|
0+50	0.1451	2.58	| VQ	|	|	|	|
0+55	0.1629	2.58	| VQ	|	|	|	|
1+ 0	0.1818	2.74	| VQ	|	|	|	|
1+ 5	0.2020	2.95	| VQ	|	|	|	|
1+10	0.2227	3.00	| Q	|	|	|	|
1+15	0.2435	3.02	| VQ	|	|	|	|
1+20	0.2643	3.03	| VQ	|	|	|	|
1+25	0.2852	3.03	| Q	|	|	|	|
1+30	0.3061	3.03	| Q	|	|	|	|
1+35	0.3269	3.03	| Q	|	|	|	|
1+40	0.3478	3.03	| Q	|	|	|	|

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1+45    0.3687    3.03 |  QV  |      |      |      |
1+50    0.3896    3.03 |  QV  |      |      |      |
1+55    0.4105    3.03 |  QV  |      |      |      |
2+ 0    0.4324    3.19 |  Q V |      |      |      |
2+ 5    0.4547    3.24 |  Q V |      |      |      |
2+10    0.4770    3.23 |  Q V |      |      |      |
2+15    0.5005    3.42 |  Q V |      |      |      |
2+20    0.5243    3.45 |  Q V |      |      |      |
2+25    0.5482    3.47 |  Q V |      |      |      |
2+30    0.5721    3.47 |  Q  V|      |      |      |
2+35    0.5961    3.48 |  Q  V|      |      |      |
2+40    0.6201    3.48 |  Q  V|      |      |      |
2+45    0.6451    3.63 |  Q  V|      |      |      |
2+50    0.6716    3.84 |  Q  V|      |      |      |
2+55    0.6984    3.89 |  Q  V|      |      |      |
3+ 0    0.7253    3.91 |  Q  V      |      |      |
3+ 5    0.7523    3.92 |  Q  V      |      |      |
3+10    0.7804    4.08 |  Q  |V     |      |      |
3+15    0.8100    4.29 |  Q  |V     |      |      |
3+20    0.8399    4.34 |  Q  |V     |      |      |
3+25    0.8710    4.51 |  Q  | V    |      |      |
3+30    0.9046    4.89 |  Q  | V    |      |      |
3+35    0.9412    5.30 |  Q  | V    |      |      |
3+40    0.9796    5.58 |  Q  | V    |      |      |
3+45    1.0197    5.82 |  Q  |  V   |      |      |
3+50    1.0614    6.06 |  Q  |  V   |      |      |
3+55    1.1047    6.28 |  Q  |  V   |      |      |
4+ 0    1.1495    6.51 |  Q  |  V   |      |      |
4+ 5    1.1959    6.73 |  Q  |  V   |      |      |
4+10    1.2449    7.12 |  Q  |  V   |      |      |
4+15    1.2968    7.54 |  Q  |  V   |      |      |
4+20    1.3517    7.98 |  Q  |  V   |      |      |
4+25    1.4097    8.42 |  |Q  |  V   |      |      |
4+30    1.4697    8.71 |  |Q  |  V      |      |
4+35    1.5313    8.95 |  |Q  |  |V     |      |
4+40    1.5957    9.35 |  | Q  |  | V    |      |
4+45    1.6631    9.78 |  | Q  |  | V    |      |
4+50    1.7323   10.06 |  | Q  |  | V    |      |
4+55    1.8032   10.29 |  | Q  |  | V    |      |
5+ 0    1.8769   10.69 |  | Q  |  | V    |      |
5+ 5    1.9577   11.74 |  | Q  |  | V    |      |
5+10    2.0516   13.63 |  |  Q  |  V   |      |
5+15    2.1577   15.41 |  |  Q  |  V      |
5+20    2.2738   16.86 |  |  | Q  |  | V    |
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 5+25     2.4017    18.57 |       |       |  Q    |  V    |
 5+30     2.5483    21.28 |       |       |     Q |   V   |
 5+35     2.6709    17.80 |       |       |  Q    |    V  |
 5+40     2.7337     9.13 |       |  Q    |       |    V  |
 5+45     2.7686     5.06 |    Q  |       |       |    V  |
 5+50     2.7905     3.18 |  Q    |       |       |    V  |
 5+55     2.8048     2.07 |  Q    |       |       |    V  |
 6+ 0     2.8132     1.23 |Q      |       |       |    V  |
 6+ 5     2.8176     0.63  Q      |       |       |    V  |
 6+10     2.8189     0.20  Q      |       |       |    V  |
 6+15     2.8195     0.08  Q      |       |       |    V  |
 6+20     2.8197     0.03  Q      |       |       |    V  |
 6+25     2.8197     0.01  Q      |       |       |    V
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17380P100YR24HRA24100.out

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR24HRA24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 24 HOUR
AREA A

Drainage Area = 14.80(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.80(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	1.70	25.16

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.80	3.90	57.72

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 3.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.800	69.00	0.900

Total Area Entered = 14.80(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.149
2	0.167	311.381	46.590	6.949
3	0.250	467.071	10.860	1.620
4	0.333	622.762	4.712	0.703
5	0.417	778.452	2.311	0.345
6	0.500	934.142	1.003	0.150
		Sum = 100.000	Sum=	14.916

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.031	(0.065)	0.006	0.026
2	0.17	0.07	0.031	(0.065)	0.006	0.026
3	0.25	0.07	0.031	(0.065)	0.006	0.026
4	0.33	0.10	0.047	(0.065)	0.008	0.038
5	0.42	0.10	0.047	(0.064)	0.008	0.038
6	0.50	0.10	0.047	(0.064)	0.008	0.038
7	0.58	0.10	0.047	(0.064)	0.008	0.038
8	0.67	0.10	0.047	(0.064)	0.008	0.038
9	0.75	0.10	0.047	(0.063)	0.008	0.038
10	0.83	0.13	0.062	(0.063)	0.011	0.051
11	0.92	0.13	0.062	(0.063)	0.011	0.051
12	1.00	0.13	0.062	(0.063)	0.011	0.051
13	1.08	0.10	0.047	(0.062)	0.008	0.038
14	1.17	0.10	0.047	(0.062)	0.008	0.038
15	1.25	0.10	0.047	(0.062)	0.008	0.038
16	1.33	0.10	0.047	(0.062)	0.008	0.038
17	1.42	0.10	0.047	(0.061)	0.008	0.038
18	1.50	0.10	0.047	(0.061)	0.008	0.038
19	1.58	0.10	0.047	(0.061)	0.008	0.038
20	1.67	0.10	0.047	(0.061)	0.008	0.038
21	1.75	0.10	0.047	(0.060)	0.008	0.038
22	1.83	0.13	0.062	(0.060)	0.011	0.051
23	1.92	0.13	0.062	(0.060)	0.011	0.051
24	2.00	0.13	0.062	(0.060)	0.011	0.051
25	2.08	0.13	0.062	(0.059)	0.011	0.051

26	2.17	0.13	0.062	(0.059)	0.011	0.051
27	2.25	0.13	0.062	(0.059)	0.011	0.051
28	2.33	0.13	0.062	(0.059)	0.011	0.051
29	2.42	0.13	0.062	(0.058)	0.011	0.051
30	2.50	0.13	0.062	(0.058)	0.011	0.051
31	2.58	0.17	0.078	(0.058)	0.014	0.064
32	2.67	0.17	0.078	(0.058)	0.014	0.064
33	2.75	0.17	0.078	(0.057)	0.014	0.064
34	2.83	0.17	0.078	(0.057)	0.014	0.064
35	2.92	0.17	0.078	(0.057)	0.014	0.064
36	3.00	0.17	0.078	(0.057)	0.014	0.064
37	3.08	0.17	0.078	(0.057)	0.014	0.064
38	3.17	0.17	0.078	(0.056)	0.014	0.064
39	3.25	0.17	0.078	(0.056)	0.014	0.064
40	3.33	0.17	0.078	(0.056)	0.014	0.064
41	3.42	0.17	0.078	(0.056)	0.014	0.064
42	3.50	0.17	0.078	(0.055)	0.014	0.064
43	3.58	0.17	0.078	(0.055)	0.014	0.064
44	3.67	0.17	0.078	(0.055)	0.014	0.064
45	3.75	0.17	0.078	(0.055)	0.014	0.064
46	3.83	0.20	0.094	(0.054)	0.017	0.077
47	3.92	0.20	0.094	(0.054)	0.017	0.077
48	4.00	0.20	0.094	(0.054)	0.017	0.077
49	4.08	0.20	0.094	(0.054)	0.017	0.077
50	4.17	0.20	0.094	(0.054)	0.017	0.077
51	4.25	0.20	0.094	(0.053)	0.017	0.077
52	4.33	0.23	0.109	(0.053)	0.020	0.090
53	4.42	0.23	0.109	(0.053)	0.020	0.090
54	4.50	0.23	0.109	(0.053)	0.020	0.090
55	4.58	0.23	0.109	(0.052)	0.020	0.090
56	4.67	0.23	0.109	(0.052)	0.020	0.090
57	4.75	0.23	0.109	(0.052)	0.020	0.090
58	4.83	0.27	0.125	(0.052)	0.022	0.102
59	4.92	0.27	0.125	(0.051)	0.022	0.102
60	5.00	0.27	0.125	(0.051)	0.022	0.102
61	5.08	0.20	0.094	(0.051)	0.017	0.077
62	5.17	0.20	0.094	(0.051)	0.017	0.077
63	5.25	0.20	0.094	(0.051)	0.017	0.077
64	5.33	0.23	0.109	(0.050)	0.020	0.090
65	5.42	0.23	0.109	(0.050)	0.020	0.090
66	5.50	0.23	0.109	(0.050)	0.020	0.090
67	5.58	0.27	0.125	(0.050)	0.022	0.102
68	5.67	0.27	0.125	(0.049)	0.022	0.102
69	5.75	0.27	0.125	(0.049)	0.022	0.102

70	5.83	0.27	0.125	(0.049)	0.022	0.102
71	5.92	0.27	0.125	(0.049)	0.022	0.102
72	6.00	0.27	0.125	(0.049)	0.022	0.102
73	6.08	0.30	0.140	(0.048)	0.025	0.115
74	6.17	0.30	0.140	(0.048)	0.025	0.115
75	6.25	0.30	0.140	(0.048)	0.025	0.115
76	6.33	0.30	0.140	(0.048)	0.025	0.115
77	6.42	0.30	0.140	(0.048)	0.025	0.115
78	6.50	0.30	0.140	(0.047)	0.025	0.115
79	6.58	0.33	0.156	(0.047)	0.028	0.128
80	6.67	0.33	0.156	(0.047)	0.028	0.128
81	6.75	0.33	0.156	(0.047)	0.028	0.128
82	6.83	0.33	0.156	(0.046)	0.028	0.128
83	6.92	0.33	0.156	(0.046)	0.028	0.128
84	7.00	0.33	0.156	(0.046)	0.028	0.128
85	7.08	0.33	0.156	(0.046)	0.028	0.128
86	7.17	0.33	0.156	(0.046)	0.028	0.128
87	7.25	0.33	0.156	(0.045)	0.028	0.128
88	7.33	0.37	0.172	(0.045)	0.031	0.141
89	7.42	0.37	0.172	(0.045)	0.031	0.141
90	7.50	0.37	0.172	(0.045)	0.031	0.141
91	7.58	0.40	0.187	(0.045)	0.034	0.153
92	7.67	0.40	0.187	(0.044)	0.034	0.153
93	7.75	0.40	0.187	(0.044)	0.034	0.153
94	7.83	0.43	0.203	(0.044)	0.037	0.166
95	7.92	0.43	0.203	(0.044)	0.037	0.166
96	8.00	0.43	0.203	(0.044)	0.037	0.166
97	8.08	0.50	0.234	(0.043)	0.042	0.192
98	8.17	0.50	0.234	(0.043)	0.042	0.192
99	8.25	0.50	0.234	(0.043)	0.042	0.192
100	8.33	0.50	0.234	(0.043)	0.042	0.192
101	8.42	0.50	0.234	(0.043)	0.042	0.192
102	8.50	0.50	0.234	(0.042)	0.042	0.192
103	8.58	0.53	0.250	0.042	(0.045)	0.207
104	8.67	0.53	0.250	0.042	(0.045)	0.208
105	8.75	0.53	0.250	0.042	(0.045)	0.208
106	8.83	0.57	0.265	0.042	(0.048)	0.224
107	8.92	0.57	0.265	0.041	(0.048)	0.224
108	9.00	0.57	0.265	0.041	(0.048)	0.224
109	9.08	0.63	0.296	0.041	(0.053)	0.255
110	9.17	0.63	0.296	0.041	(0.053)	0.256
111	9.25	0.63	0.296	0.041	(0.053)	0.256
112	9.33	0.67	0.312	0.040	(0.056)	0.272
113	9.42	0.67	0.312	0.040	(0.056)	0.272

114	9.50	0.67	0.312	0.040	(0.056)	0.272
115	9.58	0.70	0.328	0.040	(0.059)	0.288
116	9.67	0.70	0.328	0.040	(0.059)	0.288
117	9.75	0.70	0.328	0.039	(0.059)	0.288
118	9.83	0.73	0.343	0.039	(0.062)	0.304
119	9.92	0.73	0.343	0.039	(0.062)	0.304
120	10.00	0.73	0.343	0.039	(0.062)	0.304
121	10.08	0.50	0.234	0.039	(0.042)	0.195
122	10.17	0.50	0.234	0.039	(0.042)	0.195
123	10.25	0.50	0.234	0.038	(0.042)	0.196
124	10.33	0.50	0.234	0.038	(0.042)	0.196
125	10.42	0.50	0.234	0.038	(0.042)	0.196
126	10.50	0.50	0.234	0.038	(0.042)	0.196
127	10.58	0.67	0.312	0.038	(0.056)	0.274
128	10.67	0.67	0.312	0.037	(0.056)	0.275
129	10.75	0.67	0.312	0.037	(0.056)	0.275
130	10.83	0.67	0.312	0.037	(0.056)	0.275
131	10.92	0.67	0.312	0.037	(0.056)	0.275
132	11.00	0.67	0.312	0.037	(0.056)	0.275
133	11.08	0.63	0.296	0.036	(0.053)	0.260
134	11.17	0.63	0.296	0.036	(0.053)	0.260
135	11.25	0.63	0.296	0.036	(0.053)	0.260
136	11.33	0.63	0.296	0.036	(0.053)	0.260
137	11.42	0.63	0.296	0.036	(0.053)	0.261
138	11.50	0.63	0.296	0.036	(0.053)	0.261
139	11.58	0.57	0.265	0.035	(0.048)	0.230
140	11.67	0.57	0.265	0.035	(0.048)	0.230
141	11.75	0.57	0.265	0.035	(0.048)	0.230
142	11.83	0.60	0.281	0.035	(0.051)	0.246
143	11.92	0.60	0.281	0.035	(0.051)	0.246
144	12.00	0.60	0.281	0.035	(0.051)	0.246
145	12.08	0.83	0.390	0.034	(0.070)	0.356
146	12.17	0.83	0.390	0.034	(0.070)	0.356
147	12.25	0.83	0.390	0.034	(0.070)	0.356
148	12.33	0.87	0.406	0.034	(0.073)	0.372
149	12.42	0.87	0.406	0.034	(0.073)	0.372
150	12.50	0.87	0.406	0.034	(0.073)	0.372
151	12.58	0.93	0.437	0.033	(0.079)	0.403
152	12.67	0.93	0.437	0.033	(0.079)	0.404
153	12.75	0.93	0.437	0.033	(0.079)	0.404
154	12.83	0.97	0.452	0.033	(0.081)	0.420
155	12.92	0.97	0.452	0.033	(0.081)	0.420
156	13.00	0.97	0.452	0.033	(0.081)	0.420
157	13.08	1.13	0.530	0.032	(0.095)	0.498

158	13.17	1.13	0.530	0.032	(0.095)	0.498
159	13.25	1.13	0.530	0.032	(0.095)	0.498
160	13.33	1.13	0.530	0.032	(0.095)	0.499
161	13.42	1.13	0.530	0.032	(0.095)	0.499
162	13.50	1.13	0.530	0.032	(0.095)	0.499
163	13.58	0.77	0.359	0.031	(0.065)	0.327
164	13.67	0.77	0.359	0.031	(0.065)	0.328
165	13.75	0.77	0.359	0.031	(0.065)	0.328
166	13.83	0.77	0.359	0.031	(0.065)	0.328
167	13.92	0.77	0.359	0.031	(0.065)	0.328
168	14.00	0.77	0.359	0.031	(0.065)	0.328
169	14.08	0.90	0.421	0.030	(0.076)	0.391
170	14.17	0.90	0.421	0.030	(0.076)	0.391
171	14.25	0.90	0.421	0.030	(0.076)	0.391
172	14.33	0.87	0.406	0.030	(0.073)	0.376
173	14.42	0.87	0.406	0.030	(0.073)	0.376
174	14.50	0.87	0.406	0.030	(0.073)	0.376
175	14.58	0.87	0.406	0.030	(0.073)	0.376
176	14.67	0.87	0.406	0.029	(0.073)	0.376
177	14.75	0.87	0.406	0.029	(0.073)	0.376
178	14.83	0.83	0.390	0.029	(0.070)	0.361
179	14.92	0.83	0.390	0.029	(0.070)	0.361
180	15.00	0.83	0.390	0.029	(0.070)	0.361
181	15.08	0.80	0.374	0.029	(0.067)	0.346
182	15.17	0.80	0.374	0.028	(0.067)	0.346
183	15.25	0.80	0.374	0.028	(0.067)	0.346
184	15.33	0.77	0.359	0.028	(0.065)	0.331
185	15.42	0.77	0.359	0.028	(0.065)	0.331
186	15.50	0.77	0.359	0.028	(0.065)	0.331
187	15.58	0.63	0.296	0.028	(0.053)	0.269
188	15.67	0.63	0.296	0.028	(0.053)	0.269
189	15.75	0.63	0.296	0.027	(0.053)	0.269
190	15.83	0.63	0.296	0.027	(0.053)	0.269
191	15.92	0.63	0.296	0.027	(0.053)	0.269
192	16.00	0.63	0.296	0.027	(0.053)	0.269
193	16.08	0.13	0.062	(0.027)	0.011	0.051
194	16.17	0.13	0.062	(0.027)	0.011	0.051
195	16.25	0.13	0.062	(0.027)	0.011	0.051
196	16.33	0.13	0.062	(0.026)	0.011	0.051
197	16.42	0.13	0.062	(0.026)	0.011	0.051
198	16.50	0.13	0.062	(0.026)	0.011	0.051
199	16.58	0.10	0.047	(0.026)	0.008	0.038
200	16.67	0.10	0.047	(0.026)	0.008	0.038
201	16.75	0.10	0.047	(0.026)	0.008	0.038

202	16.83	0.10	0.047	(0.026)	0.008	0.038
203	16.92	0.10	0.047	(0.026)	0.008	0.038
204	17.00	0.10	0.047	(0.025)	0.008	0.038
205	17.08	0.17	0.078	(0.025)	0.014	0.064
206	17.17	0.17	0.078	(0.025)	0.014	0.064
207	17.25	0.17	0.078	(0.025)	0.014	0.064
208	17.33	0.17	0.078	(0.025)	0.014	0.064
209	17.42	0.17	0.078	(0.025)	0.014	0.064
210	17.50	0.17	0.078	(0.025)	0.014	0.064
211	17.58	0.17	0.078	(0.025)	0.014	0.064
212	17.67	0.17	0.078	(0.024)	0.014	0.064
213	17.75	0.17	0.078	(0.024)	0.014	0.064
214	17.83	0.13	0.062	(0.024)	0.011	0.051
215	17.92	0.13	0.062	(0.024)	0.011	0.051
216	18.00	0.13	0.062	(0.024)	0.011	0.051
217	18.08	0.13	0.062	(0.024)	0.011	0.051
218	18.17	0.13	0.062	(0.024)	0.011	0.051
219	18.25	0.13	0.062	(0.024)	0.011	0.051
220	18.33	0.13	0.062	(0.023)	0.011	0.051
221	18.42	0.13	0.062	(0.023)	0.011	0.051
222	18.50	0.13	0.062	(0.023)	0.011	0.051
223	18.58	0.10	0.047	(0.023)	0.008	0.038
224	18.67	0.10	0.047	(0.023)	0.008	0.038
225	18.75	0.10	0.047	(0.023)	0.008	0.038
226	18.83	0.07	0.031	(0.023)	0.006	0.026
227	18.92	0.07	0.031	(0.023)	0.006	0.026
228	19.00	0.07	0.031	(0.023)	0.006	0.026
229	19.08	0.10	0.047	(0.022)	0.008	0.038
230	19.17	0.10	0.047	(0.022)	0.008	0.038
231	19.25	0.10	0.047	(0.022)	0.008	0.038
232	19.33	0.13	0.062	(0.022)	0.011	0.051
233	19.42	0.13	0.062	(0.022)	0.011	0.051
234	19.50	0.13	0.062	(0.022)	0.011	0.051
235	19.58	0.10	0.047	(0.022)	0.008	0.038
236	19.67	0.10	0.047	(0.022)	0.008	0.038
237	19.75	0.10	0.047	(0.022)	0.008	0.038
238	19.83	0.07	0.031	(0.022)	0.006	0.026
239	19.92	0.07	0.031	(0.021)	0.006	0.026
240	20.00	0.07	0.031	(0.021)	0.006	0.026
241	20.08	0.10	0.047	(0.021)	0.008	0.038
242	20.17	0.10	0.047	(0.021)	0.008	0.038
243	20.25	0.10	0.047	(0.021)	0.008	0.038
244	20.33	0.10	0.047	(0.021)	0.008	0.038
245	20.42	0.10	0.047	(0.021)	0.008	0.038

246	20.50	0.10	0.047	(0.021)	0.008	0.038
247	20.58	0.10	0.047	(0.021)	0.008	0.038
248	20.67	0.10	0.047	(0.021)	0.008	0.038
249	20.75	0.10	0.047	(0.021)	0.008	0.038
250	20.83	0.07	0.031	(0.020)	0.006	0.026
251	20.92	0.07	0.031	(0.020)	0.006	0.026
252	21.00	0.07	0.031	(0.020)	0.006	0.026
253	21.08	0.10	0.047	(0.020)	0.008	0.038
254	21.17	0.10	0.047	(0.020)	0.008	0.038
255	21.25	0.10	0.047	(0.020)	0.008	0.038
256	21.33	0.07	0.031	(0.020)	0.006	0.026
257	21.42	0.07	0.031	(0.020)	0.006	0.026
258	21.50	0.07	0.031	(0.020)	0.006	0.026
259	21.58	0.10	0.047	(0.020)	0.008	0.038
260	21.67	0.10	0.047	(0.020)	0.008	0.038
261	21.75	0.10	0.047	(0.020)	0.008	0.038
262	21.83	0.07	0.031	(0.020)	0.006	0.026
263	21.92	0.07	0.031	(0.020)	0.006	0.026
264	22.00	0.07	0.031	(0.019)	0.006	0.026
265	22.08	0.10	0.047	(0.019)	0.008	0.038
266	22.17	0.10	0.047	(0.019)	0.008	0.038
267	22.25	0.10	0.047	(0.019)	0.008	0.038
268	22.33	0.07	0.031	(0.019)	0.006	0.026
269	22.42	0.07	0.031	(0.019)	0.006	0.026
270	22.50	0.07	0.031	(0.019)	0.006	0.026
271	22.58	0.07	0.031	(0.019)	0.006	0.026
272	22.67	0.07	0.031	(0.019)	0.006	0.026
273	22.75	0.07	0.031	(0.019)	0.006	0.026
274	22.83	0.07	0.031	(0.019)	0.006	0.026
275	22.92	0.07	0.031	(0.019)	0.006	0.026
276	23.00	0.07	0.031	(0.019)	0.006	0.026
277	23.08	0.07	0.031	(0.019)	0.006	0.026
278	23.17	0.07	0.031	(0.019)	0.006	0.026
279	23.25	0.07	0.031	(0.019)	0.006	0.026
280	23.33	0.07	0.031	(0.019)	0.006	0.026
281	23.42	0.07	0.031	(0.019)	0.006	0.026
282	23.50	0.07	0.031	(0.019)	0.006	0.026
283	23.58	0.07	0.031	(0.019)	0.006	0.026
284	23.67	0.07	0.031	(0.018)	0.006	0.026
285	23.75	0.07	0.031	(0.018)	0.006	0.026
286	23.83	0.07	0.031	(0.018)	0.006	0.026
287	23.92	0.07	0.031	(0.018)	0.006	0.026
288	24.00	0.07	0.031	(0.018)	0.006	0.026

(Loss Rate Not Used)

Sum = 100.0 Sum = 40.9

Flood volume = Effective rainfall 3.41(In)
times area 14.8(Ac.)/[(In)/(Ft.)] = 4.2(Ac.Ft)
Total soil loss = 0.49(In)
Total soil loss = 0.603(Ac.Ft)
Total rainfall = 3.90(In)
Flood volume = 183263.9 Cubic Feet
Total soil loss = 26253.6 Cubic Feet

Peak flow rate of this hydrograph = 7.442(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0009	0.13	Q				
0+10	0.0030	0.31	VQ				
0+15	0.0055	0.35	VQ				
0+20	0.0085	0.44	VQ				
0+25	0.0121	0.53	V Q				
0+30	0.0160	0.56	V Q				
0+35	0.0199	0.57	V Q				
0+40	0.0238	0.57	V Q				
0+45	0.0277	0.57	V Q				
0+50	0.0321	0.64	V Q				
0+55	0.0371	0.73	V Q				
1+ 0	0.0423	0.75	V Q				
1+ 5	0.0471	0.69	V Q				
1+10	0.0512	0.61	V Q				
1+15	0.0553	0.59	V Q				
1+20	0.0593	0.58	V Q				
1+25	0.0632	0.57	V Q				
1+30	0.0672	0.57	V Q				
1+35	0.0711	0.57	V Q				
1+40	0.0751	0.57	V Q				
1+45	0.0790	0.57	V Q				
1+50	0.0834	0.64	V Q				
1+55	0.0884	0.73	V Q				
2+ 0	0.0936	0.75	V Q				

2+ 5	0.0988	0.76	V Q	|	|	|	|
2+10	0.1040	0.76	V Q	|	|	|	|
2+15	0.1093	0.76	|V Q	|	|	|	|
2+20	0.1146	0.76	|V Q	|	|	|	|
2+25	0.1198	0.76	|V Q	|	|	|	|
2+30	0.1251	0.76	|V Q	|	|	|	|
2+35	0.1308	0.83	|V Q	|	|	|	|
2+40	0.1371	0.92	|V Q	|	|	|	|
2+45	0.1436	0.94	|V Q	|	|	|	|
2+50	0.1501	0.95	|V Q	|	|	|	|
2+55	0.1567	0.95	|V Q	|	|	|	|
3+ 0	0.1632	0.95	|V Q	|	|	|	|
3+ 5	0.1698	0.95	|V Q	|	|	|	|
3+10	0.1764	0.95	|V Q	|	|	|	|
3+15	0.1830	0.95	|V Q	|	|	|	|
3+20	0.1895	0.95	|V Q	|	|	|	|
3+25	0.1961	0.95	|V Q	|	|	|	|
3+30	0.2027	0.95	|V Q	|	|	|	|
3+35	0.2093	0.95	|V Q	|	|	|	|
3+40	0.2158	0.95	| VQ	|	|	|	|
3+45	0.2224	0.95	| VQ	|	|	|	|
3+50	0.2294	1.02	| V Q	|	|	|	|
3+55	0.2371	1.11	| V Q	|	|	|	|
4+ 0	0.2448	1.13	| V Q	|	|	|	|
4+ 5	0.2527	1.14	| V Q	|	|	|	|
4+10	0.2606	1.14	| V Q	|	|	|	|
4+15	0.2685	1.15	| V Q	|	|	|	|
4+20	0.2768	1.21	| V Q	|	|	|	|
4+25	0.2858	1.30	| V Q	|	|	|	|
4+30	0.2949	1.32	| V Q	|	|	|	|
4+35	0.3040	1.33	| V Q	|	|	|	|
4+40	0.3132	1.33	| V Q	|	|	|	|
4+45	0.3224	1.34	| V Q	|	|	|	|
4+50	0.3321	1.40	| V Q	|	|	|	|
4+55	0.3423	1.49	| V Q	|	|	|	|
5+ 0	0.3527	1.51	| V Q	|	|	|	|
5+ 5	0.3623	1.39	| V Q	|	|	|	|
5+10	0.3707	1.22	| VQ	|	|	|	|
5+15	0.3788	1.18	| VQ	|	|	|	|
5+20	0.3872	1.22	| VQ	|	|	|	|
5+25	0.3962	1.30	| V Q	|	|	|	|
5+30	0.4053	1.32	| V Q	|	|	|	|
5+35	0.4149	1.40	| V Q	|	|	|	|
5+40	0.4252	1.49	| VQ	|	|	|	|

5+45	0.4356	1.51	V Q			
5+50	0.4460	1.52	V Q			
5+55	0.4565	1.53	V Q			
6+ 0	0.4671	1.53	V Q			
6+ 5	0.4780	1.59	V Q			
6+10	0.4896	1.68	V Q			
6+15	0.5013	1.70	V Q			
6+20	0.5131	1.71	V Q			
6+25	0.5250	1.72	V Q			
6+30	0.5368	1.72	VQ			
6+35	0.5491	1.78	V Q			
6+40	0.5620	1.87	V Q			
6+45	0.5750	1.89	V Q			
6+50	0.5881	1.90	V Q			
6+55	0.6012	1.91	V Q			
7+ 0	0.6144	1.91	V Q			
7+ 5	0.6275	1.91	V Q			
7+10	0.6407	1.91	VQ			
7+15	0.6538	1.91	VQ			
7+20	0.6674	1.97	VQ			
7+25	0.6817	2.06	V Q			
7+30	0.6960	2.08	V Q			
7+35	0.7109	2.16	V Q			
7+40	0.7264	2.25	V Q			
7+45	0.7421	2.28	V Q			
7+50	0.7583	2.35	V Q			
7+55	0.7751	2.44	V Q			
8+ 0	0.7921	2.47	V Q			
8+ 5	0.8100	2.61	V Q			
8+10	0.8292	2.79	V Q			
8+15	0.8487	2.83	V Q			
8+20	0.8684	2.85	V Q			
8+25	0.8881	2.86	V Q			
8+30	0.9078	2.86	V Q			
8+35	0.9281	2.94	V Q			
8+40	0.9491	3.05	V Q			
8+45	0.9703	3.08	V Q			
8+50	0.9922	3.17	V Q			
8+55	1.0148	3.29	V Q			
9+ 0	1.0377	3.32	V Q			
9+ 5	1.0618	3.50	V Q			
9+10	1.0874	3.72	V Q			
9+15	1.1134	3.78	V Q			
9+20	1.1401	3.88	V Q			

9+25	1.1677	4.00	|V Q |	|	|
9+30	1.1955	4.04	|V Q |	|	|
9+35	1.2240	4.13	|V Q |	|	|
9+40	1.2532	4.25	|V Q |	|	|
9+45	1.2827	4.28	| V Q |	|	|
9+50	1.3128	4.37	| V Q |	|	|
9+55	1.3437	4.49	| V Q |	|	|
10+ 0	1.3749	4.52	| V Q|	|	|
10+ 5	1.4022	3.97	| V Q |	|	|
10+10	1.4244	3.22	| QV |	|	|
10+15	1.4454	3.05	| QV |	|	|
10+20	1.4659	2.97	|Q V |	|	|
10+25	1.4861	2.94	|Q V |	|	|
10+30	1.5062	2.93	|Q V |	|	|
10+35	1.5292	3.33	| QV |	|	|
10+40	1.5559	3.88	| VQ |	|	|
10+45	1.5835	4.00	| VQ |	|	|
10+50	1.6114	4.06	| VQ |	|	|
10+55	1.6396	4.09	| VQ |	|	|
11+ 0	1.6679	4.11	| VQ |	|	|
11+ 5	1.6956	4.03	| Q |	|	|
11+10	1.7226	3.92	| QV |	|	|
11+15	1.7495	3.90	| QV |	|	|
11+20	1.7763	3.89	| QV |	|	|
11+25	1.8031	3.89	| Q V |	|	|
11+30	1.8299	3.89	| Q V |	|	|
11+35	1.8556	3.73	| Q V |	|	|
11+40	1.8798	3.52	| Q V |	|	|
11+45	1.9037	3.47	| Q V |	|	|
11+50	1.9280	3.53	| Q V |	|	|
11+55	1.9530	3.63	| Q V |	|	|
12+ 0	1.9782	3.65	| Q V |	|	|
12+ 5	2.0073	4.23	| Q V|	|	|
12+10	2.0417	5.00	| Q|	|	|
12+15	2.0774	5.18	| VQ	|	|
12+20	2.1141	5.34	| VQ	|	|
12+25	2.1519	5.49	| VQ	|	|
12+30	2.1900	5.53	| V Q	|	|
12+35	2.2293	5.71	| |VQ	|	|
12+40	2.2702	5.93	| |V Q	|	|
12+45	2.3114	5.99	| |V Q	|	|
12+50	2.3533	6.09	| | V Q	|	|
12+55	2.3961	6.21	| | V Q	|	|
13+ 0	2.4391	6.24	| | VQ	|	|

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13+ 5    2.4850    6.66 |      |      | V Q  |      |
13+10    2.5346    7.21 |      |      |  V  Q|      |
13+15    2.5852    7.34 |      |      |  V   Q|     |
13+20    2.6362    7.40 |      |      |   V  Q|     |
13+25    2.6873    7.43 |      |      |   V  Q|     |
13+30    2.7386    7.44 |      |      |    V Q|     |
13+35    2.7837    6.56 |      |      |    Q  |     |
13+40    2.8207    5.37 |      |      |Q   V  |     |
13+45    2.8558    5.09 |      |      Q    V  |     |
13+50    2.8901    4.98 |      |     Q|    V  |     |
13+55    2.9240    4.92 |      |     Q|    V  |     |
14+ 0    2.9577    4.90 |      |     Q|    V  |     |
14+ 5    2.9936    5.22 |      |     Q     V  |     |
14+10    3.0326    5.66 |      |      | Q   V  |     |
14+15    3.0722    5.76 |      |      |  Q  V|     |
14+20    3.1117    5.72 |      |      | Q   V|     |
14+25    3.1505    5.64 |      |      | Q   V|     |
14+30    3.1892    5.63 |      |      | Q    V      |
14+35    3.2279    5.62 |      |      | Q    V      |
14+40    3.2666    5.61 |      |      | Q    |V     |
14+45    3.3053    5.61 |      |      | Q    |V     |
14+50    3.3434    5.54 |      |      | Q    |V     |
14+55    3.3808    5.43 |      |      |Q     | V    |
15+ 0    3.4180    5.41 |      |      |Q     | V    |
15+ 5    3.4547    5.32 |      |      |Q     | V    |
15+10    3.4905    5.21 |      |      Q     | V    |
15+15    3.5262    5.18 |      |      Q     | V    |
15+20    3.5613    5.09 |      |      Q     | V    |
15+25    3.5956    4.98 |      |     Q|     |  V   |
15+30    3.6297    4.95 |      |     Q|     |  V   |
15+35    3.6615    4.62 |      |     Q |    |  V   |
15+40    3.6904    4.19 |      |    Q  |    |  V   |
15+45    3.7185    4.09 |      |    Q  |    |  V   |
15+50    3.7464    4.04 |      |    Q  |    |  V   |
15+55    3.7741    4.02 |      |    Q  |    |  V   |
16+ 0    3.8018    4.02 |      |   Q   |    |  V   |
16+ 5    3.8217    2.89 |      |Q      |    |  V   |
16+10    3.8312    1.38 |   Q  |       |    |  V   |
16+15    3.8383    1.02 |  Q   |       |    |  V   |
16+20    3.8443    0.87 | Q    |       |    |  V   |
16+25    3.8497    0.80 | Q    |       |    |  V   |
16+30    3.8550    0.76 | Q    |       |    |  V   |
16+35    3.8598    0.70 |Q     |       |    |  V   |
16+40    3.8640    0.61 |Q     |       |    |  V   |
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16+45	3.8680	0.59	Q	|	|	|	V |
16+50	3.8720	0.58	Q	|	|	|	V |
16+55	3.8760	0.57	Q	|	|	|	V |
17+ 0	3.8799	0.57	Q	|	|	|	V |
17+ 5	3.8848	0.70	Q	|	|	|	V |
17+10	3.8909	0.88	Q	|	|	|	V |
17+15	3.8972	0.92	Q	|	|	|	V |
17+20	3.9037	0.94	Q	|	|	|	V |
17+25	3.9103	0.95	Q	|	|	|	V |
17+30	3.9168	0.95	Q	|	|	|	V |
17+35	3.9234	0.95	Q	|	|	|	V |
17+40	3.9300	0.95	Q	|	|	|	V |
17+45	3.9365	0.95	Q	|	|	|	V |
17+50	3.9427	0.89	Q	|	|	|	V |
17+55	3.9482	0.80	Q	|	|	|	V |
18+ 0	3.9535	0.78	Q	|	|	|	V |
18+ 5	3.9588	0.77	Q	|	|	|	V |
18+10	3.9641	0.77	Q	|	|	|	V |
18+15	3.9694	0.76	Q	|	|	|	V |
18+20	3.9746	0.76	Q	|	|	|	V |
18+25	3.9799	0.76	Q	|	|	|	V |
18+30	3.9852	0.76	Q	|	|	|	V |
18+35	3.9900	0.70	Q	|	|	|	V |
18+40	3.9941	0.61	Q	|	|	|	V |
18+45	3.9982	0.59	Q	|	|	|	V |
18+50	4.0017	0.51	Q	|	|	|	V |
18+55	4.0046	0.42	Q	|	|	|	V |
19+ 0	4.0074	0.40	Q	|	|	|	V |
19+ 5	4.0105	0.45	Q	|	|	|	V |
19+10	4.0142	0.54	Q	|	|	|	V |
19+15	4.0180	0.56	Q	|	|	|	V |
19+20	4.0224	0.63	Q	|	|	|	V |
19+25	4.0274	0.73	Q	|	|	|	V |
19+30	4.0325	0.75	Q	|	|	|	V |
19+35	4.0373	0.69	Q	|	|	|	V |
19+40	4.0415	0.61	Q	|	|	|	V |
19+45	4.0455	0.59	Q	|	|	|	V |
19+50	4.0491	0.51	Q	|	|	|	V |
19+55	4.0520	0.42	Q	|	|	|	V |
20+ 0	4.0547	0.40	Q	|	|	|	V |
20+ 5	4.0578	0.45	Q	|	|	|	V |
20+10	4.0615	0.54	Q	|	|	|	V |
20+15	4.0654	0.56	Q	|	|	|	V |
20+20	4.0693	0.57	Q	|	|	|	V |

20+25	4.0732	0.57	| Q	|	|	|	V |
20+30	4.0771	0.57	| Q	|	|	|	V |
20+35	4.0811	0.57	| Q	|	|	|	V |
20+40	4.0850	0.57	| Q	|	|	|	V |
20+45	4.0890	0.57	| Q	|	|	|	V |
20+50	4.0925	0.51	| Q	|	|	|	V |
20+55	4.0953	0.42	|Q	|	|	|	V |
21+ 0	4.0981	0.40	|Q	|	|	|	V |
21+ 5	4.1012	0.45	|Q	|	|	|	V |
21+10	4.1049	0.54	| Q	|	|	|	V|
21+15	4.1087	0.56	| Q	|	|	|	V|
21+20	4.1122	0.50	| Q	|	|	|	V|
21+25	4.1151	0.42	|Q	|	|	|	V|
21+30	4.1178	0.40	|Q	|	|	|	V|
21+35	4.1209	0.45	|Q	|	|	|	V|
21+40	4.1246	0.54	| Q	|	|	|	V|
21+45	4.1285	0.56	| Q	|	|	|	V|
21+50	4.1319	0.50	| Q	|	|	|	V|
21+55	4.1348	0.42	|Q	|	|	|	V|
22+ 0	4.1375	0.40	|Q	|	|	|	V|
22+ 5	4.1406	0.45	|Q	|	|	|	V|
22+10	4.1443	0.54	| Q	|	|	|	V|
22+15	4.1482	0.56	| Q	|	|	|	V|
22+20	4.1516	0.50	| Q	|	|	|	V|
22+25	4.1545	0.42	|Q	|	|	|	V|
22+30	4.1572	0.40	|Q	|	|	|	V|
22+35	4.1599	0.39	|Q	|	|	|	V|
22+40	4.1625	0.38	|Q	|	|	|	V|
22+45	4.1652	0.38	|Q	|	|	|	V|
22+50	4.1678	0.38	|Q	|	|	|	V|
22+55	4.1704	0.38	|Q	|	|	|	V|
23+ 0	4.1731	0.38	|Q	|	|	|	V|
23+ 5	4.1757	0.38	|Q	|	|	|	V|
23+10	4.1783	0.38	|Q	|	|	|	V|
23+15	4.1810	0.38	|Q	|	|	|	V|
23+20	4.1836	0.38	|Q	|	|	|	V|
23+25	4.1862	0.38	|Q	|	|	|	V|
23+30	4.1888	0.38	|Q	|	|	|	V|
23+35	4.1915	0.38	|Q	|	|	|	V|
23+40	4.1941	0.38	|Q	|	|	|	V|
23+45	4.1967	0.38	|Q	|	|	|	V|
23+50	4.1994	0.38	|Q	|	|	|	V|
23+55	4.2020	0.38	|Q	|	|	|	V|
24+ 0	4.2046	0.38	|Q	|	|	|	V|

24+ 5	4.2063	0.25	Q	|	|	|	V|
24+10	4.2068	0.07	Q	|	|	|	V|
24+15	4.2070	0.03	Q	|	|	|	V|
24+20	4.2071	0.01	Q	|	|	|	V|
24+25	4.2072	0.00	Q	|	|	|	V|

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Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR1HRB1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 1 HOUR
AREA B

Drainage Area = 14.74(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.74(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 638.00(Ft.)
Length along longest watercourse measured to centroid = 318.00(Ft.)
Length along longest watercourse = 0.121 Mi.
Length along longest watercourse measured to centroid = 0.060 Mi.
Difference in elevation = 4.60(Ft.)
Slope along watercourse = 38.0690 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.056 Hr.
Lag time = 3.33 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	0.40	5.90

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	1.10	16.21

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.740	85.00	0.000

Total Area Entered = 14.74(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	150.052	33.188	4.930
2 0.167	300.104	47.006	6.983
3 0.250	450.157	11.179	1.661
4 0.333	600.209	4.882	0.725
5 0.417	750.261	2.465	0.366
6 0.500	900.313	1.281	0.190
	Sum = 100.000	Sum=	14.855

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1 0.08	4.20	0.554	0.078	(0.499)	0.476
2 0.17	4.30	0.568	0.078	(0.511)	0.490
3 0.25	5.00	0.660	0.078	(0.594)	0.582
4 0.33	5.00	0.660	0.078	(0.594)	0.582
5 0.42	5.80	0.765	0.078	(0.689)	0.687
6 0.50	6.50	0.858	0.078	(0.772)	0.780
7 0.58	7.40	0.977	0.078	(0.879)	0.899
8 0.67	8.60	1.135	0.078	(1.022)	1.057
9 0.75	12.30	1.623	0.078	(1.461)	1.545
10 0.83	29.10	3.841	0.078	(3.457)	3.763
11 0.92	6.80	0.897	0.078	(0.808)	0.819
12 1.00	5.00	0.660	0.078	(0.594)	0.582
	(Loss Rate Not Used)				
Sum =	100.0		Sum =	12.3	

Flood volume = Effective rainfall 1.02(In)
times area 14.7(Ac.)/[(In)/(Ft.)] = 1.3(Ac.Ft)
Total soil loss = 0.08(In)
Total soil loss = 0.096(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 54675.5 Cubic Feet
Total soil loss = 4173.5 Cubic Feet

Peak flow rate of this hydrograph = 34.142(CFS)

1-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0162	2.35	V Q | | | |
0+10	0.0557	5.74	|V Q | | | |
0+15	0.1045	7.08	| V Q | | | |
0+20	0.1603	8.09	| V Q | | | |
0+25	0.2219	8.95	| VQ | | | |
0+30	0.2929	10.31	| VQ | | |
0+35	0.3739	11.75	| |Q | | |
0+40	0.4676	13.61	| | QV | | |
0+45	0.5876	17.43	| | QV | | |
0+50	0.8093	32.18	| | | V | Q |
0+55	1.0444	34.14	| | | | VQ |
1+ 0	1.1582	16.53	| | Q | | V |
1+ 5	1.2197	8.92	| Q | | | V |
1+10	1.2420	3.23	| Q | | | | V|
1+15	1.2519	1.44	|Q | | | V|
1+20	1.2544	0.37	Q | | | V|
1+25	1.2552	0.11	Q | | | V

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR3HRB3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 3 HOUR
AREA B

Drainage Area = 14.74(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.74(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 638.00(Ft.)
Length along longest watercourse measured to centroid = 318.00(Ft.)
Length along longest watercourse = 0.121 Mi.
Length along longest watercourse measured to centroid = 0.060 Mi.
Difference in elevation = 4.60(Ft.)
Slope along watercourse = 38.0690 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.056 Hr.
Lag time = 3.33 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.

Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	0.70	10.32

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	1.90	28.01

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.740	85.00	0.000

Total Area Entered = 14.74(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	150.052	33.188	4.930
2 0.167	300.104	47.006	6.983
3 0.250	450.157	11.179	1.661
4 0.333	600.209	4.882	0.725
5 0.417	750.261	2.465	0.366
6 0.500	900.313	1.281	0.190
	Sum = 100.000	Sum=	14.855

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1 0.08	1.30	0.296	0.078	(0.267)	0.218
2 0.17	1.30	0.296	0.078	(0.267)	0.218
3 0.25	1.10	0.251	0.078	(0.226)	0.173
4 0.33	1.50	0.342	0.078	(0.308)	0.264
5 0.42	1.50	0.342	0.078	(0.308)	0.264
6 0.50	1.80	0.410	0.078	(0.369)	0.332
7 0.58	1.50	0.342	0.078	(0.308)	0.264
8 0.67	1.80	0.410	0.078	(0.369)	0.332
9 0.75	1.80	0.410	0.078	(0.369)	0.332
10 0.83	1.50	0.342	0.078	(0.308)	0.264
11 0.92	1.60	0.365	0.078	(0.328)	0.287
12 1.00	1.80	0.410	0.078	(0.369)	0.332
13 1.08	2.20	0.502	0.078	(0.451)	0.424
14 1.17	2.20	0.502	0.078	(0.451)	0.424
15 1.25	2.20	0.502	0.078	(0.451)	0.424
16 1.33	2.00	0.456	0.078	(0.410)	0.378
17 1.42	2.60	0.593	0.078	(0.533)	0.515
18 1.50	2.70	0.616	0.078	(0.554)	0.538
19 1.58	2.40	0.547	0.078	(0.492)	0.469
20 1.67	2.70	0.616	0.078	(0.554)	0.538
21 1.75	3.30	0.752	0.078	(0.677)	0.674
22 1.83	3.10	0.707	0.078	(0.636)	0.629
23 1.92	2.90	0.661	0.078	(0.595)	0.583
24 2.00	3.00	0.684	0.078	(0.616)	0.606
25 2.08	3.10	0.707	0.078	(0.636)	0.629

26	2.17	4.20	0.958	0.078	(0.862)	0.880
27	2.25	5.00	1.140	0.078	(1.026)	1.062
28	2.33	3.50	0.798	0.078	(0.718)	0.720
29	2.42	6.80	1.550	0.078	(1.395)	1.472
30	2.50	7.30	1.664	0.078	(1.498)	1.586
31	2.58	8.20	1.869	0.078	(1.683)	1.791
32	2.67	5.90	1.345	0.078	(1.211)	1.267
33	2.75	2.00	0.456	0.078	(0.410)	0.378
34	2.83	1.80	0.410	0.078	(0.369)	0.332
35	2.92	1.80	0.410	0.078	(0.369)	0.332
36	3.00	0.60	0.137	0.078	(0.123)	0.059

(Loss Rate Not Used)

Sum = 100.0 Sum = 20.0

Flood volume = Effective rainfall 1.67(In)
times area 14.7(Ac.)/[(In)/(Ft.)] = 2.0(Ac.Ft)
Total soil loss = 0.23(In)
Total soil loss = 0.287(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 89134.8 Cubic Feet
Total soil loss = 12520.5 Cubic Feet

Peak flow rate of this hydrograph = 23.444(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0074	1.08	VQ	|	|	|	|
0+10	0.0253	2.60	V Q	|	|	|	|
0+15	0.0442	2.74	V Q	|	|	|	|
0+20	0.0651	3.03	|V Q	|	|	|	|
0+25	0.0904	3.67	|V Q	|	|	|	|
0+30	0.1191	4.17	| V Q	|	|	|	|
0+35	0.1491	4.36	| V Q	|	|	|	|
0+40	0.1791	4.36	| VQ	|	|	|	|
0+45	0.2121	4.79	| VQ	|	|	|	|
0+50	0.2434	4.54	| VQ	|	|	|	|
0+55	0.2724	4.21	| Q	|	|	|	|
1+ 0	0.3033	4.49	| Q	|	|	|	|

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1+ 5    0.3396    5.26 |   VQ |      |      |      |
1+10    0.3807    5.97 |    Q |      |      |      |
1+15    0.4230    6.15 |    Q |      |      |      |
1+20    0.4644    6.01 |    QV|      |      |      |
1+25    0.5086    6.41 |    QV|      |      |      |
1+30    0.5597    7.42 |    QV      |      |      |
1+35    0.6109    7.44 |    Q|V     |      |      |
1+40    0.6620    7.42 |    Q| V     |      |      |
1+45    0.7206    8.51 |     |Q V    |      |      |
1+50    0.7849    9.34 |     | Q V   |      |      |
1+55    0.8473    9.05 |     | Q  V  |      |      |
2+ 0    0.9084    8.88 |     |Q   V  |      |      |
2+ 5    0.9712    9.11 |     | Q   V |      |      |
2+10    1.0436   10.52 |     |  Q   V      |      |
2+15    1.1345   13.20 |     |    Q | V    |      |
2+20    1.2256   13.22 |     |    Q | V    |      |
2+25    1.3292   15.04 |     |      Q  V   |      |
2+30    1.4705   20.52 |     |      |   QV |      |
2+35    1.6320   23.44 |     |      |     |Q     |
2+40    1.7899   22.94 |     |      |     Q  V    |
2+45    1.8968   15.52 |     |      Q      |   V  |
2+50    1.9557    8.55 |     |Q     |      |   V  |
2+55    2.0002    6.47 |    Q|      |      |    V|
3+ 0    2.0294    4.24 |  Q  |      |      |    V|
3+ 5    2.0404    1.58 | Q   |      |      |    V|
3+10    2.0440    0.53 Q      |      |      |    V|
3+15    2.0456    0.23 Q      |      |      |    V|
3+20    2.0462    0.08 Q      |      |      |    V|
3+25    2.0463    0.01 Q      |      |      |     V
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Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR6HRB6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 6 HOUR
AREA B

Drainage Area = 14.74(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.74(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 638.00(Ft.)
Length along longest watercourse measured to centroid = 318.00(Ft.)
Length along longest watercourse = 0.121 Mi.
Length along longest watercourse measured to centroid = 0.060 Mi.
Difference in elevation = 4.60(Ft.)
Slope along watercourse = 38.0690 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.056 Hr.
Lag time = 3.33 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	1.00	14.74

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	2.50	36.85

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.740	85.00	0.000

Total Area Entered = 14.74(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	150.052	33.188	4.930
2 0.167	300.104	47.006	6.983
3 0.250	450.157	11.179	1.661
4 0.333	600.209	4.882	0.725
5 0.417	750.261	2.465	0.366
6 0.500	900.313	1.281	0.190
	Sum = 100.000	Sum=	14.855

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low	Effective (In/Hr)
1 0.08	0.50	0.150	0.078 (0.135)	0.072
2 0.17	0.60	0.180	0.078 (0.162)	0.102
3 0.25	0.60	0.180	0.078 (0.162)	0.102
4 0.33	0.60	0.180	0.078 (0.162)	0.102
5 0.42	0.60	0.180	0.078 (0.162)	0.102
6 0.50	0.70	0.210	0.078 (0.189)	0.132
7 0.58	0.70	0.210	0.078 (0.189)	0.132
8 0.67	0.70	0.210	0.078 (0.189)	0.132
9 0.75	0.70	0.210	0.078 (0.189)	0.132
10 0.83	0.70	0.210	0.078 (0.189)	0.132
11 0.92	0.70	0.210	0.078 (0.189)	0.132
12 1.00	0.80	0.240	0.078 (0.216)	0.162
13 1.08	0.80	0.240	0.078 (0.216)	0.162
14 1.17	0.80	0.240	0.078 (0.216)	0.162
15 1.25	0.80	0.240	0.078 (0.216)	0.162
16 1.33	0.80	0.240	0.078 (0.216)	0.162
17 1.42	0.80	0.240	0.078 (0.216)	0.162
18 1.50	0.80	0.240	0.078 (0.216)	0.162
19 1.58	0.80	0.240	0.078 (0.216)	0.162
20 1.67	0.80	0.240	0.078 (0.216)	0.162
21 1.75	0.80	0.240	0.078 (0.216)	0.162
22 1.83	0.80	0.240	0.078 (0.216)	0.162
23 1.92	0.80	0.240	0.078 (0.216)	0.162
24 2.00	0.90	0.270	0.078 (0.243)	0.192
25 2.08	0.80	0.240	0.078 (0.216)	0.162

26	2.17	0.90	0.270	0.078	(0.243)	0.192
27	2.25	0.90	0.270	0.078	(0.243)	0.192
28	2.33	0.90	0.270	0.078	(0.243)	0.192
29	2.42	0.90	0.270	0.078	(0.243)	0.192
30	2.50	0.90	0.270	0.078	(0.243)	0.192
31	2.58	0.90	0.270	0.078	(0.243)	0.192
32	2.67	0.90	0.270	0.078	(0.243)	0.192
33	2.75	1.00	0.300	0.078	(0.270)	0.222
34	2.83	1.00	0.300	0.078	(0.270)	0.222
35	2.92	1.00	0.300	0.078	(0.270)	0.222
36	3.00	1.00	0.300	0.078	(0.270)	0.222
37	3.08	1.00	0.300	0.078	(0.270)	0.222
38	3.17	1.10	0.330	0.078	(0.297)	0.252
39	3.25	1.10	0.330	0.078	(0.297)	0.252
40	3.33	1.10	0.330	0.078	(0.297)	0.252
41	3.42	1.20	0.360	0.078	(0.324)	0.282
42	3.50	1.30	0.390	0.078	(0.351)	0.312
43	3.58	1.40	0.420	0.078	(0.378)	0.342
44	3.67	1.40	0.420	0.078	(0.378)	0.342
45	3.75	1.50	0.450	0.078	(0.405)	0.372
46	3.83	1.50	0.450	0.078	(0.405)	0.372
47	3.92	1.60	0.480	0.078	(0.432)	0.402
48	4.00	1.60	0.480	0.078	(0.432)	0.402
49	4.08	1.70	0.510	0.078	(0.459)	0.432
50	4.17	1.80	0.540	0.078	(0.486)	0.462
51	4.25	1.90	0.570	0.078	(0.513)	0.492
52	4.33	2.00	0.600	0.078	(0.540)	0.522
53	4.42	2.10	0.630	0.078	(0.567)	0.552
54	4.50	2.10	0.630	0.078	(0.567)	0.552
55	4.58	2.20	0.660	0.078	(0.594)	0.582
56	4.67	2.30	0.690	0.078	(0.621)	0.612
57	4.75	2.40	0.720	0.078	(0.648)	0.642
58	4.83	2.40	0.720	0.078	(0.648)	0.642
59	4.92	2.50	0.750	0.078	(0.675)	0.672
60	5.00	2.60	0.780	0.078	(0.702)	0.702
61	5.08	3.10	0.930	0.078	(0.837)	0.852
62	5.17	3.60	1.080	0.078	(0.972)	1.002
63	5.25	3.90	1.170	0.078	(1.053)	1.092
64	5.33	4.20	1.260	0.078	(1.134)	1.182
65	5.42	4.70	1.410	0.078	(1.269)	1.332
66	5.50	5.60	1.680	0.078	(1.512)	1.602
67	5.58	1.90	0.570	0.078	(0.513)	0.492
68	5.67	0.90	0.270	0.078	(0.243)	0.192
69	5.75	0.60	0.180	0.078	(0.162)	0.102

70	5.83	0.50	0.150	0.078	(0.135)	0.072
71	5.92	0.30	0.090	0.078	(0.081)	0.012
72	6.00	0.20	0.060	(0.078)	0.054	0.006

(Loss Rate Not Used)

Sum = 100.0 Sum = 24.4

Flood volume = Effective rainfall 2.03(In)
times area 14.7(Ac.)/[(In)/(Ft.)] = 2.5(Ac.Ft)
Total soil loss = 0.47(In)
Total soil loss = 0.572(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 108824.8 Cubic Feet
Total soil loss = 24933.9 Cubic Feet

Peak flow rate of this hydrograph = 20.492(CFS)

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6-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0024	0.36	Q	|	|	|	|
0+10	0.0094	1.01	VQ	|	|	|	|
0+15	0.0186	1.34	VQ	|	|	|	|
0+20	0.0285	1.44	VQ	|	|	|	|
0+25	0.0387	1.49	VQ	|	|	|	|
0+30	0.0501	1.66	V Q	|	|	|	|
0+35	0.0630	1.87	|VQ	|	|	|	|
0+40	0.0763	1.92	|VQ	|	|	|	|
0+45	0.0897	1.95	|VQ	|	|	|	|
0+50	0.1031	1.96	|VQ	|	|	|	|
0+55	0.1166	1.96	|VQ	|	|	|	|
1+ 0	0.1312	2.11	| Q	|	|	|	|
1+ 5	0.1471	2.32	| VQ	|	|	|	|
1+10	0.1635	2.37	| VQ	|	|	|	|
1+15	0.1799	2.39	| VQ	|	|	|	|
1+20	0.1965	2.40	| Q	|	|	|	|
1+25	0.2131	2.41	| Q	|	|	|	|
1+30	0.2296	2.41	| Q	|	|	|	|
1+35	0.2462	2.41	| Q	|	|	|	|
1+40	0.2628	2.41	| QV	|	|	|	|

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1+45    0.2794    2.41 | QV    |       |       |       |
1+50    0.2960    2.41 | QV    |       |       |       |
1+55    0.3125    2.41 | Q V   |       |       |       |
2+ 0    0.3301    2.56 | Q V   |       |       |       |
2+ 5    0.3482    2.62 | Q V   |       |       |       |
2+10    0.3661    2.61 | Q V   |       |       |       |
2+15    0.3853    2.79 | Q  V  |       |       |       |
2+20    0.4048    2.83 | Q  V  |       |       |       |
2+25    0.4243    2.84 | Q  V  |       |       |       |
2+30    0.4440    2.85 | Q   V |       |       |       |
2+35    0.4636    2.85 | Q   V |       |       |       |
2+40    0.4833    2.85 | Q   V |       |       |       |
2+45    0.5039    3.00 |  Q  V |       |       |       |
2+50    0.5260    3.21 |  Q  V |       |       |       |
2+55    0.5485    3.26 |  Q  V |       |       |       |
3+ 0    0.5711    3.28 |  Q  V|       |       |       |
3+ 5    0.5938    3.29 |  Q  V|       |       |       |
3+10    0.6175    3.45 |  Q  V|       |       |       |
3+15    0.6427    3.66 |  Q   V       |       |       |
3+20    0.6682    3.71 |  Q   V       |       |       |
3+25    0.6949    3.88 |  Q  |V       |       |       |
3+30    0.7242    4.25 |  Q  |V       |       |       |
3+35    0.7563    4.66 |   Q | V      |       |       |
3+40    0.7903    4.94 |   Q | V      |       |       |
3+45    0.8259    5.17 |   Q |  V     |       |       |
3+50    0.8632    5.42 |   Q |  V     |       |       |
3+55    0.9020    5.63 |   Q |  V     |       |       |
4+ 0    0.9424    5.87 |   Q |  V     |       |       |
4+ 5    0.9843    6.08 |   Q |  V     |       |       |
4+10    1.0288    6.46 |    Q|   V    |       |       |
4+15    1.0762    6.88 |    Q|   V    |       |       |
4+20    1.1266    7.32 |    Q|   V    |       |       |
4+25    1.1800    7.76 |     Q    V    |       |       |
4+30    1.2355    8.05 |     Q    V|   |       |       |
4+35    1.2926    8.29 |     |Q   V    |       |       |
4+40    1.3524    8.69 |     |Q   |V   |       |       |
4+45    1.4151    9.11 |     | Q  | V  |       |       |
4+50    1.4799    9.40 |     | Q  |  V |       |       |
4+55    1.5462    9.63 |     | Q  |  V |       |       |
5+ 0    1.6152   10.02 |     | Q  |  V |       |       |
5+ 5    1.6913   11.04 |     |  Q |   V|       |       |
5+10    1.7801   12.91 |     |   Q|   V|       |       |
5+15    1.8812   14.68 |     |    Q|  V       |       |
5+20    1.9923   16.13 |     |     |Q  |V      |       |
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5+25    2.1150   17.81 |      |      | Q    | V    |
5+30    2.2561   20.49 |      |      |    Q |   V  |
5+35    2.3751   17.28 |      |      | Q    |    V |
5+40    2.4347    8.65 |      |Q     |      |    V |
5+45    2.4660    4.54 |   Q  |      |      |    V|
5+50    2.4838    2.58 |  Q   |      |      |    V|
5+55    2.4931    1.36 |Q     |      |      |    V|
6+ 0    2.4963    0.47 Q      |      |      |    V|
6+ 5    2.4976    0.19 Q      |      |      |    V|
6+10    2.4981    0.06 Q      |      |      |    V|
6+15    2.4982    0.02 Q      |      |      |    V|
6+20    2.4983    0.00 Q      |      |      |    V|
6+25    2.4983    0.00 Q      |      |      |    V
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Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR24HRB24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 24 HOUR
AREA B

Drainage Area = 14.74(Ac.) = 0.023 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 14.74(Ac.) = 0.023 Sq. Mi.
Length along longest watercourse = 638.00(Ft.)
Length along longest watercourse measured to centroid = 318.00(Ft.)
Length along longest watercourse = 0.121 Mi.
Length along longest watercourse measured to centroid = 0.060 Mi.
Difference in elevation = 4.60(Ft.)
Slope along watercourse = 38.0690 Ft./Mi.
Average Manning's 'N' = 0.030
Lag time = 0.056 Hr.
Lag time = 3.33 Min.
25% of lag time = 0.83 Min.
40% of lag time = 1.33 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	1.70	25.06

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
14.74	3.80	56.01

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.800(In)

Point rain (area averaged) = 3.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
14.740	85.00	0.000

Total Area Entered = 14.74(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.000	0.078	1.000	0.078

Sum (F) = 0.078
Area averaged mean soil loss (F) (In/Hr) = 0.078
Minimum soil loss rate ((In/Hr)) = 0.039
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	150.052	33.188	4.930
2	0.167	300.104	47.006	6.983
3	0.250	450.157	11.179	1.661
4	0.333	600.209	4.882	0.725
5	0.417	750.261	2.465	0.366
6	0.500	900.313	1.281	0.190
		Sum = 100.000	Sum=	14.855

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.138)	0.027	0.003
2	0.17	0.07	0.030	(0.138)	0.027	0.003
3	0.25	0.07	0.030	(0.137)	0.027	0.003
4	0.33	0.10	0.046	(0.137)	0.041	0.005
5	0.42	0.10	0.046	(0.136)	0.041	0.005
6	0.50	0.10	0.046	(0.136)	0.041	0.005
7	0.58	0.10	0.046	(0.135)	0.041	0.005
8	0.67	0.10	0.046	(0.135)	0.041	0.005
9	0.75	0.10	0.046	(0.134)	0.041	0.005
10	0.83	0.13	0.061	(0.133)	0.055	0.006
11	0.92	0.13	0.061	(0.133)	0.055	0.006
12	1.00	0.13	0.061	(0.132)	0.055	0.006
13	1.08	0.10	0.046	(0.132)	0.041	0.005
14	1.17	0.10	0.046	(0.131)	0.041	0.005
15	1.25	0.10	0.046	(0.131)	0.041	0.005
16	1.33	0.10	0.046	(0.130)	0.041	0.005
17	1.42	0.10	0.046	(0.130)	0.041	0.005
18	1.50	0.10	0.046	(0.129)	0.041	0.005
19	1.58	0.10	0.046	(0.129)	0.041	0.005
20	1.67	0.10	0.046	(0.128)	0.041	0.005
21	1.75	0.10	0.046	(0.128)	0.041	0.005
22	1.83	0.13	0.061	(0.127)	0.055	0.006
23	1.92	0.13	0.061	(0.127)	0.055	0.006
24	2.00	0.13	0.061	(0.126)	0.055	0.006
25	2.08	0.13	0.061	(0.126)	0.055	0.006

26	2.17	0.13	0.061	(0.125)	0.055	0.006
27	2.25	0.13	0.061	(0.125)	0.055	0.006
28	2.33	0.13	0.061	(0.124)	0.055	0.006
29	2.42	0.13	0.061	(0.124)	0.055	0.006
30	2.50	0.13	0.061	(0.123)	0.055	0.006
31	2.58	0.17	0.076	(0.123)	0.068	0.008
32	2.67	0.17	0.076	(0.122)	0.068	0.008
33	2.75	0.17	0.076	(0.122)	0.068	0.008
34	2.83	0.17	0.076	(0.121)	0.068	0.008
35	2.92	0.17	0.076	(0.121)	0.068	0.008
36	3.00	0.17	0.076	(0.120)	0.068	0.008
37	3.08	0.17	0.076	(0.120)	0.068	0.008
38	3.17	0.17	0.076	(0.119)	0.068	0.008
39	3.25	0.17	0.076	(0.119)	0.068	0.008
40	3.33	0.17	0.076	(0.118)	0.068	0.008
41	3.42	0.17	0.076	(0.118)	0.068	0.008
42	3.50	0.17	0.076	(0.117)	0.068	0.008
43	3.58	0.17	0.076	(0.117)	0.068	0.008
44	3.67	0.17	0.076	(0.116)	0.068	0.008
45	3.75	0.17	0.076	(0.116)	0.068	0.008
46	3.83	0.20	0.091	(0.115)	0.082	0.009
47	3.92	0.20	0.091	(0.115)	0.082	0.009
48	4.00	0.20	0.091	(0.114)	0.082	0.009
49	4.08	0.20	0.091	(0.114)	0.082	0.009
50	4.17	0.20	0.091	(0.113)	0.082	0.009
51	4.25	0.20	0.091	(0.113)	0.082	0.009
52	4.33	0.23	0.106	(0.112)	0.096	0.011
53	4.42	0.23	0.106	(0.112)	0.096	0.011
54	4.50	0.23	0.106	(0.111)	0.096	0.011
55	4.58	0.23	0.106	(0.111)	0.096	0.011
56	4.67	0.23	0.106	(0.110)	0.096	0.011
57	4.75	0.23	0.106	(0.110)	0.096	0.011
58	4.83	0.27	0.122	(0.109)	0.109	0.012
59	4.92	0.27	0.122	0.109	(0.109)	0.013
60	5.00	0.27	0.122	0.109	(0.109)	0.013
61	5.08	0.20	0.091	(0.108)	0.082	0.009
62	5.17	0.20	0.091	(0.108)	0.082	0.009
63	5.25	0.20	0.091	(0.107)	0.082	0.009
64	5.33	0.23	0.106	(0.107)	0.096	0.011
65	5.42	0.23	0.106	(0.106)	0.096	0.011
66	5.50	0.23	0.106	(0.106)	0.096	0.011
67	5.58	0.27	0.122	0.105	(0.109)	0.016
68	5.67	0.27	0.122	0.105	(0.109)	0.017
69	5.75	0.27	0.122	0.104	(0.109)	0.017

70	5.83	0.27	0.122	0.104	(0.109)	0.018
71	5.92	0.27	0.122	0.103	(0.109)	0.018
72	6.00	0.27	0.122	0.103	(0.109)	0.019
73	6.08	0.30	0.137	0.103	(0.123)	0.034
74	6.17	0.30	0.137	0.102	(0.123)	0.035
75	6.25	0.30	0.137	0.102	(0.123)	0.035
76	6.33	0.30	0.137	0.101	(0.123)	0.036
77	6.42	0.30	0.137	0.101	(0.123)	0.036
78	6.50	0.30	0.137	0.100	(0.123)	0.037
79	6.58	0.33	0.152	0.100	(0.137)	0.052
80	6.67	0.33	0.152	0.099	(0.137)	0.053
81	6.75	0.33	0.152	0.099	(0.137)	0.053
82	6.83	0.33	0.152	0.098	(0.137)	0.054
83	6.92	0.33	0.152	0.098	(0.137)	0.054
84	7.00	0.33	0.152	0.098	(0.137)	0.054
85	7.08	0.33	0.152	0.097	(0.137)	0.055
86	7.17	0.33	0.152	0.097	(0.137)	0.055
87	7.25	0.33	0.152	0.096	(0.137)	0.056
88	7.33	0.37	0.167	0.096	(0.150)	0.071
89	7.42	0.37	0.167	0.095	(0.150)	0.072
90	7.50	0.37	0.167	0.095	(0.150)	0.072
91	7.58	0.40	0.182	0.094	(0.164)	0.088
92	7.67	0.40	0.182	0.094	(0.164)	0.088
93	7.75	0.40	0.182	0.094	(0.164)	0.089
94	7.83	0.43	0.198	0.093	(0.178)	0.104
95	7.92	0.43	0.198	0.093	(0.178)	0.105
96	8.00	0.43	0.198	0.092	(0.178)	0.105
97	8.08	0.50	0.228	0.092	(0.205)	0.136
98	8.17	0.50	0.228	0.091	(0.205)	0.137
99	8.25	0.50	0.228	0.091	(0.205)	0.137
100	8.33	0.50	0.228	0.091	(0.205)	0.137
101	8.42	0.50	0.228	0.090	(0.205)	0.138
102	8.50	0.50	0.228	0.090	(0.205)	0.138
103	8.58	0.53	0.243	0.089	(0.219)	0.154
104	8.67	0.53	0.243	0.089	(0.219)	0.154
105	8.75	0.53	0.243	0.088	(0.219)	0.155
106	8.83	0.57	0.258	0.088	(0.233)	0.170
107	8.92	0.57	0.258	0.088	(0.233)	0.171
108	9.00	0.57	0.258	0.087	(0.233)	0.171
109	9.08	0.63	0.289	0.087	(0.260)	0.202
110	9.17	0.63	0.289	0.086	(0.260)	0.202
111	9.25	0.63	0.289	0.086	(0.260)	0.203
112	9.33	0.67	0.304	0.086	(0.274)	0.218
113	9.42	0.67	0.304	0.085	(0.274)	0.219

114	9.50	0.67	0.304	0.085	(0.274)	0.219
115	9.58	0.70	0.319	0.084	(0.287)	0.235
116	9.67	0.70	0.319	0.084	(0.287)	0.235
117	9.75	0.70	0.319	0.084	(0.287)	0.236
118	9.83	0.73	0.334	0.083	(0.301)	0.251
119	9.92	0.73	0.334	0.083	(0.301)	0.252
120	10.00	0.73	0.334	0.082	(0.301)	0.252
121	10.08	0.50	0.228	0.082	(0.205)	0.146
122	10.17	0.50	0.228	0.082	(0.205)	0.146
123	10.25	0.50	0.228	0.081	(0.205)	0.147
124	10.33	0.50	0.228	0.081	(0.205)	0.147
125	10.42	0.50	0.228	0.080	(0.205)	0.148
126	10.50	0.50	0.228	0.080	(0.205)	0.148
127	10.58	0.67	0.304	0.080	(0.274)	0.224
128	10.67	0.67	0.304	0.079	(0.274)	0.225
129	10.75	0.67	0.304	0.079	(0.274)	0.225
130	10.83	0.67	0.304	0.078	(0.274)	0.226
131	10.92	0.67	0.304	0.078	(0.274)	0.226
132	11.00	0.67	0.304	0.078	(0.274)	0.226
133	11.08	0.63	0.289	0.077	(0.260)	0.211
134	11.17	0.63	0.289	0.077	(0.260)	0.212
135	11.25	0.63	0.289	0.077	(0.260)	0.212
136	11.33	0.63	0.289	0.076	(0.260)	0.213
137	11.42	0.63	0.289	0.076	(0.260)	0.213
138	11.50	0.63	0.289	0.075	(0.260)	0.213
139	11.58	0.57	0.258	0.075	(0.233)	0.183
140	11.67	0.57	0.258	0.075	(0.233)	0.184
141	11.75	0.57	0.258	0.074	(0.233)	0.184
142	11.83	0.60	0.274	0.074	(0.246)	0.200
143	11.92	0.60	0.274	0.074	(0.246)	0.200
144	12.00	0.60	0.274	0.073	(0.246)	0.200
145	12.08	0.83	0.380	0.073	(0.342)	0.307
146	12.17	0.83	0.380	0.072	(0.342)	0.308
147	12.25	0.83	0.380	0.072	(0.342)	0.308
148	12.33	0.87	0.395	0.072	(0.356)	0.323
149	12.42	0.87	0.395	0.071	(0.356)	0.324
150	12.50	0.87	0.395	0.071	(0.356)	0.324
151	12.58	0.93	0.426	0.071	(0.383)	0.355
152	12.67	0.93	0.426	0.070	(0.383)	0.355
153	12.75	0.93	0.426	0.070	(0.383)	0.356
154	12.83	0.97	0.441	0.070	(0.397)	0.371
155	12.92	0.97	0.441	0.069	(0.397)	0.372
156	13.00	0.97	0.441	0.069	(0.397)	0.372
157	13.08	1.13	0.517	0.069	(0.465)	0.448

158	13.17	1.13	0.517	0.068	(0.465)	0.449
159	13.25	1.13	0.517	0.068	(0.465)	0.449
160	13.33	1.13	0.517	0.067	(0.465)	0.449
161	13.42	1.13	0.517	0.067	(0.465)	0.450
162	13.50	1.13	0.517	0.067	(0.465)	0.450
163	13.58	0.77	0.350	0.066	(0.315)	0.283
164	13.67	0.77	0.350	0.066	(0.315)	0.283
165	13.75	0.77	0.350	0.066	(0.315)	0.284
166	13.83	0.77	0.350	0.065	(0.315)	0.284
167	13.92	0.77	0.350	0.065	(0.315)	0.284
168	14.00	0.77	0.350	0.065	(0.315)	0.285
169	14.08	0.90	0.410	0.064	(0.369)	0.346
170	14.17	0.90	0.410	0.064	(0.369)	0.346
171	14.25	0.90	0.410	0.064	(0.369)	0.347
172	14.33	0.87	0.395	0.063	(0.356)	0.332
173	14.42	0.87	0.395	0.063	(0.356)	0.332
174	14.50	0.87	0.395	0.063	(0.356)	0.332
175	14.58	0.87	0.395	0.063	(0.356)	0.333
176	14.67	0.87	0.395	0.062	(0.356)	0.333
177	14.75	0.87	0.395	0.062	(0.356)	0.333
178	14.83	0.83	0.380	0.062	(0.342)	0.318
179	14.92	0.83	0.380	0.061	(0.342)	0.319
180	15.00	0.83	0.380	0.061	(0.342)	0.319
181	15.08	0.80	0.365	0.061	(0.328)	0.304
182	15.17	0.80	0.365	0.060	(0.328)	0.304
183	15.25	0.80	0.365	0.060	(0.328)	0.305
184	15.33	0.77	0.350	0.060	(0.315)	0.290
185	15.42	0.77	0.350	0.059	(0.315)	0.290
186	15.50	0.77	0.350	0.059	(0.315)	0.291
187	15.58	0.63	0.289	0.059	(0.260)	0.230
188	15.67	0.63	0.289	0.058	(0.260)	0.230
189	15.75	0.63	0.289	0.058	(0.260)	0.231
190	15.83	0.63	0.289	0.058	(0.260)	0.231
191	15.92	0.63	0.289	0.058	(0.260)	0.231
192	16.00	0.63	0.289	0.057	(0.260)	0.232
193	16.08	0.13	0.061	(0.057)	0.055	0.006
194	16.17	0.13	0.061	(0.057)	0.055	0.006
195	16.25	0.13	0.061	(0.056)	0.055	0.006
196	16.33	0.13	0.061	(0.056)	0.055	0.006
197	16.42	0.13	0.061	(0.056)	0.055	0.006
198	16.50	0.13	0.061	(0.056)	0.055	0.006
199	16.58	0.10	0.046	(0.055)	0.041	0.005
200	16.67	0.10	0.046	(0.055)	0.041	0.005
201	16.75	0.10	0.046	(0.055)	0.041	0.005

202	16.83	0.10	0.046	(0.054)	0.041	0.005
203	16.92	0.10	0.046	(0.054)	0.041	0.005
204	17.00	0.10	0.046	(0.054)	0.041	0.005
205	17.08	0.17	0.076	0.054	(0.068)	0.022
206	17.17	0.17	0.076	0.053	(0.068)	0.023
207	17.25	0.17	0.076	0.053	(0.068)	0.023
208	17.33	0.17	0.076	0.053	(0.068)	0.023
209	17.42	0.17	0.076	0.053	(0.068)	0.023
210	17.50	0.17	0.076	0.052	(0.068)	0.024
211	17.58	0.17	0.076	0.052	(0.068)	0.024
212	17.67	0.17	0.076	0.052	(0.068)	0.024
213	17.75	0.17	0.076	0.051	(0.068)	0.025
214	17.83	0.13	0.061	0.051	(0.055)	0.010
215	17.92	0.13	0.061	0.051	(0.055)	0.010
216	18.00	0.13	0.061	0.051	(0.055)	0.010
217	18.08	0.13	0.061	0.050	(0.055)	0.010
218	18.17	0.13	0.061	0.050	(0.055)	0.011
219	18.25	0.13	0.061	0.050	(0.055)	0.011
220	18.33	0.13	0.061	0.050	(0.055)	0.011
221	18.42	0.13	0.061	0.050	(0.055)	0.011
222	18.50	0.13	0.061	0.049	(0.055)	0.012
223	18.58	0.10	0.046	(0.049)	0.041	0.005
224	18.67	0.10	0.046	(0.049)	0.041	0.005
225	18.75	0.10	0.046	(0.049)	0.041	0.005
226	18.83	0.07	0.030	(0.048)	0.027	0.003
227	18.92	0.07	0.030	(0.048)	0.027	0.003
228	19.00	0.07	0.030	(0.048)	0.027	0.003
229	19.08	0.10	0.046	(0.048)	0.041	0.005
230	19.17	0.10	0.046	(0.047)	0.041	0.005
231	19.25	0.10	0.046	(0.047)	0.041	0.005
232	19.33	0.13	0.061	0.047	(0.055)	0.014
233	19.42	0.13	0.061	0.047	(0.055)	0.014
234	19.50	0.13	0.061	0.047	(0.055)	0.014
235	19.58	0.10	0.046	(0.046)	0.041	0.005
236	19.67	0.10	0.046	(0.046)	0.041	0.005
237	19.75	0.10	0.046	(0.046)	0.041	0.005
238	19.83	0.07	0.030	(0.046)	0.027	0.003
239	19.92	0.07	0.030	(0.045)	0.027	0.003
240	20.00	0.07	0.030	(0.045)	0.027	0.003
241	20.08	0.10	0.046	(0.045)	0.041	0.005
242	20.17	0.10	0.046	(0.045)	0.041	0.005
243	20.25	0.10	0.046	(0.045)	0.041	0.005
244	20.33	0.10	0.046	(0.045)	0.041	0.005
245	20.42	0.10	0.046	(0.044)	0.041	0.005

246	20.50	0.10	0.046	(0.044)	0.041	0.005
247	20.58	0.10	0.046	(0.044)	0.041	0.005
248	20.67	0.10	0.046	(0.044)	0.041	0.005
249	20.75	0.10	0.046	(0.044)	0.041	0.005
250	20.83	0.07	0.030	(0.043)	0.027	0.003
251	20.92	0.07	0.030	(0.043)	0.027	0.003
252	21.00	0.07	0.030	(0.043)	0.027	0.003
253	21.08	0.10	0.046	(0.043)	0.041	0.005
254	21.17	0.10	0.046	(0.043)	0.041	0.005
255	21.25	0.10	0.046	(0.043)	0.041	0.005
256	21.33	0.07	0.030	(0.042)	0.027	0.003
257	21.42	0.07	0.030	(0.042)	0.027	0.003
258	21.50	0.07	0.030	(0.042)	0.027	0.003
259	21.58	0.10	0.046	(0.042)	0.041	0.005
260	21.67	0.10	0.046	(0.042)	0.041	0.005
261	21.75	0.10	0.046	(0.042)	0.041	0.005
262	21.83	0.07	0.030	(0.041)	0.027	0.003
263	21.92	0.07	0.030	(0.041)	0.027	0.003
264	22.00	0.07	0.030	(0.041)	0.027	0.003
265	22.08	0.10	0.046	(0.041)	0.041	0.005
266	22.17	0.10	0.046	0.041	(0.041)	0.005
267	22.25	0.10	0.046	0.041	(0.041)	0.005
268	22.33	0.07	0.030	(0.041)	0.027	0.003
269	22.42	0.07	0.030	(0.041)	0.027	0.003
270	22.50	0.07	0.030	(0.040)	0.027	0.003
271	22.58	0.07	0.030	(0.040)	0.027	0.003
272	22.67	0.07	0.030	(0.040)	0.027	0.003
273	22.75	0.07	0.030	(0.040)	0.027	0.003
274	22.83	0.07	0.030	(0.040)	0.027	0.003
275	22.92	0.07	0.030	(0.040)	0.027	0.003
276	23.00	0.07	0.030	(0.040)	0.027	0.003
277	23.08	0.07	0.030	(0.040)	0.027	0.003
278	23.17	0.07	0.030	(0.040)	0.027	0.003
279	23.25	0.07	0.030	(0.040)	0.027	0.003
280	23.33	0.07	0.030	(0.039)	0.027	0.003
281	23.42	0.07	0.030	(0.039)	0.027	0.003
282	23.50	0.07	0.030	(0.039)	0.027	0.003
283	23.58	0.07	0.030	(0.039)	0.027	0.003
284	23.67	0.07	0.030	(0.039)	0.027	0.003
285	23.75	0.07	0.030	(0.039)	0.027	0.003
286	23.83	0.07	0.030	(0.039)	0.027	0.003
287	23.92	0.07	0.030	(0.039)	0.027	0.003
288	24.00	0.07	0.030	(0.039)	0.027	0.003

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.5

Flood volume = Effective rainfall 2.29(In)
times area 14.7(Ac.)/[(In)/(Ft.)] = 2.8(Ac.Ft)
Total soil loss = 1.51(In)
Total soil loss = 1.849(Ac.Ft)
Total rainfall = 3.80(In)
Flood volume = 122788.5 Cubic Feet
Total soil loss = 80529.2 Cubic Feet

Peak flow rate of this hydrograph = 6.683(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0001	0.01 Q	|	|	|	|	
0+10	0.0004	0.04 Q	|	|	|	|	
0+15	0.0006	0.04 Q	|	|	|	|	
0+20	0.0010	0.05 Q	|	|	|	|	
0+25	0.0014	0.06 Q	|	|	|	|	
0+30	0.0019	0.07 Q	|	|	|	|	
0+35	0.0023	0.07 Q	|	|	|	|	
0+40	0.0028	0.07 Q	|	|	|	|	
0+45	0.0033	0.07 Q	|	|	|	|	
0+50	0.0038	0.08 Q	|	|	|	|	
0+55	0.0044	0.09 Q	|	|	|	|	
1+ 0	0.0050	0.09 Q	|	|	|	|	
1+ 5	0.0055	0.08 Q	|	|	|	|	
1+10	0.0060	0.07 Q	|	|	|	|	
1+15	0.0065	0.07 Q	|	|	|	|	
1+20	0.0070	0.07 Q	|	|	|	|	
1+25	0.0075	0.07 Q	|	|	|	|	
1+30	0.0079	0.07 Q	|	|	|	|	
1+35	0.0084	0.07 Q	|	|	|	|	
1+40	0.0089	0.07 Q	|	|	|	|	
1+45	0.0093	0.07 Q	|	|	|	|	
1+50	0.0099	0.08 Q	|	|	|	|	
1+55	0.0104	0.09 Q	|	|	|	|	
2+ 0	0.0111	0.09 Q	|	|	|	|	

2+ 5	0.0117	0.09	Q	|	|	|	|
2+10	0.0123	0.09	Q	|	|	|	|
2+15	0.0129	0.09	Q	|	|	|	|
2+20	0.0135	0.09	Q	|	|	|	|
2+25	0.0142	0.09	Q	|	|	|	|
2+30	0.0148	0.09	Q	|	|	|	|
2+35	0.0155	0.10	Q	|	|	|	|
2+40	0.0162	0.11	Q	|	|	|	|
2+45	0.0170	0.11	Q	|	|	|	|
2+50	0.0177	0.11	Q	|	|	|	|
2+55	0.0185	0.11	Q	|	|	|	|
3+ 0	0.0193	0.11	Q	|	|	|	|
3+ 5	0.0201	0.11	Q	|	|	|	|
3+10	0.0208	0.11	Q	|	|	|	|
3+15	0.0216	0.11	Q	|	|	|	|
3+20	0.0224	0.11	Q	|	|	|	|
3+25	0.0232	0.11	Q	|	|	|	|
3+30	0.0240	0.11	Q	|	|	|	|
3+35	0.0247	0.11	Q	|	|	|	|
3+40	0.0255	0.11	Q	|	|	|	|
3+45	0.0263	0.11	Q	|	|	|	|
3+50	0.0271	0.12	Q	|	|	|	|
3+55	0.0280	0.13	Q	|	|	|	|
4+ 0	0.0289	0.13	Q	|	|	|	|
4+ 5	0.0299	0.13	Q	|	|	|	|
4+10	0.0308	0.14	Q	|	|	|	|
4+15	0.0317	0.14	Q	|	|	|	|
4+20	0.0327	0.14	Q	|	|	|	|
4+25	0.0338	0.15	Q	|	|	|	|
4+30	0.0349	0.16	Q	|	|	|	|
4+35	0.0359	0.16	Q	|	|	|	|
4+40	0.0370	0.16	Q	|	|	|	|
4+45	0.0381	0.16	Q	|	|	|	|
4+50	0.0393	0.17	Q	|	|	|	|
4+55	0.0405	0.18	Q	|	|	|	|
5+ 0	0.0418	0.19	Q	|	|	|	|
5+ 5	0.0430	0.17	Q	|	|	|	|
5+10	0.0440	0.15	Q	|	|	|	|
5+15	0.0449	0.14	Q	|	|	|	|
5+20	0.0459	0.15	Q	|	|	|	|
5+25	0.0470	0.15	Q	|	|	|	|
5+30	0.0481	0.16	Q	|	|	|	|
5+35	0.0493	0.19	Q	|	|	|	|
5+40	0.0509	0.23	Q	|	|	|	|

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5+45    0.0526    0.24 Q      |       |       |       |
5+50    0.0543    0.25 VQ     |       |       |       |
5+55    0.0561    0.26 VQ     |       |       |       |
6+ 0    0.0580    0.27 VQ     |       |       |       |
6+ 5    0.0604    0.35 VQ     |       |       |       |
6+10    0.0636    0.46 VQ     |       |       |       |
6+15    0.0670    0.50 VQ     |       |       |       |
6+20    0.0706    0.51 |VQ     |       |       |       |
6+25    0.0742    0.53 |VQ     |       |       |       |
6+30    0.0779    0.54 |VQ     |       |       |       |
6+35    0.0822    0.62 |VQ     |       |       |       |
6+40    0.0872    0.73 |VQ     |       |       |       |
6+45    0.0925    0.76 |V Q    |       |       |       |
6+50    0.0978    0.78 |V Q    |       |       |       |
6+55    0.1033    0.79 |V Q    |       |       |       |
7+ 0    0.1088    0.80 |V Q    |       |       |       |
7+ 5    0.1144    0.81 |V Q    |       |       |       |
7+10    0.1200    0.82 |V Q    |       |       |       |
7+15    0.1257    0.82 |V Q    |       |       |       |
7+20    0.1319    0.90 |V Q    |       |       |       |
7+25    0.1389    1.02 |V  Q   |       |       |       |
7+30    0.1461    1.05 | V Q   |       |       |       |
7+35    0.1540    1.14 | V Q   |       |       |       |
7+40    0.1627    1.26 | V  Q  |       |       |       |
7+45    0.1716    1.29 | V  Q  |       |       |       |
7+50    0.1811    1.39 | V  Q  |       |       |       |
7+55    0.1915    1.50 | V   Q |       |       |       |
8+ 0    0.2021    1.54 | V   Q |       |       |       |
8+ 5    0.2138    1.71 |  V Q  |       |       |       |
8+10    0.2271    1.93 |  V  Q |       |       |       |
8+15    0.2408    1.99 |  V  Q |       |       |       |
8+20    0.2547    2.02 |  V   Q|       |       |       |
8+25    0.2688    2.04 |  V   Q|       |       |       |
8+30    0.2829    2.05 |  V   Q|       |       |       |
8+35    0.2975    2.13 |  V   Q|       |       |       |
8+40    0.3130    2.24 |  V   Q|       |       |       |
8+45    0.3286    2.27 |  V   Q|       |       |       |
8+50    0.3449    2.37 |  V   Q|       |       |       |
8+55    0.3620    2.48 |   V  Q|       |       |       |
9+ 0    0.3794    2.52 |   V  Q      |       |       |
9+ 5    0.3979    2.69 |   V  Q      |       |       |
9+10    0.4179    2.91 |   V  |Q     |       |       |
9+15    0.4384    2.97 |    V |Q     |       |       |
9+20    0.4595    3.07 |    V | Q    |       |       |
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9+25	0.4815	3.20	V	Q			
9+30	0.5038	3.23	V	Q			
9+35	0.5267	3.32	V	Q			
9+40	0.5504	3.44	V	Q			
9+45	0.5743	3.48	V	Q			
9+50	0.5989	3.57	V	Q			
9+55	0.6243	3.69	V	Q			
10+ 0	0.6499	3.72	V	Q			
10+ 5	0.6720	3.21	V	Q			
10+10	0.6891	2.48	Q				
10+15	0.7050	2.31	QV				
10+20	0.7205	2.24	Q V				
10+25	0.7357	2.21	Q V				
10+30	0.7508	2.19	Q V				
10+35	0.7685	2.57	Q				
10+40	0.7900	3.11	VQ				
10+45	0.8123	3.24	VQ				
10+50	0.8350	3.30	V Q				
10+55	0.8580	3.34	VQ				
11+ 0	0.8812	3.36	VQ				
11+ 5	0.9038	3.29	VQ				
11+10	0.9258	3.19	QV				
11+15	0.9476	3.17	QV				
11+20	0.9694	3.16	QV				
11+25	0.9912	3.16	Q V				
11+30	1.0130	3.17	Q V				
11+35	1.0338	3.02	Q V				
11+40	1.0532	2.81	Q V				
11+45	1.0722	2.77	Q V				
11+50	1.0917	2.83	Q V				
11+55	1.1119	2.93	Q V				
12+ 0	1.1322	2.95	Q V				
12+ 5	1.1563	3.50	Q V				
12+10	1.1856	4.25	Q				
12+15	1.2161	4.43	Q				
12+20	1.2477	4.59	VQ				
12+25	1.2804	4.74	Q				
12+30	1.3134	4.79	VQ				
12+35	1.3476	4.96	Q				
12+40	1.3833	5.18	VQ				
12+45	1.4194	5.24	Q				
12+50	1.4562	5.34	VQ				
12+55	1.4938	5.47	Q				
13+ 0	1.5317	5.50	VQ				

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13+ 5    1.5723   5.89 |      |      | VQ    |      |
13+10    1.6166   6.44 |      |      | V Q   |      |
13+15    1.6619   6.57 |      |      | V Q   |      |
13+20    1.7075   6.63 |      |      | V Q   |      |
13+25    1.7534   6.66 |      |      | V Q   |      |
13+30    1.7995   6.68 |      |      |  VQ   |      |
13+35    1.8398   5.86 |      |      | Q V   |      |
13+40    1.8722   4.70 |      |    Q |   V   |      |
13+45    1.9027   4.43 |      |    Q |   V   |      |
13+50    1.9324   4.31 |      |    Q |   V   |      |
13+55    1.9617   4.25 |      |    Q |   V   |      |
14+ 0    1.9908   4.23 |      |   Q  |   V   |      |
14+ 5    2.0220   4.53 |      |    Q |   V   |      |
14+10    2.0562   4.96 |      |     Q|    V  |      |
14+15    2.0911   5.07 |      |      Q    V   |      |
14+20    2.1258   5.04 |      |      Q    V   |
14+25    2.1600   4.96 |      |     Q|    V  |
14+30    2.1941   4.95 |      |     Q|     V |      |
14+35    2.2282   4.95 |      |     Q|     V |      |
14+40    2.2623   4.95 |      |     Q|     | V      |
14+45    2.2964   4.95 |      |     Q|     | V      |
14+50    2.3300   4.88 |      |     Q|     |  V     |
14+55    2.3629   4.78 |      |     Q|     |  V     |
15+ 0    2.3956   4.76 |      |     Q|     |  V     |
15+ 5    2.4278   4.68 |      |    Q |     |  V     |
15+10    2.4593   4.57 |      |    Q |     |   V    |
15+15    2.4906   4.55 |      |    Q |     |   V    |
15+20    2.5214   4.46 |      |    Q |     |   V    |
15+25    2.5514   4.36 |      |    Q |     |   V    |
15+30    2.5812   4.33 |      |    Q |     |   V    |
15+35    2.6089   4.03 |      |   Q  |     |    V   |
15+40    2.6337   3.60 |      |  Q   |     |    V   |
15+45    2.6578   3.50 |      |  Q   |     |    V   |
15+50    2.6817   3.46 |      |  Q   |     |     V  |
15+55    2.7054   3.44 |      |  Q   |     |     V  |
16+ 0    2.7291   3.44 |      | Q    |     |     V  |
16+ 5    2.7451   2.33 |     Q|      |     |     V  |
16+10    2.7503   0.75 |  Q   |      |     |      V |
16+15    2.7529   0.38 | Q    |      |     |      V |
16+20    2.7544   0.22  Q     |      |     |      V |
16+25    2.7553   0.13  Q     |      |     |      V |
16+30    2.7559   0.09  Q     |      |     |      V |
16+35    2.7565   0.08  Q     |      |     |      V |
16+40    2.7570   0.07  Q     |      |     |      V |
```

16+45	2.7575	0.07	Q	|	|	V|
16+50	2.7579	0.07	Q	|	|	V|
16+55	2.7584	0.07	Q	|	|	V|
17+ 0	2.7589	0.07	Q	|	|	V|
17+ 5	2.7600	0.16	Q	|	|	V|
17+10	2.7619	0.28	|Q	|	|	V|
17+15	2.7641	0.31	|Q	|	|	V|
17+20	2.7663	0.33	|Q	|	|	V|
17+25	2.7687	0.34	|Q	|	|	V|
17+30	2.7711	0.35	|Q	|	|	V|
17+35	2.7735	0.35	|Q	|	|	V|
17+40	2.7760	0.36	|Q	|	|	V|
17+45	2.7785	0.36	|Q	|	|	V|
17+50	2.7804	0.29	|Q	|	|	V|
17+55	2.7817	0.19	Q	|	|	V|
18+ 0	2.7829	0.17	Q	|	|	V|
18+ 5	2.7840	0.16	Q	|	|	V|
18+10	2.7850	0.16	Q	|	|	V|
18+15	2.7861	0.16	Q	|	|	V|
18+20	2.7872	0.16	Q	|	|	V|
18+25	2.7884	0.16	Q	|	|	V|
18+30	2.7895	0.17	Q	|	|	V|
18+35	2.7904	0.14	Q	|	|	V|
18+40	2.7911	0.09	Q	|	|	V|
18+45	2.7916	0.08	Q	|	|	V|
18+50	2.7920	0.06	Q	|	|	V|
18+55	2.7924	0.05	Q	|	|	V|
19+ 0	2.7927	0.05	Q	|	|	V|
19+ 5	2.7931	0.05	Q	|	|	V|
19+10	2.7935	0.06	Q	|	|	V|
19+15	2.7940	0.07	Q	|	|	V|
19+20	2.7947	0.11	Q	|	|	V|
19+25	2.7960	0.18	Q	|	|	V|
19+30	2.7973	0.20	Q	|	|	V|
19+35	2.7984	0.16	Q	|	|	V|
19+40	2.7991	0.09	Q	|	|	V|
19+45	2.7996	0.08	Q	|	|	V|
19+50	2.8001	0.07	Q	|	|	V|
19+55	2.8004	0.05	Q	|	|	V|
20+ 0	2.8007	0.05	Q	|	|	V|
20+ 5	2.8011	0.05	Q	|	|	V|
20+10	2.8015	0.06	Q	|	|	V|
20+15	2.8020	0.07	Q	|	|	V|
20+20	2.8025	0.07	Q	|	|	V|

20+25	2.8029	0.07	Q	|	|	| V|
20+30	2.8034	0.07	Q	|	|	| V|
20+35	2.8039	0.07	Q	|	|	| V|
20+40	2.8043	0.07	Q	|	|	| V|
20+45	2.8048	0.07	Q	|	|	| V|
20+50	2.8052	0.06	Q	|	|	| V|
20+55	2.8056	0.05	Q	|	|	| V|
21+ 0	2.8059	0.05	Q	|	|	| V|
21+ 5	2.8062	0.05	Q	|	|	| V|
21+10	2.8067	0.06	Q	|	|	| V|
21+15	2.8071	0.07	Q	|	|	| V|
21+20	2.8075	0.06	Q	|	|	| V|
21+25	2.8079	0.05	Q	|	|	| V|
21+30	2.8082	0.05	Q	|	|	| V|
21+35	2.8086	0.05	Q	|	|	| V|
21+40	2.8090	0.06	Q	|	|	| V|
21+45	2.8095	0.07	Q	|	|	| V|
21+50	2.8099	0.06	Q	|	|	| V|
21+55	2.8102	0.05	Q	|	|	| V|
22+ 0	2.8105	0.05	Q	|	|	| V|
22+ 5	2.8109	0.05	Q	|	|	| V|
22+10	2.8114	0.06	Q	|	|	| V|
22+15	2.8118	0.07	Q	|	|	| V|
22+20	2.8122	0.06	Q	|	|	| V|
22+25	2.8126	0.05	Q	|	|	| V|
22+30	2.8129	0.05	Q	|	|	| V|
22+35	2.8132	0.05	Q	|	|	| V|
22+40	2.8135	0.05	Q	|	|	| V|
22+45	2.8139	0.05	Q	|	|	| V|
22+50	2.8142	0.05	Q	|	|	| V|
22+55	2.8145	0.05	Q	|	|	| V|
23+ 0	2.8148	0.05	Q	|	|	| V|
23+ 5	2.8151	0.05	Q	|	|	| V|
23+10	2.8154	0.05	Q	|	|	| V|
23+15	2.8157	0.05	Q	|	|	| V|
23+20	2.8160	0.05	Q	|	|	| V|
23+25	2.8163	0.05	Q	|	|	| V|
23+30	2.8167	0.05	Q	|	|	| V|
23+35	2.8170	0.05	Q	|	|	| V|
23+40	2.8173	0.05	Q	|	|	| V|
23+45	2.8176	0.05	Q	|	|	| V|
23+50	2.8179	0.05	Q	|	|	| V|
23+55	2.8182	0.05	Q	|	|	| V|
24+ 0	2.8185	0.05	Q	|	|	| V|

24+ 5	2.8187	0.03	Q	|	|	| V|
24+10	2.8188	0.01	Q	|	|	| V|
24+15	2.8188	0.00	Q	|	|	| V|
24+20	2.8188	0.00	Q	|	|	| V|
24+25	2.8188	0.00	Q	|	|	| V

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR1HRB1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 1 HOUR
AREA B

Drainage Area = 15.37(Ac.) = 0.024 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.37(Ac.) = 0.024 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	0.40	6.15

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	1.10	16.91

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.370	69.00	0.900

Total Area Entered = 15.37(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	155.690	34.524	5.348
2 0.167	311.381	46.590	7.217
3 0.250	467.071	10.860	1.682
4 0.333	622.762	4.712	0.730
5 0.417	778.452	2.311	0.358
6 0.500	934.142	1.003	0.155
	Sum = 100.000	Sum=	15.490

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low	Effective (In/Hr)
1 0.08	4.20	0.554	0.037 (0.100)	0.517
2 0.17	4.30	0.568	0.037 (0.102)	0.531
3 0.25	5.00	0.660	0.037 (0.119)	0.623
4 0.33	5.00	0.660	0.037 (0.119)	0.623
5 0.42	5.80	0.765	0.037 (0.138)	0.729
6 0.50	6.50	0.858	0.037 (0.154)	0.821
7 0.58	7.40	0.977	0.037 (0.176)	0.940
8 0.67	8.60	1.135	0.037 (0.204)	1.098
9 0.75	12.30	1.623	0.037 (0.292)	1.587
10 0.83	29.10	3.841	0.037 (0.691)	3.804
11 0.92	6.80	0.897	0.037 (0.162)	0.861
12 1.00	5.00	0.660	0.037 (0.119)	0.623
		(Loss Rate Not Used)		
Sum =	100.0		Sum =	12.8

Flood volume = Effective rainfall 1.06(In)
times area 15.4(Ac.)/[(In)/(Ft.)] = 1.4(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.047(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 59309.0 Cubic Feet
Total soil loss = 2054.8 Cubic Feet

Peak flow rate of this hydrograph = 36.007(CFS)

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1-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 10.0 20.0 30.0 40.0
0+ 5	0.0191	2.77	V Q | | | |
0+10	0.0644	6.58	|V Q | | | |
0+15	0.1197	8.04	| V Q | | | |
0+20	0.1824	9.10	| V Q| | | |
0+25	0.2514	10.02	| V Q | | |
0+30	0.3301	11.43	| V|Q | | |
0+35	0.4193	12.94	| | Q | | |
0+40	0.5219	14.90	| | QV | | |
0+45	0.6524	18.96	| | QV| | |
0+50	0.8918	34.75	| | | V | Q |
0+55	1.1397	36.01	| | | | V Q |
1+ 0	1.2613	17.65	| | Q | | V |
1+ 5	1.3265	9.46	| Q| | | V |
1+10	1.3491	3.29	| Q | | | V|
1+15	1.3584	1.35	|Q | | | V|
1+20	1.3609	0.36	Q | | | V|
1+25	1.3615	0.10	Q | | | V|

17380P100YR3HRB3100.out

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR3HRB3100.out

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Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	0.70	10.76

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	1.90	29.20

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.370	69.00	0.900

Total Area Entered = 15.37(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.348
2	0.167	311.381	46.590	7.217
3	0.250	467.071	10.860	1.682
4	0.333	622.762	4.712	0.730
5	0.417	778.452	2.311	0.358
6	0.500	934.142	1.003	0.155
		Sum = 100.000	Sum=	15.490

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low		Effective (In/Hr)
1	0.08	1.30	0.296	0.037	(0.053)	0.260
2	0.17	1.30	0.296	0.037	(0.053)	0.260
3	0.25	1.10	0.251	0.037	(0.045)	0.214
4	0.33	1.50	0.342	0.037	(0.062)	0.305
5	0.42	1.50	0.342	0.037	(0.062)	0.305
6	0.50	1.80	0.410	0.037	(0.074)	0.374
7	0.58	1.50	0.342	0.037	(0.062)	0.305
8	0.67	1.80	0.410	0.037	(0.074)	0.374
9	0.75	1.80	0.410	0.037	(0.074)	0.374
10	0.83	1.50	0.342	0.037	(0.062)	0.305
11	0.92	1.60	0.365	0.037	(0.066)	0.328
12	1.00	1.80	0.410	0.037	(0.074)	0.374
13	1.08	2.20	0.502	0.037	(0.090)	0.465
14	1.17	2.20	0.502	0.037	(0.090)	0.465
15	1.25	2.20	0.502	0.037	(0.090)	0.465
16	1.33	2.00	0.456	0.037	(0.082)	0.419
17	1.42	2.60	0.593	0.037	(0.107)	0.556
18	1.50	2.70	0.616	0.037	(0.111)	0.579
19	1.58	2.40	0.547	0.037	(0.098)	0.510
20	1.67	2.70	0.616	0.037	(0.111)	0.579
21	1.75	3.30	0.752	0.037	(0.135)	0.716
22	1.83	3.10	0.707	0.037	(0.127)	0.670
23	1.92	2.90	0.661	0.037	(0.119)	0.624
24	2.00	3.00	0.684	0.037	(0.123)	0.647
25	2.08	3.10	0.707	0.037	(0.127)	0.670

26	2.17	4.20	0.958	0.037	(0.172)	0.921
27	2.25	5.00	1.140	0.037	(0.205)	1.103
28	2.33	3.50	0.798	0.037	(0.144)	0.761
29	2.42	6.80	1.550	0.037	(0.279)	1.513
30	2.50	7.30	1.664	0.037	(0.300)	1.627
31	2.58	8.20	1.869	0.037	(0.337)	1.833
32	2.67	5.90	1.345	0.037	(0.242)	1.308
33	2.75	2.00	0.456	0.037	(0.082)	0.419
34	2.83	1.80	0.410	0.037	(0.074)	0.374
35	2.92	1.80	0.410	0.037	(0.074)	0.374
36	3.00	0.60	0.137	(0.037)	0.025	0.112

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)
times area 15.4(Ac.)/[(In)/(Ft.)] = 2.3(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.140(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 99892.0 Cubic Feet
Total soil loss = 6107.8 Cubic Feet

Peak flow rate of this hydrograph = 25.198(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0096	1.39	VQ	|	|	|	|
0+10	0.0320	3.26	V Q	|	|	|	|
0+15	0.0558	3.46	V Q	|	|	|	|
0+20	0.0820	3.80	|V Q	|	|	|	|
0+25	0.1129	4.48	|V Q	|	|	|	|
0+30	0.1473	5.01	| V Q	|	|	|	|
0+35	0.1830	5.18	| V Q	|	|	|	|
0+40	0.2188	5.20	| V Q	|	|	|	|
0+45	0.2577	5.64	| V Q	|	|	|	|
0+50	0.2946	5.36	| VQ	|	|	|	|
0+55	0.3292	5.03	| VQ	|	|	|	|
1+ 0	0.3660	5.33	| VQ	|	|	|	|

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1+ 5    0.4083    6.15 |    VQ |       |       |       |
1+10    0.4557    6.88 |    V Q|       |       |       |
1+15    0.5043    7.06 |    VQ|       |       |       |
1+20    0.5519    6.90 |     Q|       |       |       |
1+25    0.6025    7.35 |     QV       |       |       |
1+30    0.6603    8.39 |     |Q       |       |       |
1+35    0.7181    8.39 |     |QV      |       |       |
1+40    0.7758    8.38 |     |Q V     |       |       |
1+45    0.8416    9.55 |     | Q V    |       |       |
1+50    0.9132   10.39 |     |  Q V   |       |       |
1+55    0.9826   10.08 |     |  Q  V  |       |       |
2+ 0    1.0508    9.91 |     |  Q   V |       |       |
2+ 5    1.1207   10.14 |     |  Q    V|       |       |
2+10    1.2010   11.66 |     |   Q   V       |       |
2+15    1.3007   14.48 |     |     Q| V      |       |
2+20    1.3999   14.41 |     |     Q|  V     |       |
2+25    1.5133   16.46 |     |      |Q   V   |       |
2+30    1.6658   22.16 |     |      |     Q|        |
2+35    1.8394   25.20 |     |      |      | VQ     |
2+40    2.0083   24.52 |     |      |      | Q V    |
2+45    2.1227   16.62 |     |      | Q    |     V  |
2+50    2.1874    9.38 |     | Q    |      |     V  |
2+55    2.2374    7.27 |     Q|     |      |     V|
3+ 0    2.2718    4.99 |   Q  |     |      |     V|
3+ 5    2.2860    2.06 | Q    |     |      |     V|
3+10    2.2905    0.66 Q       |     |      |     V|
3+15    2.2924    0.27 Q       |     |      |     V|
3+20    2.2931    0.10 Q       |     |      |     V|
3+25    2.2932    0.02 Q       |     |      |     V
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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR6HRB6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 6 HOUR
AREA B

Drainage Area = 15.37(Ac.) = 0.024 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.37(Ac.) = 0.024 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	1.00	15.37

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	2.50	38.42

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 99.99 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.370	69.00	0.900

Total Area Entered = 15.37(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.348
2	0.167	311.381	46.590	7.217
3	0.250	467.071	10.860	1.682
4	0.333	622.762	4.712	0.730
5	0.417	778.452	2.311	0.358
6	0.500	934.142	1.003	0.155
		Sum = 100.000	Sum=	15.490

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.037)	0.027	0.123
2	0.17	0.60	0.180	(0.037)	0.032	0.148
3	0.25	0.60	0.180	(0.037)	0.032	0.148
4	0.33	0.60	0.180	(0.037)	0.032	0.148
5	0.42	0.60	0.180	(0.037)	0.032	0.148
6	0.50	0.70	0.210	0.037	(0.038)	0.173
7	0.58	0.70	0.210	0.037	(0.038)	0.173
8	0.67	0.70	0.210	0.037	(0.038)	0.173
9	0.75	0.70	0.210	0.037	(0.038)	0.173
10	0.83	0.70	0.210	0.037	(0.038)	0.173
11	0.92	0.70	0.210	0.037	(0.038)	0.173
12	1.00	0.80	0.240	0.037	(0.043)	0.203
13	1.08	0.80	0.240	0.037	(0.043)	0.203
14	1.17	0.80	0.240	0.037	(0.043)	0.203
15	1.25	0.80	0.240	0.037	(0.043)	0.203
16	1.33	0.80	0.240	0.037	(0.043)	0.203
17	1.42	0.80	0.240	0.037	(0.043)	0.203
18	1.50	0.80	0.240	0.037	(0.043)	0.203
19	1.58	0.80	0.240	0.037	(0.043)	0.203
20	1.67	0.80	0.240	0.037	(0.043)	0.203
21	1.75	0.80	0.240	0.037	(0.043)	0.203
22	1.83	0.80	0.240	0.037	(0.043)	0.203
23	1.92	0.80	0.240	0.037	(0.043)	0.203
24	2.00	0.90	0.270	0.037	(0.049)	0.233
25	2.08	0.80	0.240	0.037	(0.043)	0.203

26	2.17	0.90	0.270	0.037	(0.049)	0.233
27	2.25	0.90	0.270	0.037	(0.049)	0.233
28	2.33	0.90	0.270	0.037	(0.049)	0.233
29	2.42	0.90	0.270	0.037	(0.049)	0.233
30	2.50	0.90	0.270	0.037	(0.049)	0.233
31	2.58	0.90	0.270	0.037	(0.049)	0.233
32	2.67	0.90	0.270	0.037	(0.049)	0.233
33	2.75	1.00	0.300	0.037	(0.054)	0.263
34	2.83	1.00	0.300	0.037	(0.054)	0.263
35	2.92	1.00	0.300	0.037	(0.054)	0.263
36	3.00	1.00	0.300	0.037	(0.054)	0.263
37	3.08	1.00	0.300	0.037	(0.054)	0.263
38	3.17	1.10	0.330	0.037	(0.059)	0.293
39	3.25	1.10	0.330	0.037	(0.059)	0.293
40	3.33	1.10	0.330	0.037	(0.059)	0.293
41	3.42	1.20	0.360	0.037	(0.065)	0.323
42	3.50	1.30	0.390	0.037	(0.070)	0.353
43	3.58	1.40	0.420	0.037	(0.076)	0.383
44	3.67	1.40	0.420	0.037	(0.076)	0.383
45	3.75	1.50	0.450	0.037	(0.081)	0.413
46	3.83	1.50	0.450	0.037	(0.081)	0.413
47	3.92	1.60	0.480	0.037	(0.086)	0.443
48	4.00	1.60	0.480	0.037	(0.086)	0.443
49	4.08	1.70	0.510	0.037	(0.092)	0.473
50	4.17	1.80	0.540	0.037	(0.097)	0.503
51	4.25	1.90	0.570	0.037	(0.103)	0.533
52	4.33	2.00	0.600	0.037	(0.108)	0.563
53	4.42	2.10	0.630	0.037	(0.113)	0.593
54	4.50	2.10	0.630	0.037	(0.113)	0.593
55	4.58	2.20	0.660	0.037	(0.119)	0.623
56	4.67	2.30	0.690	0.037	(0.124)	0.653
57	4.75	2.40	0.720	0.037	(0.130)	0.683
58	4.83	2.40	0.720	0.037	(0.130)	0.683
59	4.92	2.50	0.750	0.037	(0.135)	0.713
60	5.00	2.60	0.780	0.037	(0.140)	0.743
61	5.08	3.10	0.930	0.037	(0.167)	0.893
62	5.17	3.60	1.080	0.037	(0.194)	1.043
63	5.25	3.90	1.170	0.037	(0.211)	1.133
64	5.33	4.20	1.260	0.037	(0.227)	1.223
65	5.42	4.70	1.410	0.037	(0.254)	1.373
66	5.50	5.60	1.680	0.037	(0.302)	1.643
67	5.58	1.90	0.570	0.037	(0.103)	0.533
68	5.67	0.90	0.270	0.037	(0.049)	0.233
69	5.75	0.60	0.180	(0.037)	0.032	0.148

70	5.83	0.50	0.150	(0.037)	0.027	0.123
71	5.92	0.30	0.090	(0.037)	0.016	0.074
72	6.00	0.20	0.060	(0.037)	0.011	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.4

Flood volume = Effective rainfall 2.29(In)
times area 15.4(Ac.)/[(In)/(Ft.)] = 2.9(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.274(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 127557.7 Cubic Feet
Total soil loss = 11917.6 Cubic Feet

Peak flow rate of this hydrograph = 22.104(CFS)

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6-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0045	0.66	Q	|	|	|	|
0+10	0.0161	1.68	V Q	|	|	|	|
0+15	0.0303	2.06	V Q	|	|	|	|
0+20	0.0454	2.19	V Q	|	|	|	|
0+25	0.0609	2.26	V Q	|	|	|	|
0+30	0.0776	2.42	|V Q	|	|	|	|
0+35	0.0956	2.61	|V Q	|	|	|	|
0+40	0.1138	2.65	|V Q	|	|	|	|
0+45	0.1322	2.67	|V Q	|	|	|	|
0+50	0.1507	2.68	| VQ	|	|	|	|
0+55	0.1692	2.68	| VQ	|	|	|	|
1+ 0	0.1887	2.84	| VQ	|	|	|	|
1+ 5	0.2098	3.06	| V Q	|	|	|	|
1+10	0.2313	3.11	| VQ	|	|	|	|
1+15	0.2528	3.13	| VQ	|	|	|	|
1+20	0.2745	3.14	| VQ	|	|	|	|
1+25	0.2962	3.15	| Q	|	|	|	|
1+30	0.3179	3.15	| Q	|	|	|	|
1+35	0.3395	3.15	| Q	|	|	|	|
1+40	0.3612	3.15	| Q	|	|	|	|

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1+45    0.3829    3.15 |  QV  |      |      |      |
1+50    0.4046    3.15 |  QV  |      |      |      |
1+55    0.4263    3.15 |  QV  |      |      |      |
2+ 0    0.4491    3.31 |  Q V |      |      |      |
2+ 5    0.4722    3.37 |  Q V |      |      |      |
2+10    0.4954    3.36 |  Q V |      |      |      |
2+15    0.5198    3.55 |  Q V |      |      |      |
2+20    0.5445    3.59 |  Q V |      |      |      |
2+25    0.5693    3.60 |  Q V |      |      |      |
2+30    0.5942    3.61 |  Q  V|      |      |      |
2+35    0.6191    3.61 |  Q  V|      |      |      |
2+40    0.6440    3.61 |  Q  V|      |      |      |
2+45    0.6699    3.77 |  Q  V|      |      |      |
2+50    0.6974    3.99 |  Q  V|      |      |      |
2+55    0.7253    4.04 |  Q  V|      |      |      |
3+ 0    0.7532    4.06 |  Q  V      |      |      |
3+ 5    0.7813    4.07 |  Q  V      |      |      |
3+10    0.8105    4.24 |  Q  |V     |      |      |
3+15    0.8412    4.46 |  Q  |V     |      |      |
3+20    0.8722    4.51 |  Q  |V     |      |      |
3+25    0.9045    4.69 |  Q  | V    |      |      |
3+30    0.9395    5.08 |  Q  | V    |      |      |
3+35    0.9774    5.51 |  Q  | V    |      |      |
3+40    1.0173    5.80 |  Q  | V    |      |      |
3+45    1.0589    6.04 |  Q  |  V   |      |      |
3+50    1.1023    6.30 |  Q  |  V   |      |      |
3+55    1.1472    6.52 |  Q  |  V   |      |      |
4+ 0    1.1938    6.76 |  Q  |  V   |      |      |
4+ 5    1.2419    6.99 |  Q  |  V   |      |      |
4+10    1.2928    7.39 |  Q  |  V   |      |      |
4+15    1.3467    7.83 |  Q  |  V   |      |      |
4+20    1.4038    8.28 |  |Q  |  V|      |      |
4+25    1.4640    8.74 |  |Q  |  V|      |      |
4+30    1.5263    9.05 |  | Q  |  V      |      |
4+35    1.5903    9.30 |  | Q  |  |V     |      |
4+40    1.6572    9.71 |  | Q  |  | V    |      |
4+45    1.7271   10.15 |  |  Q  |  | V   |      |
4+50    1.7990   10.45 |  |  Q  |  |  V  |      |
4+55    1.8727   10.69 |  |  Q  |  |  V  |      |
5+ 0    1.9491   11.10 |  |  Q  |  |  V  |      |
5+ 5    2.0331   12.19 |  |  Q  |  |  V  |      |
5+10    2.1306   14.15 |  |  |  Q  |  |  V|      |
5+15    2.2408   16.00 |  |  |  |Q  |  V      |
5+20    2.3614   17.51 |  |  |  |  Q  |  | V    |
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5+25    2.4942   19.28 |      |      |  Q   | V    |
5+30    2.6464   22.10 |      |      |     Q|  V   |
5+35    2.7737   18.49 |      |      |  Q   |   V  |
5+40    2.8390    9.48 |      | Q    |      |   V  |
5+45    2.8752    5.25 |    Q |      |      |   V  |
5+50    2.8980    3.31 |  Q   |      |      |   V  |
5+55    2.9128    2.15 | Q    |      |      |   V  |
6+ 0    2.9216    1.28 |Q     |      |      |   V  |
6+ 5    2.9261    0.66 Q      |      |      |   V  |
6+10    2.9275    0.20 Q      |      |      |   V  |
6+15    2.9281    0.08 Q      |      |      |   V  |
6+20    2.9283    0.03 Q      |      |      |   V  |
6+25    2.9283    0.01 Q      |      |      |   V
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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR24HRB24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 24 HOUR
AREA B

Drainage Area = 15.37(Ac.) = 0.024 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 15.37(Ac.) = 0.024 Sq. Mi.
Length along longest watercourse = 1398.00(Ft.)
Length along longest watercourse measured to centroid = 794.00(Ft.)
Length along longest watercourse = 0.265 Mi.
Length along longest watercourse measured to centroid = 0.150 Mi.
Difference in elevation = 9.54(Ft.)
Slope along watercourse = 36.0309 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.054 Hr.
Lag time = 3.21 Min.
25% of lag time = 0.80 Min.
40% of lag time = 1.28 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	1.70	26.13

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
15.37	3.90	59.94

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 3.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
15.370	69.00	0.900

Total Area Entered = 15.37(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	155.690	34.524	5.348
2	0.167	311.381	46.590	7.217
3	0.250	467.071	10.860	1.682
4	0.333	622.762	4.712	0.730
5	0.417	778.452	2.311	0.358
6	0.500	934.142	1.003	0.155
		Sum = 100.000	Sum=	15.490

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1	0.08	0.07	0.031	(0.065)	0.006	0.026
2	0.17	0.07	0.031	(0.065)	0.006	0.026
3	0.25	0.07	0.031	(0.065)	0.006	0.026
4	0.33	0.10	0.047	(0.065)	0.008	0.038
5	0.42	0.10	0.047	(0.064)	0.008	0.038
6	0.50	0.10	0.047	(0.064)	0.008	0.038
7	0.58	0.10	0.047	(0.064)	0.008	0.038
8	0.67	0.10	0.047	(0.064)	0.008	0.038
9	0.75	0.10	0.047	(0.063)	0.008	0.038
10	0.83	0.13	0.062	(0.063)	0.011	0.051
11	0.92	0.13	0.062	(0.063)	0.011	0.051
12	1.00	0.13	0.062	(0.063)	0.011	0.051
13	1.08	0.10	0.047	(0.062)	0.008	0.038
14	1.17	0.10	0.047	(0.062)	0.008	0.038
15	1.25	0.10	0.047	(0.062)	0.008	0.038
16	1.33	0.10	0.047	(0.062)	0.008	0.038
17	1.42	0.10	0.047	(0.061)	0.008	0.038
18	1.50	0.10	0.047	(0.061)	0.008	0.038
19	1.58	0.10	0.047	(0.061)	0.008	0.038
20	1.67	0.10	0.047	(0.061)	0.008	0.038
21	1.75	0.10	0.047	(0.060)	0.008	0.038
22	1.83	0.13	0.062	(0.060)	0.011	0.051
23	1.92	0.13	0.062	(0.060)	0.011	0.051
24	2.00	0.13	0.062	(0.060)	0.011	0.051
25	2.08	0.13	0.062	(0.059)	0.011	0.051

26	2.17	0.13	0.062	(0.059)	0.011	0.051
27	2.25	0.13	0.062	(0.059)	0.011	0.051
28	2.33	0.13	0.062	(0.059)	0.011	0.051
29	2.42	0.13	0.062	(0.058)	0.011	0.051
30	2.50	0.13	0.062	(0.058)	0.011	0.051
31	2.58	0.17	0.078	(0.058)	0.014	0.064
32	2.67	0.17	0.078	(0.058)	0.014	0.064
33	2.75	0.17	0.078	(0.057)	0.014	0.064
34	2.83	0.17	0.078	(0.057)	0.014	0.064
35	2.92	0.17	0.078	(0.057)	0.014	0.064
36	3.00	0.17	0.078	(0.057)	0.014	0.064
37	3.08	0.17	0.078	(0.057)	0.014	0.064
38	3.17	0.17	0.078	(0.056)	0.014	0.064
39	3.25	0.17	0.078	(0.056)	0.014	0.064
40	3.33	0.17	0.078	(0.056)	0.014	0.064
41	3.42	0.17	0.078	(0.056)	0.014	0.064
42	3.50	0.17	0.078	(0.055)	0.014	0.064
43	3.58	0.17	0.078	(0.055)	0.014	0.064
44	3.67	0.17	0.078	(0.055)	0.014	0.064
45	3.75	0.17	0.078	(0.055)	0.014	0.064
46	3.83	0.20	0.094	(0.054)	0.017	0.077
47	3.92	0.20	0.094	(0.054)	0.017	0.077
48	4.00	0.20	0.094	(0.054)	0.017	0.077
49	4.08	0.20	0.094	(0.054)	0.017	0.077
50	4.17	0.20	0.094	(0.054)	0.017	0.077
51	4.25	0.20	0.094	(0.053)	0.017	0.077
52	4.33	0.23	0.109	(0.053)	0.020	0.090
53	4.42	0.23	0.109	(0.053)	0.020	0.090
54	4.50	0.23	0.109	(0.053)	0.020	0.090
55	4.58	0.23	0.109	(0.052)	0.020	0.090
56	4.67	0.23	0.109	(0.052)	0.020	0.090
57	4.75	0.23	0.109	(0.052)	0.020	0.090
58	4.83	0.27	0.125	(0.052)	0.022	0.102
59	4.92	0.27	0.125	(0.051)	0.022	0.102
60	5.00	0.27	0.125	(0.051)	0.022	0.102
61	5.08	0.20	0.094	(0.051)	0.017	0.077
62	5.17	0.20	0.094	(0.051)	0.017	0.077
63	5.25	0.20	0.094	(0.051)	0.017	0.077
64	5.33	0.23	0.109	(0.050)	0.020	0.090
65	5.42	0.23	0.109	(0.050)	0.020	0.090
66	5.50	0.23	0.109	(0.050)	0.020	0.090
67	5.58	0.27	0.125	(0.050)	0.022	0.102
68	5.67	0.27	0.125	(0.049)	0.022	0.102
69	5.75	0.27	0.125	(0.049)	0.022	0.102

70	5.83	0.27	0.125	(0.049)	0.022	0.102
71	5.92	0.27	0.125	(0.049)	0.022	0.102
72	6.00	0.27	0.125	(0.049)	0.022	0.102
73	6.08	0.30	0.140	(0.048)	0.025	0.115
74	6.17	0.30	0.140	(0.048)	0.025	0.115
75	6.25	0.30	0.140	(0.048)	0.025	0.115
76	6.33	0.30	0.140	(0.048)	0.025	0.115
77	6.42	0.30	0.140	(0.048)	0.025	0.115
78	6.50	0.30	0.140	(0.047)	0.025	0.115
79	6.58	0.33	0.156	(0.047)	0.028	0.128
80	6.67	0.33	0.156	(0.047)	0.028	0.128
81	6.75	0.33	0.156	(0.047)	0.028	0.128
82	6.83	0.33	0.156	(0.046)	0.028	0.128
83	6.92	0.33	0.156	(0.046)	0.028	0.128
84	7.00	0.33	0.156	(0.046)	0.028	0.128
85	7.08	0.33	0.156	(0.046)	0.028	0.128
86	7.17	0.33	0.156	(0.046)	0.028	0.128
87	7.25	0.33	0.156	(0.045)	0.028	0.128
88	7.33	0.37	0.172	(0.045)	0.031	0.141
89	7.42	0.37	0.172	(0.045)	0.031	0.141
90	7.50	0.37	0.172	(0.045)	0.031	0.141
91	7.58	0.40	0.187	(0.045)	0.034	0.153
92	7.67	0.40	0.187	(0.044)	0.034	0.153
93	7.75	0.40	0.187	(0.044)	0.034	0.153
94	7.83	0.43	0.203	(0.044)	0.037	0.166
95	7.92	0.43	0.203	(0.044)	0.037	0.166
96	8.00	0.43	0.203	(0.044)	0.037	0.166
97	8.08	0.50	0.234	(0.043)	0.042	0.192
98	8.17	0.50	0.234	(0.043)	0.042	0.192
99	8.25	0.50	0.234	(0.043)	0.042	0.192
100	8.33	0.50	0.234	(0.043)	0.042	0.192
101	8.42	0.50	0.234	(0.043)	0.042	0.192
102	8.50	0.50	0.234	(0.042)	0.042	0.192
103	8.58	0.53	0.250	0.042	(0.045)	0.207
104	8.67	0.53	0.250	0.042	(0.045)	0.208
105	8.75	0.53	0.250	0.042	(0.045)	0.208
106	8.83	0.57	0.265	0.042	(0.048)	0.224
107	8.92	0.57	0.265	0.041	(0.048)	0.224
108	9.00	0.57	0.265	0.041	(0.048)	0.224
109	9.08	0.63	0.296	0.041	(0.053)	0.255
110	9.17	0.63	0.296	0.041	(0.053)	0.256
111	9.25	0.63	0.296	0.041	(0.053)	0.256
112	9.33	0.67	0.312	0.040	(0.056)	0.272
113	9.42	0.67	0.312	0.040	(0.056)	0.272

114	9.50	0.67	0.312	0.040	(0.056)	0.272
115	9.58	0.70	0.328	0.040	(0.059)	0.288
116	9.67	0.70	0.328	0.040	(0.059)	0.288
117	9.75	0.70	0.328	0.039	(0.059)	0.288
118	9.83	0.73	0.343	0.039	(0.062)	0.304
119	9.92	0.73	0.343	0.039	(0.062)	0.304
120	10.00	0.73	0.343	0.039	(0.062)	0.304
121	10.08	0.50	0.234	0.039	(0.042)	0.195
122	10.17	0.50	0.234	0.039	(0.042)	0.195
123	10.25	0.50	0.234	0.038	(0.042)	0.196
124	10.33	0.50	0.234	0.038	(0.042)	0.196
125	10.42	0.50	0.234	0.038	(0.042)	0.196
126	10.50	0.50	0.234	0.038	(0.042)	0.196
127	10.58	0.67	0.312	0.038	(0.056)	0.274
128	10.67	0.67	0.312	0.037	(0.056)	0.275
129	10.75	0.67	0.312	0.037	(0.056)	0.275
130	10.83	0.67	0.312	0.037	(0.056)	0.275
131	10.92	0.67	0.312	0.037	(0.056)	0.275
132	11.00	0.67	0.312	0.037	(0.056)	0.275
133	11.08	0.63	0.296	0.036	(0.053)	0.260
134	11.17	0.63	0.296	0.036	(0.053)	0.260
135	11.25	0.63	0.296	0.036	(0.053)	0.260
136	11.33	0.63	0.296	0.036	(0.053)	0.260
137	11.42	0.63	0.296	0.036	(0.053)	0.261
138	11.50	0.63	0.296	0.036	(0.053)	0.261
139	11.58	0.57	0.265	0.035	(0.048)	0.230
140	11.67	0.57	0.265	0.035	(0.048)	0.230
141	11.75	0.57	0.265	0.035	(0.048)	0.230
142	11.83	0.60	0.281	0.035	(0.051)	0.246
143	11.92	0.60	0.281	0.035	(0.051)	0.246
144	12.00	0.60	0.281	0.035	(0.051)	0.246
145	12.08	0.83	0.390	0.034	(0.070)	0.356
146	12.17	0.83	0.390	0.034	(0.070)	0.356
147	12.25	0.83	0.390	0.034	(0.070)	0.356
148	12.33	0.87	0.406	0.034	(0.073)	0.372
149	12.42	0.87	0.406	0.034	(0.073)	0.372
150	12.50	0.87	0.406	0.034	(0.073)	0.372
151	12.58	0.93	0.437	0.033	(0.079)	0.403
152	12.67	0.93	0.437	0.033	(0.079)	0.404
153	12.75	0.93	0.437	0.033	(0.079)	0.404
154	12.83	0.97	0.452	0.033	(0.081)	0.420
155	12.92	0.97	0.452	0.033	(0.081)	0.420
156	13.00	0.97	0.452	0.033	(0.081)	0.420
157	13.08	1.13	0.530	0.032	(0.095)	0.498

158	13.17	1.13	0.530	0.032	(0.095)	0.498
159	13.25	1.13	0.530	0.032	(0.095)	0.498
160	13.33	1.13	0.530	0.032	(0.095)	0.499
161	13.42	1.13	0.530	0.032	(0.095)	0.499
162	13.50	1.13	0.530	0.032	(0.095)	0.499
163	13.58	0.77	0.359	0.031	(0.065)	0.327
164	13.67	0.77	0.359	0.031	(0.065)	0.328
165	13.75	0.77	0.359	0.031	(0.065)	0.328
166	13.83	0.77	0.359	0.031	(0.065)	0.328
167	13.92	0.77	0.359	0.031	(0.065)	0.328
168	14.00	0.77	0.359	0.031	(0.065)	0.328
169	14.08	0.90	0.421	0.030	(0.076)	0.391
170	14.17	0.90	0.421	0.030	(0.076)	0.391
171	14.25	0.90	0.421	0.030	(0.076)	0.391
172	14.33	0.87	0.406	0.030	(0.073)	0.376
173	14.42	0.87	0.406	0.030	(0.073)	0.376
174	14.50	0.87	0.406	0.030	(0.073)	0.376
175	14.58	0.87	0.406	0.030	(0.073)	0.376
176	14.67	0.87	0.406	0.029	(0.073)	0.376
177	14.75	0.87	0.406	0.029	(0.073)	0.376
178	14.83	0.83	0.390	0.029	(0.070)	0.361
179	14.92	0.83	0.390	0.029	(0.070)	0.361
180	15.00	0.83	0.390	0.029	(0.070)	0.361
181	15.08	0.80	0.374	0.029	(0.067)	0.346
182	15.17	0.80	0.374	0.028	(0.067)	0.346
183	15.25	0.80	0.374	0.028	(0.067)	0.346
184	15.33	0.77	0.359	0.028	(0.065)	0.331
185	15.42	0.77	0.359	0.028	(0.065)	0.331
186	15.50	0.77	0.359	0.028	(0.065)	0.331
187	15.58	0.63	0.296	0.028	(0.053)	0.269
188	15.67	0.63	0.296	0.028	(0.053)	0.269
189	15.75	0.63	0.296	0.027	(0.053)	0.269
190	15.83	0.63	0.296	0.027	(0.053)	0.269
191	15.92	0.63	0.296	0.027	(0.053)	0.269
192	16.00	0.63	0.296	0.027	(0.053)	0.269
193	16.08	0.13	0.062	(0.027)	0.011	0.051
194	16.17	0.13	0.062	(0.027)	0.011	0.051
195	16.25	0.13	0.062	(0.027)	0.011	0.051
196	16.33	0.13	0.062	(0.026)	0.011	0.051
197	16.42	0.13	0.062	(0.026)	0.011	0.051
198	16.50	0.13	0.062	(0.026)	0.011	0.051
199	16.58	0.10	0.047	(0.026)	0.008	0.038
200	16.67	0.10	0.047	(0.026)	0.008	0.038
201	16.75	0.10	0.047	(0.026)	0.008	0.038

202	16.83	0.10	0.047	(0.026)	0.008	0.038
203	16.92	0.10	0.047	(0.026)	0.008	0.038
204	17.00	0.10	0.047	(0.025)	0.008	0.038
205	17.08	0.17	0.078	(0.025)	0.014	0.064
206	17.17	0.17	0.078	(0.025)	0.014	0.064
207	17.25	0.17	0.078	(0.025)	0.014	0.064
208	17.33	0.17	0.078	(0.025)	0.014	0.064
209	17.42	0.17	0.078	(0.025)	0.014	0.064
210	17.50	0.17	0.078	(0.025)	0.014	0.064
211	17.58	0.17	0.078	(0.025)	0.014	0.064
212	17.67	0.17	0.078	(0.024)	0.014	0.064
213	17.75	0.17	0.078	(0.024)	0.014	0.064
214	17.83	0.13	0.062	(0.024)	0.011	0.051
215	17.92	0.13	0.062	(0.024)	0.011	0.051
216	18.00	0.13	0.062	(0.024)	0.011	0.051
217	18.08	0.13	0.062	(0.024)	0.011	0.051
218	18.17	0.13	0.062	(0.024)	0.011	0.051
219	18.25	0.13	0.062	(0.024)	0.011	0.051
220	18.33	0.13	0.062	(0.023)	0.011	0.051
221	18.42	0.13	0.062	(0.023)	0.011	0.051
222	18.50	0.13	0.062	(0.023)	0.011	0.051
223	18.58	0.10	0.047	(0.023)	0.008	0.038
224	18.67	0.10	0.047	(0.023)	0.008	0.038
225	18.75	0.10	0.047	(0.023)	0.008	0.038
226	18.83	0.07	0.031	(0.023)	0.006	0.026
227	18.92	0.07	0.031	(0.023)	0.006	0.026
228	19.00	0.07	0.031	(0.023)	0.006	0.026
229	19.08	0.10	0.047	(0.022)	0.008	0.038
230	19.17	0.10	0.047	(0.022)	0.008	0.038
231	19.25	0.10	0.047	(0.022)	0.008	0.038
232	19.33	0.13	0.062	(0.022)	0.011	0.051
233	19.42	0.13	0.062	(0.022)	0.011	0.051
234	19.50	0.13	0.062	(0.022)	0.011	0.051
235	19.58	0.10	0.047	(0.022)	0.008	0.038
236	19.67	0.10	0.047	(0.022)	0.008	0.038
237	19.75	0.10	0.047	(0.022)	0.008	0.038
238	19.83	0.07	0.031	(0.022)	0.006	0.026
239	19.92	0.07	0.031	(0.021)	0.006	0.026
240	20.00	0.07	0.031	(0.021)	0.006	0.026
241	20.08	0.10	0.047	(0.021)	0.008	0.038
242	20.17	0.10	0.047	(0.021)	0.008	0.038
243	20.25	0.10	0.047	(0.021)	0.008	0.038
244	20.33	0.10	0.047	(0.021)	0.008	0.038
245	20.42	0.10	0.047	(0.021)	0.008	0.038

246	20.50	0.10	0.047	(0.021)	0.008	0.038
247	20.58	0.10	0.047	(0.021)	0.008	0.038
248	20.67	0.10	0.047	(0.021)	0.008	0.038
249	20.75	0.10	0.047	(0.021)	0.008	0.038
250	20.83	0.07	0.031	(0.020)	0.006	0.026
251	20.92	0.07	0.031	(0.020)	0.006	0.026
252	21.00	0.07	0.031	(0.020)	0.006	0.026
253	21.08	0.10	0.047	(0.020)	0.008	0.038
254	21.17	0.10	0.047	(0.020)	0.008	0.038
255	21.25	0.10	0.047	(0.020)	0.008	0.038
256	21.33	0.07	0.031	(0.020)	0.006	0.026
257	21.42	0.07	0.031	(0.020)	0.006	0.026
258	21.50	0.07	0.031	(0.020)	0.006	0.026
259	21.58	0.10	0.047	(0.020)	0.008	0.038
260	21.67	0.10	0.047	(0.020)	0.008	0.038
261	21.75	0.10	0.047	(0.020)	0.008	0.038
262	21.83	0.07	0.031	(0.020)	0.006	0.026
263	21.92	0.07	0.031	(0.020)	0.006	0.026
264	22.00	0.07	0.031	(0.019)	0.006	0.026
265	22.08	0.10	0.047	(0.019)	0.008	0.038
266	22.17	0.10	0.047	(0.019)	0.008	0.038
267	22.25	0.10	0.047	(0.019)	0.008	0.038
268	22.33	0.07	0.031	(0.019)	0.006	0.026
269	22.42	0.07	0.031	(0.019)	0.006	0.026
270	22.50	0.07	0.031	(0.019)	0.006	0.026
271	22.58	0.07	0.031	(0.019)	0.006	0.026
272	22.67	0.07	0.031	(0.019)	0.006	0.026
273	22.75	0.07	0.031	(0.019)	0.006	0.026
274	22.83	0.07	0.031	(0.019)	0.006	0.026
275	22.92	0.07	0.031	(0.019)	0.006	0.026
276	23.00	0.07	0.031	(0.019)	0.006	0.026
277	23.08	0.07	0.031	(0.019)	0.006	0.026
278	23.17	0.07	0.031	(0.019)	0.006	0.026
279	23.25	0.07	0.031	(0.019)	0.006	0.026
280	23.33	0.07	0.031	(0.019)	0.006	0.026
281	23.42	0.07	0.031	(0.019)	0.006	0.026
282	23.50	0.07	0.031	(0.019)	0.006	0.026
283	23.58	0.07	0.031	(0.019)	0.006	0.026
284	23.67	0.07	0.031	(0.018)	0.006	0.026
285	23.75	0.07	0.031	(0.018)	0.006	0.026
286	23.83	0.07	0.031	(0.018)	0.006	0.026
287	23.92	0.07	0.031	(0.018)	0.006	0.026
288	24.00	0.07	0.031	(0.018)	0.006	0.026

(Loss Rate Not Used)

Sum = 100.0 Sum = 40.9

Flood volume = Effective rainfall 3.41(In)
times area 15.4(Ac.)/[(In)/(Ft.)] = 4.4(Ac.Ft)
Total soil loss = 0.49(In)
Total soil loss = 0.626(Ac.Ft)
Total rainfall = 3.90(In)
Flood volume = 190321.8 Cubic Feet
Total soil loss = 27264.7 Cubic Feet

Peak flow rate of this hydrograph = 7.729(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0009	0.14 Q	
0+10	0.0032	0.32 VQ	
0+15	0.0057	0.36 VQ	
0+20	0.0088	0.45 VQ	
0+25	0.0126	0.55 V Q	
0+30	0.0166	0.58 V Q	
0+35	0.0206	0.59 V Q	
0+40	0.0247	0.59 V Q	
0+45	0.0288	0.59 V Q	
0+50	0.0334	0.66 V Q	
0+55	0.0386	0.76 V Q	
1+ 0	0.0439	0.78 V Q	
1+ 5	0.0489	0.72 V Q	
1+10	0.0532	0.63 V Q	
1+15	0.0574	0.61 V Q	
1+20	0.0616	0.60 V Q	
1+25	0.0657	0.60 V Q	
1+30	0.0698	0.59 V Q	
1+35	0.0739	0.59 V Q	
1+40	0.0780	0.59 V Q	
1+45	0.0821	0.59 V Q	
1+50	0.0866	0.66 V Q	
1+55	0.0918	0.76 V Q	
2+ 0	0.0972	0.78 V Q	

2+ 5	0.1026	0.79	V Q	|	|	|	|
2+10	0.1080	0.79	V Q	|	|	|	|
2+15	0.1135	0.79	|V Q	|	|	|	|
2+20	0.1190	0.79	|V Q	|	|	|	|
2+25	0.1244	0.79	|V Q	|	|	|	|
2+30	0.1299	0.79	|V Q	|	|	|	|
2+35	0.1358	0.86	|V Q	|	|	|	|
2+40	0.1424	0.95	|V Q	|	|	|	|
2+45	0.1491	0.98	|V Q	|	|	|	|
2+50	0.1559	0.98	|V Q	|	|	|	|
2+55	0.1627	0.99	|V Q	|	|	|	|
3+ 0	0.1695	0.99	|V Q	|	|	|	|
3+ 5	0.1764	0.99	|V Q	|	|	|	|
3+10	0.1832	0.99	|V Q	|	|	|	|
3+15	0.1900	0.99	|V Q	|	|	|	|
3+20	0.1968	0.99	|V Q	|	|	|	|
3+25	0.2037	0.99	|V Q	|	|	|	|
3+30	0.2105	0.99	|V Q	|	|	|	|
3+35	0.2173	0.99	|V Q	|	|	|	|
3+40	0.2241	0.99	| VQ	|	|	|	|
3+45	0.2310	0.99	| VQ	|	|	|	|
3+50	0.2383	1.06	| V Q	|	|	|	|
3+55	0.2462	1.15	| V Q	|	|	|	|
4+ 0	0.2543	1.17	| V Q	|	|	|	|
4+ 5	0.2624	1.18	| V Q	|	|	|	|
4+10	0.2706	1.19	| V Q	|	|	|	|
4+15	0.2788	1.19	| V Q	|	|	|	|
4+20	0.2875	1.26	| V Q	|	|	|	|
4+25	0.2968	1.35	| V Q	|	|	|	|
4+30	0.3062	1.37	| V Q	|	|	|	|
4+35	0.3157	1.38	| V Q	|	|	|	|
4+40	0.3253	1.39	| V Q	|	|	|	|
4+45	0.3348	1.39	| V Q	|	|	|	|
4+50	0.3448	1.46	| V Q	|	|	|	|
4+55	0.3555	1.55	| V Q	|	|	|	|
5+ 0	0.3663	1.57	| V Q	|	|	|	|
5+ 5	0.3763	1.44	| V Q	|	|	|	|
5+10	0.3850	1.26	| V Q	|	|	|	|
5+15	0.3934	1.22	| VQ	|	|	|	|
5+20	0.4021	1.27	| V Q	|	|	|	|
5+25	0.4114	1.35	| V Q	|	|	|	|
5+30	0.4209	1.37	| V Q	|	|	|	|
5+35	0.4309	1.45	| V Q	|	|	|	|
5+40	0.4415	1.55	| V Q	|	|	|	|

5+45	0.4523	1.57	V Q			
5+50	0.4632	1.58	V Q			
5+55	0.4741	1.58	V Q			
6+ 0	0.4851	1.59	V Q			
6+ 5	0.4964	1.65	V Q			
6+10	0.5085	1.75	V Q			
6+15	0.5207	1.77	V Q			
6+20	0.5329	1.78	V Q			
6+25	0.5452	1.78	V Q			
6+30	0.5575	1.78	V Q			
6+35	0.5702	1.85	V Q			
6+40	0.5836	1.95	V Q			
6+45	0.5972	1.97	V Q			
6+50	0.6108	1.98	V Q			
6+55	0.6244	1.98	V Q			
7+ 0	0.6381	1.98	V Q			
7+ 5	0.6517	1.98	V Q			
7+10	0.6654	1.98	VQ			
7+15	0.6790	1.98	VQ			
7+20	0.6931	2.05	V Q			
7+25	0.7079	2.14	V Q			
7+30	0.7228	2.16	V Q			
7+35	0.7383	2.24	V Q			
7+40	0.7544	2.34	V Q			
7+45	0.7706	2.36	V Q			
7+50	0.7875	2.44	V Q			
7+55	0.8049	2.54	V Q			
8+ 0	0.8226	2.56	V Q			
8+ 5	0.8412	2.71	V Q			
8+10	0.8612	2.90	V Q			
8+15	0.8814	2.94	V Q			
8+20	0.9018	2.96	V Q			
8+25	0.9223	2.97	V Q			
8+30	0.9428	2.97	V Q			
8+35	0.9638	3.06	V Q			
8+40	0.9856	3.17	V Q			
8+45	1.0077	3.20	V Q			
8+50	1.0304	3.30	V Q			
8+55	1.0539	3.42	V Q			
9+ 0	1.0777	3.45	V Q			
9+ 5	1.1027	3.63	V Q			
9+10	1.1293	3.86	V Q			
9+15	1.1563	3.92	V Q			
9+20	1.1841	4.03	V Q			

```
 9+25    1.2127    4.16 |      |V   Q  |      |      |
 9+30    1.2416    4.19 |      |V   Q  |      |      |
 9+35    1.2711    4.29 |      |V    Q |      |      |
 9+40    1.3015    4.41 |      |V    Q |      |      |
 9+45    1.3321    4.44 |      | V   Q |      |      |
 9+50    1.3634    4.54 |      | V    Q|      |      |
 9+55    1.3955    4.66 |      | V    Q|      |      |
10+ 0    1.4278    4.69 |      | V   Q|      |      |
10+ 5    1.4562    4.12 |      | V Q  |      |      |
10+10    1.4792    3.34 |      | Q    |      |      |
10+15    1.5010    3.17 |      | QV   |      |      |
10+20    1.5223    3.09 |      | QV   |      |      |
10+25    1.5433    3.05 |      | Q V  |      |      |
10+30    1.5643    3.04 |      | Q V  |      |      |
10+35    1.5881    3.46 |      | QV   |      |      |
10+40    1.6158    4.02 |      |  V Q |      |      |
10+45    1.6444    4.16 |      |  VQ  |      |      |
10+50    1.6735    4.22 |      |  VQ  |      |      |
10+55    1.7028    4.25 |      |  VQ  |      |      |
11+ 0    1.7321    4.26 |      |  V Q |      |      |
11+ 5    1.7609    4.18 |      |  Q   |      |      |
11+10    1.7890    4.07 |      |  Q   |      |      |
11+15    1.8169    4.05 |      |  Q   |      |      |
11+20    1.8447    4.04 |      |  Q   |      |      |
11+25    1.8725    4.04 |      |  QV  |      |      |
11+30    1.9003    4.04 |      |  QV  |      |      |
11+35    1.9270    3.87 |      |  Q V |      |      |
11+40    1.9522    3.65 |      |  Q V |      |      |
11+45    1.9770    3.60 |      |  Q  V|      |      |
11+50    2.0022    3.67 |      |  Q  V|      |      |
11+55    2.0282    3.77 |      |  Q V |      |      |
12+ 0    2.0543    3.79 |      |  Q V |      |      |
12+ 5    2.0846    4.39 |      |  Q V|      |      |
12+10    2.1203    5.19 |      |   VQ |      |      |
12+15    2.1574    5.38 |      |   V|Q|      |      |
12+20    2.1956    5.54 |      |   V Q|      |      |
12+25    2.2348    5.70 |      |   V Q|      |      |
12+30    2.2744    5.74 |      |   V Q|      |      |
12+35    2.3152    5.93 |      |   |V Q|      |      |
12+40    2.3576    6.16 |      |   |V  Q|      |      |
12+45    2.4004    6.22 |      |   |V  Q|      |      |
12+50    2.4440    6.33 |      |   | V  Q|      |      |
12+55    2.4884    6.45 |      |   | V  Q|      |      |
13+ 0    2.5331    6.49 |      |   | V Q  |      |
```

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13+ 5    2.5807   6.92 |      |      | V  Q |      |
13+10    2.6323   7.49 |      |      |  V   Q|      |
13+15    2.6848   7.62 |      |      |  V   Q       |
13+20    2.7377   7.68 |      |      |  V   Q       |
13+25    2.7908   7.71 |      |      |  V   Q       |
13+30    2.8440   7.73 |      |      |   V  Q       |
13+35    2.8910   6.81 |      |      |   VQ |       |
13+40    2.9294   5.58 |      |      | Q  V |       |
13+45    2.9658   5.29 |      |      |Q   V |       |
13+50    3.0014   5.17 |      |      Q   V |       |
13+55    3.0366   5.11 |      |      Q   V |       |
14+ 0    3.0716   5.08 |      |      Q   V |       |
14+ 5    3.1089   5.42 |      |      |Q   V |       |
14+10    3.1494   5.87 |      |      | Q  V |       |
14+15    3.1905   5.98 |      |      | Q  V|       |
14+20    3.2315   5.95 |      |      | Q  V|       |
14+25    3.2718   5.86 |      |      | Q  V|       |
14+30    3.3121   5.84 |      |      | Q   V       |
14+35    3.3523   5.83 |      |      | Q   V       |
14+40    3.3924   5.83 |      |      | Q   |V      |
14+45    3.4326   5.83 |      |      | Q   |V      |
14+50    3.4722   5.75 |      |      | Q   |V      |
14+55    3.5110   5.64 |      |      | Q   | V     |
15+ 0    3.5497   5.62 |      |      | Q   | V     |
15+ 5    3.5877   5.52 |      |      | Q   | V     |
15+10    3.6250   5.41 |      |      |Q    |  V    |
15+15    3.6620   5.38 |      |      |Q    |  V    |
15+20    3.6984   5.29 |      |      |Q    |  V    |
15+25    3.7340   5.17 |      |      Q     |  V    |
15+30    3.7695   5.15 |      |      Q     |  V    |
15+35    3.8026   4.80 |      |      Q|    |  V    |
15+40    3.8325   4.35 |      |    Q |     |  V    |
15+45    3.8617   4.24 |      |    Q |     |  V    |
15+50    3.8907   4.20 |      |    Q |     |  V    |
15+55    3.9194   4.18 |      |    Q |     |  V    |
16+ 0    3.9482   4.17 |      |   Q  |     |  V    |
16+ 5    3.9689   3.01 |      | Q    |     |  V    |
16+10    3.9787   1.43 |   Q  |      |     |  V    |
16+15    3.9861   1.06 |  Q   |      |     |  V    |
16+20    3.9923   0.91 | Q    |      |     |  V    |
16+25    3.9980   0.83 | Q    |      |     |  V    |
16+30    4.0035   0.79 | Q    |      |     |  V    |
16+35    4.0084   0.72 |Q     |      |     |  V    |
16+40    4.0128   0.63 |Q     |      |     |  V    |
```

16+45	4.0170	0.61	Q				V
16+50	4.0212	0.60	Q				V
16+55	4.0253	0.60	Q				V
17+ 0	4.0294	0.59	Q				V
17+ 5	4.0344	0.73	Q				V
17+10	4.0407	0.92	Q				V
17+15	4.0473	0.96	Q				V
17+20	4.0540	0.98	Q				V
17+25	4.0608	0.99	Q				V
17+30	4.0677	0.99	Q				V
17+35	4.0745	0.99	Q				V
17+40	4.0813	0.99	Q				V
17+45	4.0882	0.99	Q				V
17+50	4.0945	0.92	Q				V
17+55	4.1002	0.83	Q				V
18+ 0	4.1058	0.81	Q				V
18+ 5	4.1113	0.80	Q				V
18+10	4.1168	0.79	Q				V
18+15	4.1222	0.79	Q				V
18+20	4.1277	0.79	Q				V
18+25	4.1332	0.79	Q				V
18+30	4.1386	0.79	Q				V
18+35	4.1436	0.72	Q				V
18+40	4.1480	0.63	Q				V
18+45	4.1522	0.61	Q				V
18+50	4.1558	0.53	Q				V
18+55	4.1588	0.44	Q				V
19+ 0	4.1617	0.41	Q				V
19+ 5	4.1649	0.47	Q				V
19+10	4.1688	0.56	Q				V
19+15	4.1728	0.58	Q				V
19+20	4.1773	0.66	Q				V
19+25	4.1825	0.75	Q				V
19+30	4.1878	0.78	Q				V
19+35	4.1928	0.72	Q				V
19+40	4.1971	0.63	Q				V
19+45	4.2013	0.61	Q				V
19+50	4.2050	0.53	Q				V
19+55	4.2080	0.44	Q				V
20+ 0	4.2108	0.41	Q				V
20+ 5	4.2141	0.47	Q				V
20+10	4.2179	0.56	Q				V
20+15	4.2219	0.58	Q				V
20+20	4.2260	0.59	Q				V

20+25	4.2301	0.59	| Q	|	|	|	V |
20+30	4.2342	0.59	| Q	|	|	|	V |
20+35	4.2383	0.59	| Q	|	|	|	V |
20+40	4.2423	0.59	| Q	|	|	|	V |
20+45	4.2464	0.59	| Q	|	|	|	V |
20+50	4.2501	0.53	| Q	|	|	|	V |
20+55	4.2531	0.43	|Q	|	|	|	V |
21+ 0	4.2559	0.41	|Q	|	|	|	V |
21+ 5	4.2591	0.47	|Q	|	|	|	V |
21+10	4.2630	0.56	| Q	|	|	|	V|
21+15	4.2670	0.58	| Q	|	|	|	V|
21+20	4.2706	0.52	| Q	|	|	|	V|
21+25	4.2735	0.43	|Q	|	|	|	V|
21+30	4.2764	0.41	|Q	|	|	|	V|
21+35	4.2796	0.47	|Q	|	|	|	V|
21+40	4.2835	0.56	| Q	|	|	|	V|
21+45	4.2875	0.58	| Q	|	|	|	V|
21+50	4.2910	0.52	| Q	|	|	|	V|
21+55	4.2940	0.43	|Q	|	|	|	V|
22+ 0	4.2969	0.41	|Q	|	|	|	V|
22+ 5	4.3001	0.47	|Q	|	|	|	V|
22+10	4.3040	0.56	| Q	|	|	|	V|
22+15	4.3079	0.58	| Q	|	|	|	V|
22+20	4.3115	0.52	| Q	|	|	|	V|
22+25	4.3145	0.43	|Q	|	|	|	V|
22+30	4.3173	0.41	|Q	|	|	|	V|
22+35	4.3201	0.40	|Q	|	|	|	V|
22+40	4.3229	0.40	|Q	|	|	|	V|
22+45	4.3256	0.40	|Q	|	|	|	V|
22+50	4.3283	0.40	|Q	|	|	|	V|
22+55	4.3310	0.40	|Q	|	|	|	V|
23+ 0	4.3338	0.40	|Q	|	|	|	V|
23+ 5	4.3365	0.40	|Q	|	|	|	V|
23+10	4.3392	0.40	|Q	|	|	|	V|
23+15	4.3420	0.40	|Q	|	|	|	V|
23+20	4.3447	0.40	|Q	|	|	|	V|
23+25	4.3474	0.40	|Q	|	|	|	V|
23+30	4.3502	0.40	|Q	|	|	|	V|
23+35	4.3529	0.40	|Q	|	|	|	V|
23+40	4.3556	0.40	|Q	|	|	|	V|
23+45	4.3584	0.40	|Q	|	|	|	V|
23+50	4.3611	0.40	|Q	|	|	|	V|
23+55	4.3638	0.40	|Q	|	|	|	V|
24+ 0	4.3665	0.40	|Q	|	|	|	V|

24+ 5	4.3683	0.26	|Q	|	|	|	V|
24+10	4.3689	0.07	Q	|	|	|	V|
24+15	4.3691	0.03	Q	|	|	|	V|
24+20	4.3692	0.01	Q	|	|	|	V|
24+25	4.3692	0.00	Q	|	|	|	V|

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Unit Hydrograph Analysis

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 1 HOUR
AREA C

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 667.00(Ft.)
Length along longest watercourse measured to centroid = 321.00(Ft.)
Length along longest watercourse = 0.126 Mi.
Length along longest watercourse measured to centroid = 0.061 Mi.
Difference in elevation = 4.80(Ft.)
Slope along watercourse = 37.9970 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.047 Hr.
Lag time = 2.84 Min.
25% of lag time = 0.71 Min.
40% of lag time = 1.13 Min.

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	0.40	1.20

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	1.10	3.30

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	85.00	0.200

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.200	0.064	1.000	0.064

Sum (F) = 0.064
Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)	Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1 0.083	176.353	38.997	1.179
2 0.167	352.705	45.050	1.362
3 0.250	529.058	9.831	0.297
4 0.333	705.410	4.067	0.123
5 0.417	881.763	2.056	0.062
	Sum = 100.000	Sum=	3.023

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max | Low	Effective (In/Hr)
1 0.08	4.20	0.554	0.064 (0.499)	0.490
2 0.17	4.30	0.568	0.064 (0.511)	0.504
3 0.25	5.00	0.660	0.064 (0.594)	0.596
4 0.33	5.00	0.660	0.064 (0.594)	0.596
5 0.42	5.80	0.766	0.064 (0.689)	0.702
6 0.50	6.50	0.858	0.064 (0.772)	0.794
7 0.58	7.40	0.977	0.064 (0.879)	0.913
8 0.67	8.60	1.135	0.064 (1.022)	1.071
9 0.75	12.30	1.624	0.064 (1.461)	1.560
10 0.83	29.10	3.841	0.064 (3.457)	3.777
11 0.92	6.80	0.898	0.064 (0.808)	0.834
12 1.00	5.00	0.660	0.064 (0.594)	0.596
		(Loss Rate Not Used)		
Sum =	100.0		Sum = 12.4	

Flood volume = Effective rainfall 1.04(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.3(Ac.Ft)
Total soil loss = 0.06(In)
Total soil loss = 0.016(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 11282.1 Cubic Feet
Total soil loss = 696.5 Cubic Feet

Peak flow rate of this hydrograph = 7.061(CFS)

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1-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0040	0.58	V Q | | | |
0+10	0.0127	1.26	|V Q | | | |
0+15	0.0233	1.54	| V Q | | | |
0+20	0.0351	1.73	| VQ | | | |
0+25	0.0483	1.91	| Q | | | |
0+30	0.0633	2.17	| QV| | | |
0+35	0.0803	2.48	| Q| V | | |
0+40	0.1001	2.87	| |Q V | | |
0+45	0.1256	3.71	| | Q V| | |
0+50	0.1743	7.06	| | | V Q | |
0+55	0.2210	6.78	| | | Q | V |
1+ 0	0.2432	3.22	| | Q | | V |
1+ 5	0.2543	1.62	| Q | | | V|
1+10	0.2579	0.51	| Q | | | V|
1+15	0.2587	0.13	Q | | | V|
1+20	0.2590	0.04	Q | | | V

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR3HRC3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 3 HOUR
AREA C

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 667.00(Ft.)
Length along longest watercourse measured to centroid = 321.00(Ft.)
Length along longest watercourse = 0.126 Mi.
Length along longest watercourse measured to centroid = 0.061 Mi.
Difference in elevation = 4.80(Ft.)
Slope along watercourse = 37.9970 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.047 Hr.
Lag time = 2.84 Min.
25% of lag time = 0.71 Min.
40% of lag time = 1.13 Min.

Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	0.70	2.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	1.90	5.70

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	85.00	0.200

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.200	0.064	1.000	0.064

Sum (F) = 0.064
Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	176.353	38.997	1.179
2	0.167	352.705	45.050	1.362
3	0.250	529.058	9.831	0.297
4	0.333	705.410	4.067	0.123
5	0.417	881.763	2.056	0.062
		Sum = 100.000	Sum=	3.023

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	0.064	(0.267)	0.232
2	0.17	1.30	0.296	0.064	(0.267)	0.232
3	0.25	1.10	0.251	0.064	(0.226)	0.187
4	0.33	1.50	0.342	0.064	(0.308)	0.278
5	0.42	1.50	0.342	0.064	(0.308)	0.278
6	0.50	1.80	0.410	0.064	(0.369)	0.346
7	0.58	1.50	0.342	0.064	(0.308)	0.278
8	0.67	1.80	0.410	0.064	(0.369)	0.346
9	0.75	1.80	0.410	0.064	(0.369)	0.346
10	0.83	1.50	0.342	0.064	(0.308)	0.278
11	0.92	1.60	0.365	0.064	(0.328)	0.301
12	1.00	1.80	0.410	0.064	(0.369)	0.346
13	1.08	2.20	0.502	0.064	(0.451)	0.438
14	1.17	2.20	0.502	0.064	(0.451)	0.438
15	1.25	2.20	0.502	0.064	(0.451)	0.438
16	1.33	2.00	0.456	0.064	(0.410)	0.392
17	1.42	2.60	0.593	0.064	(0.534)	0.529
18	1.50	2.70	0.616	0.064	(0.554)	0.552
19	1.58	2.40	0.547	0.064	(0.492)	0.483
20	1.67	2.70	0.616	0.064	(0.554)	0.552
21	1.75	3.30	0.752	0.064	(0.677)	0.688
22	1.83	3.10	0.707	0.064	(0.636)	0.643
23	1.92	2.90	0.661	0.064	(0.595)	0.597
24	2.00	3.00	0.684	0.064	(0.616)	0.620
25	2.08	3.10	0.707	0.064	(0.636)	0.643
26	2.17	4.20	0.958	0.064	(0.862)	0.894

27	2.25	5.00	1.140	0.064	(1.026)	1.076
28	2.33	3.50	0.798	0.064	(0.718)	0.734
29	2.42	6.80	1.550	0.064	(1.395)	1.486
30	2.50	7.30	1.664	0.064	(1.498)	1.600
31	2.58	8.20	1.870	0.064	(1.683)	1.806
32	2.67	5.90	1.345	0.064	(1.211)	1.281
33	2.75	2.00	0.456	0.064	(0.410)	0.392
34	2.83	1.80	0.410	0.064	(0.369)	0.346
35	2.92	1.80	0.410	0.064	(0.369)	0.346
36	3.00	0.60	0.137	0.064	(0.123)	0.073

(Loss Rate Not Used)

Sum = 100.0 Sum = 20.5

Flood volume = Effective rainfall 1.71(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.19(In)
Total soil loss = 0.048(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 18601.2 Cubic Feet
Total soil loss = 2089.6 Cubic Feet

Peak flow rate of this hydrograph = 4.910(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0019	0.27	VQ	|	|	|	|
0+10	0.0060	0.59	V Q	|	|	|	|
0+15	0.0101	0.61	V Q	|	|	|	|
0+20	0.0148	0.68	|VQ	|	|	|	|
0+25	0.0204	0.81	|V Q	|	|	|	|
0+30	0.0266	0.91	| VQ	|	|	|	|
0+35	0.0330	0.93	| Q	|	|	|	|
0+40	0.0395	0.94	| Q	|	|	|	|
0+45	0.0465	1.02	| Q	|	|	|	|
0+50	0.0532	0.96	| QV	|	|	|	|
0+55	0.0593	0.90	| Q V	|	|	|	|
1+ 0	0.0660	0.97	| Q V	|	|	|	|
1+ 5	0.0738	1.13	| Q V	|	|	|	|

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 1+10    0.0825    1.27 |   Q V |       |       |       |
 1+15    0.0915    1.30 |   Q V |       |       |       |
 1+20    0.1002    1.26 |   Q  V|       |       |       |
 1+25    0.1097    1.37 |   Q   V       |       |       |
 1+30    0.1205    1.57 |   Q  |V       |       |       |
 1+35    0.1312    1.55 |   Q  | V      |       |       |
 1+40    0.1419    1.56 |   Q  |  V     |       |       |
 1+45    0.1544    1.81 |   Q  |  V     |       |       |
 1+50    0.1678    1.95 |   Q  |   V    |       |       |
 1+55    0.1808    1.88 |   Q  |   V    |       |       |
 2+ 0    0.1936    1.86 |   Q  |    V   |       |       |
 2+ 5    0.2067    1.90 |   Q  |    V|  |       |       |
 2+10    0.2220    2.23 |   Q  |     V  |       |       |
 2+15    0.2413    2.79 |      |Q    | V |       |       |
 2+20    0.2600    2.72 |      Q      |  V    |       |
 2+25    0.2822    3.22 |      | Q    |   V   |       |
 2+30    0.3119    4.32 |      |   Q  |    V|       |
 2+35    0.3457    4.91 |      |    Q|     | V     |
 2+40    0.3779    4.68 |      |    Q |     |  V    |
 2+45    0.3988    3.03 |      | Q    |     |    V  |
 2+50    0.4102    1.65 |   Q  |      |     |    V  |
 2+55    0.4189    1.27 |  Q   |      |     |    V|
 3+ 0    0.4243    0.79 | Q    |      |     |    V|
 3+ 5    0.4262    0.27 |Q     |      |     |    V|
 3+10    0.4268    0.09 Q      |      |     |    V|
 3+15    0.4270    0.03 Q      |      |     |    V|
 3+20    0.4270    0.00 Q      |      |     |    V|
-------------------------------------------------------------------------------
```

17380E100YR6HRC6100.out

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR6HRC6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 6 HOUR
AREA C

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 667.00(Ft.)
Length along longest watercourse measured to centroid = 321.00(Ft.)
Length along longest watercourse = 0.126 Mi.
Length along longest watercourse measured to centroid = 0.061 Mi.
Difference in elevation = 4.80(Ft.)
Slope along watercourse = 37.9970 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.047 Hr.
Lag time = 2.84 Min.
25% of lag time = 0.71 Min.
40% of lag time = 1.13 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	1.00	3.00

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	2.50	7.50

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	85.00	0.200

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.200	0.064	1.000	0.064

Sum (F) = 0.064
Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	176.353	38.997	1.179
2	0.167	352.705	45.050	1.362
3	0.250	529.058	9.831	0.297
4	0.333	705.410	4.067	0.123
5	0.417	881.763	2.056	0.062
		Sum = 100.000	Sum=	3.023

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	0.064	(0.135)	0.086
2	0.17	0.60	0.180	0.064	(0.162)	0.116
3	0.25	0.60	0.180	0.064	(0.162)	0.116
4	0.33	0.60	0.180	0.064	(0.162)	0.116
5	0.42	0.60	0.180	0.064	(0.162)	0.116
6	0.50	0.70	0.210	0.064	(0.189)	0.146
7	0.58	0.70	0.210	0.064	(0.189)	0.146
8	0.67	0.70	0.210	0.064	(0.189)	0.146
9	0.75	0.70	0.210	0.064	(0.189)	0.146
10	0.83	0.70	0.210	0.064	(0.189)	0.146
11	0.92	0.70	0.210	0.064	(0.189)	0.146
12	1.00	0.80	0.240	0.064	(0.216)	0.176
13	1.08	0.80	0.240	0.064	(0.216)	0.176
14	1.17	0.80	0.240	0.064	(0.216)	0.176
15	1.25	0.80	0.240	0.064	(0.216)	0.176
16	1.33	0.80	0.240	0.064	(0.216)	0.176
17	1.42	0.80	0.240	0.064	(0.216)	0.176
18	1.50	0.80	0.240	0.064	(0.216)	0.176
19	1.58	0.80	0.240	0.064	(0.216)	0.176
20	1.67	0.80	0.240	0.064	(0.216)	0.176
21	1.75	0.80	0.240	0.064	(0.216)	0.176
22	1.83	0.80	0.240	0.064	(0.216)	0.176
23	1.92	0.80	0.240	0.064	(0.216)	0.176
24	2.00	0.90	0.270	0.064	(0.243)	0.206
25	2.08	0.80	0.240	0.064	(0.216)	0.176
26	2.17	0.90	0.270	0.064	(0.243)	0.206

27	2.25	0.90	0.270	0.064	(0.243)	0.206
28	2.33	0.90	0.270	0.064	(0.243)	0.206
29	2.42	0.90	0.270	0.064	(0.243)	0.206
30	2.50	0.90	0.270	0.064	(0.243)	0.206
31	2.58	0.90	0.270	0.064	(0.243)	0.206
32	2.67	0.90	0.270	0.064	(0.243)	0.206
33	2.75	1.00	0.300	0.064	(0.270)	0.236
34	2.83	1.00	0.300	0.064	(0.270)	0.236
35	2.92	1.00	0.300	0.064	(0.270)	0.236
36	3.00	1.00	0.300	0.064	(0.270)	0.236
37	3.08	1.00	0.300	0.064	(0.270)	0.236
38	3.17	1.10	0.330	0.064	(0.297)	0.266
39	3.25	1.10	0.330	0.064	(0.297)	0.266
40	3.33	1.10	0.330	0.064	(0.297)	0.266
41	3.42	1.20	0.360	0.064	(0.324)	0.296
42	3.50	1.30	0.390	0.064	(0.351)	0.326
43	3.58	1.40	0.420	0.064	(0.378)	0.356
44	3.67	1.40	0.420	0.064	(0.378)	0.356
45	3.75	1.50	0.450	0.064	(0.405)	0.386
46	3.83	1.50	0.450	0.064	(0.405)	0.386
47	3.92	1.60	0.480	0.064	(0.432)	0.416
48	4.00	1.60	0.480	0.064	(0.432)	0.416
49	4.08	1.70	0.510	0.064	(0.459)	0.446
50	4.17	1.80	0.540	0.064	(0.486)	0.476
51	4.25	1.90	0.570	0.064	(0.513)	0.506
52	4.33	2.00	0.600	0.064	(0.540)	0.536
53	4.42	2.10	0.630	0.064	(0.567)	0.566
54	4.50	2.10	0.630	0.064	(0.567)	0.566
55	4.58	2.20	0.660	0.064	(0.594)	0.596
56	4.67	2.30	0.690	0.064	(0.621)	0.626
57	4.75	2.40	0.720	0.064	(0.648)	0.656
58	4.83	2.40	0.720	0.064	(0.648)	0.656
59	4.92	2.50	0.750	0.064	(0.675)	0.686
60	5.00	2.60	0.780	0.064	(0.702)	0.716
61	5.08	3.10	0.930	0.064	(0.837)	0.866
62	5.17	3.60	1.080	0.064	(0.972)	1.016
63	5.25	3.90	1.170	0.064	(1.053)	1.106
64	5.33	4.20	1.260	0.064	(1.134)	1.196
65	5.42	4.70	1.410	0.064	(1.269)	1.346
66	5.50	5.60	1.680	0.064	(1.512)	1.616
67	5.58	1.90	0.570	0.064	(0.513)	0.506
68	5.67	0.90	0.270	0.064	(0.243)	0.206
69	5.75	0.60	0.180	0.064	(0.162)	0.116
70	5.83	0.50	0.150	0.064	(0.135)	0.086

71 5.92 0.30 0.090 0.064 (0.081) 0.026
72 6.00 0.20 0.060 (0.064) 0.054 0.006
(Loss Rate Not Used)
Sum = 100.0 Sum = 25.4
Flood volume = Effective rainfall 2.12(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.38(In)
Total soil loss = 0.096(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 23054.6 Cubic Feet
Total soil loss = 4170.1 Cubic Feet

Peak flow rate of this hydrograph = 4.296(CFS)

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6-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0007	0.10	Q | | | |
0+10	0.0024	0.25	VQ | | | |
0+15	0.0047	0.32	VQ | | | |
0+20	0.0070	0.34	VQ | | | |
0+25	0.0094	0.35	VQ | | | |
0+30	0.0121	0.39	VQ | | | |
0+35	0.0150	0.43	|Q | | | |
0+40	0.0180	0.44	|Q | | | |
0+45	0.0210	0.44	|Q | | | |
0+50	0.0241	0.44	|Q | | | |
0+55	0.0271	0.44	|QV | | | |
1+ 0	0.0304	0.48	|QV | | | |
1+ 5	0.0340	0.52	| Q | | | |
1+10	0.0376	0.53	| Q | | | |
1+15	0.0413	0.53	| QV | | | |
1+20	0.0449	0.53	| QV | | | |
1+25	0.0486	0.53	| QV | | | |
1+30	0.0523	0.53	| QV | | | |
1+35	0.0559	0.53	| Q V | | | |
1+40	0.0596	0.53	| Q V | | | |
1+45	0.0633	0.53	| Q V | | | |

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1+50    0.0669    0.53 | Q V  |      |      |      |
1+55    0.0706    0.53 | Q V  |      |      |      |
2+ 0    0.0745    0.57 | Q V  |      |      |      |
2+ 5    0.0785    0.57 | Q V  |      |      |      |
2+10    0.0824    0.58 | Q  V |      |      |      |
2+15    0.0867    0.61 | Q  V |      |      |      |
2+20    0.0909    0.62 | Q  V |      |      |      |
2+25    0.0952    0.62 | Q   V|      |      |      |
2+30    0.0995    0.62 | Q   V|      |      |      |
2+35    0.1038    0.62 | Q   V|      |      |      |
2+40    0.1081    0.62 | Q    V|      |      |      |
2+45    0.1126    0.66 | Q    V|      |      |      |
2+50    0.1174    0.70 | Q    V|      |      |      |
2+55    0.1223    0.71 | Q    V|      |      |      |
3+ 0    0.1272    0.71 | Q    V|      |      |      |
3+ 5    0.1321    0.71 | Q    V|      |      |      |
3+10    0.1373    0.75 | Q     V      |      |      |
3+15    0.1427    0.79 | Q     V      |      |      |
3+20    0.1482    0.80 | Q     |V     |      |      |
3+25    0.1540    0.84 | Q     |V     |      |      |
3+30    0.1603    0.92 | Q     | V    |      |      |
3+35    0.1672    1.00 |  Q    | V    |      |      |
3+40    0.1745    1.06 |  Q    |  V   |      |      |
3+45    0.1821    1.10 |  Q    |  V   |      |      |
3+50    0.1900    1.15 |  Q    |   V  |      |      |
3+55    0.1983    1.20 |  Q    |   V  |      |      |
4+ 0    0.2068    1.24 |  Q    |   V  |      |      |
4+ 5    0.2157    1.29 |  Q    |   V  |      |      |
4+10    0.2251    1.37 |   Q   |    V |      |      |
4+15    0.2352    1.46 |   Q   |    V |      |      |
4+20    0.2458    1.54 |    Q  |    V |      |      |
4+25    0.2570    1.63 |    Q  |     V|      |      |
4+30    0.2687    1.69 |    Q  |      V      |      |
4+35    0.2807    1.74 |    Q  |      |V     |      |
4+40    0.2932    1.82 |    Q  |      | V    |      |
4+45    0.3064    1.91 |    Q  |      |  V   |      |
4+50    0.3199    1.96 |    Q  |      |   V  |      |
4+55    0.3337    2.01 |     Q |      |   V  |      |
5+ 0    0.3482    2.09 |     Q |      |   V  |      |
5+ 5    0.3642    2.32 |     Q|      |    V |      |
5+10    0.3829    2.72 |      Q      |    V |      |
5+15    0.4041    3.08 |       | Q   |      V      |
5+20    0.4273    3.37 |       |  Q  |      | V    |
5+25    0.4530    3.73 |       |   Q |      |  V   |
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5+30    0.4825   4.30 |      |    Q |      |   V  |
5+35    0.5061   3.42 |      | Q    |      |    V |
5+40    0.5174   1.65 |   Q  |      |      |     V|
5+45    0.5233   0.85 | Q    |      |      |     V|
5+50    0.5266   0.48 |Q     |      |      |     V|
5+55    0.5283   0.24 Q      |      |      |     V|
6+ 0    0.5289   0.10 Q      |      |      |     V|
6+ 5    0.5292   0.03 Q      |      |      |     V|
6+10    0.5292   0.01 Q      |      |      |     V|
6+15    0.5293   0.00 Q      |      |      |     V|
6+20    0.5293   0.00 Q      |      |      |     V
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17380E100YR24HRC24100.out

Unit Hydrograph Analysis

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Study date 05/22/18 File: 17380E100YR24HRC24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
EXISTING CONDITION
100 YEAR 24 HOUR
AREA C

Drainage Area = 3.00(Ac.) = 0.005 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 3.00(Ac.) = 0.005 Sq. Mi.
Length along longest watercourse = 667.00(Ft.)
Length along longest watercourse measured to centroid = 321.00(Ft.)
Length along longest watercourse = 0.126 Mi.
Length along longest watercourse measured to centroid = 0.061 Mi.
Difference in elevation = 4.80(Ft.)
Slope along watercourse = 37.9970 Ft./Mi.
Average Manning's 'N' = 0.025
Lag time = 0.047 Hr.
Lag time = 2.84 Min.
25% of lag time = 0.71 Min.
40% of lag time = 1.13 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	1.70	5.10

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
3.00	3.80	11.40

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.800(In)

Point rain (area averaged) = 3.800(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.800(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
3.000	85.00	0.200

Total Area Entered = 3.00(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
85.0	94.0	0.078	0.200	0.064	1.000	0.064

Sum (F) = 0.064
Area averaged mean soil loss (F) (In/Hr) = 0.064
Minimum soil loss rate ((In/Hr)) = 0.032
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.900

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	176.353	38.997	1.179
2	0.167	352.705	45.050	1.362
3	0.250	529.058	9.831	0.297
4	0.333	705.410	4.067	0.123
5	0.417	881.763	2.056	0.062
		Sum = 100.000	Sum=	3.023

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

	Unit Time (Hr.)	Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max |	Low	Effective (In/Hr)
1	0.08	0.07	0.030	(0.113)	0.027	0.003
2	0.17	0.07	0.030	(0.113)	0.027	0.003
3	0.25	0.07	0.030	(0.113)	0.027	0.003
4	0.33	0.10	0.046	(0.112)	0.041	0.005
5	0.42	0.10	0.046	(0.112)	0.041	0.005
6	0.50	0.10	0.046	(0.111)	0.041	0.005
7	0.58	0.10	0.046	(0.111)	0.041	0.005
8	0.67	0.10	0.046	(0.110)	0.041	0.005
9	0.75	0.10	0.046	(0.110)	0.041	0.005
10	0.83	0.13	0.061	(0.109)	0.055	0.006
11	0.92	0.13	0.061	(0.109)	0.055	0.006
12	1.00	0.13	0.061	(0.109)	0.055	0.006
13	1.08	0.10	0.046	(0.108)	0.041	0.005
14	1.17	0.10	0.046	(0.108)	0.041	0.005
15	1.25	0.10	0.046	(0.107)	0.041	0.005
16	1.33	0.10	0.046	(0.107)	0.041	0.005
17	1.42	0.10	0.046	(0.106)	0.041	0.005
18	1.50	0.10	0.046	(0.106)	0.041	0.005
19	1.58	0.10	0.046	(0.106)	0.041	0.005
20	1.67	0.10	0.046	(0.105)	0.041	0.005
21	1.75	0.10	0.046	(0.105)	0.041	0.005
22	1.83	0.13	0.061	(0.104)	0.055	0.006
23	1.92	0.13	0.061	(0.104)	0.055	0.006
24	2.00	0.13	0.061	(0.104)	0.055	0.006
25	2.08	0.13	0.061	(0.103)	0.055	0.006
26	2.17	0.13	0.061	(0.103)	0.055	0.006

27	2.25	0.13	0.061	(0.102)	0.055	0.006
28	2.33	0.13	0.061	(0.102)	0.055	0.006
29	2.42	0.13	0.061	(0.101)	0.055	0.006
30	2.50	0.13	0.061	(0.101)	0.055	0.006
31	2.58	0.17	0.076	(0.101)	0.068	0.008
32	2.67	0.17	0.076	(0.100)	0.068	0.008
33	2.75	0.17	0.076	(0.100)	0.068	0.008
34	2.83	0.17	0.076	(0.099)	0.068	0.008
35	2.92	0.17	0.076	(0.099)	0.068	0.008
36	3.00	0.17	0.076	(0.099)	0.068	0.008
37	3.08	0.17	0.076	(0.098)	0.068	0.008
38	3.17	0.17	0.076	(0.098)	0.068	0.008
39	3.25	0.17	0.076	(0.097)	0.068	0.008
40	3.33	0.17	0.076	(0.097)	0.068	0.008
41	3.42	0.17	0.076	(0.097)	0.068	0.008
42	3.50	0.17	0.076	(0.096)	0.068	0.008
43	3.58	0.17	0.076	(0.096)	0.068	0.008
44	3.67	0.17	0.076	(0.095)	0.068	0.008
45	3.75	0.17	0.076	(0.095)	0.068	0.008
46	3.83	0.20	0.091	(0.095)	0.082	0.009
47	3.92	0.20	0.091	(0.094)	0.082	0.009
48	4.00	0.20	0.091	(0.094)	0.082	0.009
49	4.08	0.20	0.091	(0.093)	0.082	0.009
50	4.17	0.20	0.091	(0.093)	0.082	0.009
51	4.25	0.20	0.091	(0.093)	0.082	0.009
52	4.33	0.23	0.106	0.092	(0.096)	0.014
53	4.42	0.23	0.106	0.092	(0.096)	0.015
54	4.50	0.23	0.106	0.091	(0.096)	0.015
55	4.58	0.23	0.106	0.091	(0.096)	0.015
56	4.67	0.23	0.106	0.091	(0.096)	0.016
57	4.75	0.23	0.106	0.090	(0.096)	0.016
58	4.83	0.27	0.122	0.090	(0.109)	0.032
59	4.92	0.27	0.122	0.089	(0.109)	0.032
60	5.00	0.27	0.122	0.089	(0.109)	0.033
61	5.08	0.20	0.091	(0.089)	0.082	0.009
62	5.17	0.20	0.091	(0.088)	0.082	0.009
63	5.25	0.20	0.091	(0.088)	0.082	0.009
64	5.33	0.23	0.106	0.087	(0.096)	0.019
65	5.42	0.23	0.106	0.087	(0.096)	0.019
66	5.50	0.23	0.106	0.087	(0.096)	0.020
67	5.58	0.27	0.122	0.086	(0.109)	0.035
68	5.67	0.27	0.122	0.086	(0.109)	0.036
69	5.75	0.27	0.122	0.086	(0.109)	0.036
70	5.83	0.27	0.122	0.085	(0.109)	0.036

71	5.92	0.27	0.122	0.085	(0.109)	0.037
72	6.00	0.27	0.122	0.084	(0.109)	0.037
73	6.08	0.30	0.137	0.084	(0.123)	0.053
74	6.17	0.30	0.137	0.084	(0.123)	0.053
75	6.25	0.30	0.137	0.083	(0.123)	0.053
76	6.33	0.30	0.137	0.083	(0.123)	0.054
77	6.42	0.30	0.137	0.083	(0.123)	0.054
78	6.50	0.30	0.137	0.082	(0.123)	0.055
79	6.58	0.33	0.152	0.082	(0.137)	0.070
80	6.67	0.33	0.152	0.081	(0.137)	0.071
81	6.75	0.33	0.152	0.081	(0.137)	0.071
82	6.83	0.33	0.152	0.081	(0.137)	0.071
83	6.92	0.33	0.152	0.080	(0.137)	0.072
84	7.00	0.33	0.152	0.080	(0.137)	0.072
85	7.08	0.33	0.152	0.080	(0.137)	0.072
86	7.17	0.33	0.152	0.079	(0.137)	0.073
87	7.25	0.33	0.152	0.079	(0.137)	0.073
88	7.33	0.37	0.167	0.079	(0.150)	0.089
89	7.42	0.37	0.167	0.078	(0.150)	0.089
90	7.50	0.37	0.167	0.078	(0.150)	0.089
91	7.58	0.40	0.182	0.077	(0.164)	0.105
92	7.67	0.40	0.182	0.077	(0.164)	0.105
93	7.75	0.40	0.182	0.077	(0.164)	0.106
94	7.83	0.43	0.198	0.076	(0.178)	0.121
95	7.92	0.43	0.198	0.076	(0.178)	0.122
96	8.00	0.43	0.198	0.076	(0.178)	0.122
97	8.08	0.50	0.228	0.075	(0.205)	0.153
98	8.17	0.50	0.228	0.075	(0.205)	0.153
99	8.25	0.50	0.228	0.075	(0.205)	0.153
100	8.33	0.50	0.228	0.074	(0.205)	0.154
101	8.42	0.50	0.228	0.074	(0.205)	0.154
102	8.50	0.50	0.228	0.074	(0.205)	0.154
103	8.58	0.53	0.243	0.073	(0.219)	0.170
104	8.67	0.53	0.243	0.073	(0.219)	0.170
105	8.75	0.53	0.243	0.073	(0.219)	0.171
106	8.83	0.57	0.258	0.072	(0.233)	0.186
107	8.92	0.57	0.258	0.072	(0.233)	0.187
108	9.00	0.57	0.258	0.072	(0.233)	0.187
109	9.08	0.63	0.289	0.071	(0.260)	0.218
110	9.17	0.63	0.289	0.071	(0.260)	0.218
111	9.25	0.63	0.289	0.071	(0.260)	0.218
112	9.33	0.67	0.304	0.070	(0.274)	0.234
113	9.42	0.67	0.304	0.070	(0.274)	0.234
114	9.50	0.67	0.304	0.070	(0.274)	0.234

115	9.58	0.70	0.319	0.069	(0.287)	0.250
116	9.67	0.70	0.319	0.069	(0.287)	0.250
117	9.75	0.70	0.319	0.069	(0.287)	0.251
118	9.83	0.73	0.334	0.068	(0.301)	0.266
119	9.92	0.73	0.334	0.068	(0.301)	0.267
120	10.00	0.73	0.334	0.068	(0.301)	0.267
121	10.08	0.50	0.228	0.067	(0.205)	0.161
122	10.17	0.50	0.228	0.067	(0.205)	0.161
123	10.25	0.50	0.228	0.067	(0.205)	0.161
124	10.33	0.50	0.228	0.066	(0.205)	0.162
125	10.42	0.50	0.228	0.066	(0.205)	0.162
126	10.50	0.50	0.228	0.066	(0.205)	0.162
127	10.58	0.67	0.304	0.065	(0.274)	0.239
128	10.67	0.67	0.304	0.065	(0.274)	0.239
129	10.75	0.67	0.304	0.065	(0.274)	0.239
130	10.83	0.67	0.304	0.064	(0.274)	0.240
131	10.92	0.67	0.304	0.064	(0.274)	0.240
132	11.00	0.67	0.304	0.064	(0.274)	0.240
133	11.08	0.63	0.289	0.063	(0.260)	0.225
134	11.17	0.63	0.289	0.063	(0.260)	0.226
135	11.25	0.63	0.289	0.063	(0.260)	0.226
136	11.33	0.63	0.289	0.062	(0.260)	0.226
137	11.42	0.63	0.289	0.062	(0.260)	0.227
138	11.50	0.63	0.289	0.062	(0.260)	0.227
139	11.58	0.57	0.258	0.062	(0.233)	0.197
140	11.67	0.57	0.258	0.061	(0.233)	0.197
141	11.75	0.57	0.258	0.061	(0.233)	0.197
142	11.83	0.60	0.274	0.061	(0.246)	0.213
143	11.92	0.60	0.274	0.060	(0.246)	0.213
144	12.00	0.60	0.274	0.060	(0.246)	0.214
145	12.08	0.83	0.380	0.060	(0.342)	0.320
146	12.17	0.83	0.380	0.059	(0.342)	0.321
147	12.25	0.83	0.380	0.059	(0.342)	0.321
148	12.33	0.87	0.395	0.059	(0.356)	0.336
149	12.42	0.87	0.395	0.059	(0.356)	0.337
150	12.50	0.87	0.395	0.058	(0.356)	0.337
151	12.58	0.93	0.426	0.058	(0.383)	0.368
152	12.67	0.93	0.426	0.058	(0.383)	0.368
153	12.75	0.93	0.426	0.057	(0.383)	0.368
154	12.83	0.97	0.441	0.057	(0.397)	0.384
155	12.92	0.97	0.441	0.057	(0.397)	0.384
156	13.00	0.97	0.441	0.056	(0.397)	0.384
157	13.08	1.13	0.517	0.056	(0.465)	0.461
158	13.17	1.13	0.517	0.056	(0.465)	0.461

159	13.25	1.13	0.517	0.056	(0.465)	0.461
160	13.33	1.13	0.517	0.055	(0.465)	0.461
161	13.42	1.13	0.517	0.055	(0.465)	0.462
162	13.50	1.13	0.517	0.055	(0.465)	0.462
163	13.58	0.77	0.350	0.055	(0.315)	0.295
164	13.67	0.77	0.350	0.054	(0.315)	0.295
165	13.75	0.77	0.350	0.054	(0.315)	0.296
166	13.83	0.77	0.350	0.054	(0.315)	0.296
167	13.92	0.77	0.350	0.053	(0.315)	0.296
168	14.00	0.77	0.350	0.053	(0.315)	0.296
169	14.08	0.90	0.410	0.053	(0.369)	0.358
170	14.17	0.90	0.410	0.053	(0.369)	0.358
171	14.25	0.90	0.410	0.052	(0.369)	0.358
172	14.33	0.87	0.395	0.052	(0.356)	0.343
173	14.42	0.87	0.395	0.052	(0.356)	0.343
174	14.50	0.87	0.395	0.052	(0.356)	0.344
175	14.58	0.87	0.395	0.051	(0.356)	0.344
176	14.67	0.87	0.395	0.051	(0.356)	0.344
177	14.75	0.87	0.395	0.051	(0.356)	0.344
178	14.83	0.83	0.380	0.050	(0.342)	0.330
179	14.92	0.83	0.380	0.050	(0.342)	0.330
180	15.00	0.83	0.380	0.050	(0.342)	0.330
181	15.08	0.80	0.365	0.050	(0.328)	0.315
182	15.17	0.80	0.365	0.049	(0.328)	0.315
183	15.25	0.80	0.365	0.049	(0.328)	0.316
184	15.33	0.77	0.350	0.049	(0.315)	0.301
185	15.42	0.77	0.350	0.049	(0.315)	0.301
186	15.50	0.77	0.350	0.048	(0.315)	0.301
187	15.58	0.63	0.289	0.048	(0.260)	0.241
188	15.67	0.63	0.289	0.048	(0.260)	0.241
189	15.75	0.63	0.289	0.048	(0.260)	0.241
190	15.83	0.63	0.289	0.047	(0.260)	0.241
191	15.92	0.63	0.289	0.047	(0.260)	0.242
192	16.00	0.63	0.289	0.047	(0.260)	0.242
193	16.08	0.13	0.061	0.047	(0.055)	0.014
194	16.17	0.13	0.061	0.046	(0.055)	0.014
195	16.25	0.13	0.061	0.046	(0.055)	0.015
196	16.33	0.13	0.061	0.046	(0.055)	0.015
197	16.42	0.13	0.061	0.046	(0.055)	0.015
198	16.50	0.13	0.061	0.046	(0.055)	0.015
199	16.58	0.10	0.046	(0.045)	0.041	0.005
200	16.67	0.10	0.046	(0.045)	0.041	0.005
201	16.75	0.10	0.046	(0.045)	0.041	0.005
202	16.83	0.10	0.046	(0.045)	0.041	0.005

203	16.92	0.10	0.046	(0.044)	0.041	0.005
204	17.00	0.10	0.046	(0.044)	0.041	0.005
205	17.08	0.17	0.076	0.044	(0.068)	0.032
206	17.17	0.17	0.076	0.044	(0.068)	0.032
207	17.25	0.17	0.076	0.044	(0.068)	0.032
208	17.33	0.17	0.076	0.043	(0.068)	0.033
209	17.42	0.17	0.076	0.043	(0.068)	0.033
210	17.50	0.17	0.076	0.043	(0.068)	0.033
211	17.58	0.17	0.076	0.043	(0.068)	0.033
212	17.67	0.17	0.076	0.042	(0.068)	0.034
213	17.75	0.17	0.076	0.042	(0.068)	0.034
214	17.83	0.13	0.061	0.042	(0.055)	0.019
215	17.92	0.13	0.061	0.042	(0.055)	0.019
216	18.00	0.13	0.061	0.042	(0.055)	0.019
217	18.08	0.13	0.061	0.041	(0.055)	0.019
218	18.17	0.13	0.061	0.041	(0.055)	0.020
219	18.25	0.13	0.061	0.041	(0.055)	0.020
220	18.33	0.13	0.061	0.041	(0.055)	0.020
221	18.42	0.13	0.061	0.041	(0.055)	0.020
222	18.50	0.13	0.061	0.040	(0.055)	0.020
223	18.58	0.10	0.046	0.040	(0.041)	0.005
224	18.67	0.10	0.046	0.040	(0.041)	0.006
225	18.75	0.10	0.046	0.040	(0.041)	0.006
226	18.83	0.07	0.030	(0.040)	0.027	0.003
227	18.92	0.07	0.030	(0.039)	0.027	0.003
228	19.00	0.07	0.030	(0.039)	0.027	0.003
229	19.08	0.10	0.046	0.039	(0.041)	0.007
230	19.17	0.10	0.046	0.039	(0.041)	0.007
231	19.25	0.10	0.046	0.039	(0.041)	0.007
232	19.33	0.13	0.061	0.039	(0.055)	0.022
233	19.42	0.13	0.061	0.038	(0.055)	0.022
234	19.50	0.13	0.061	0.038	(0.055)	0.023
235	19.58	0.10	0.046	0.038	(0.041)	0.008
236	19.67	0.10	0.046	0.038	(0.041)	0.008
237	19.75	0.10	0.046	0.038	(0.041)	0.008
238	19.83	0.07	0.030	(0.037)	0.027	0.003
239	19.92	0.07	0.030	(0.037)	0.027	0.003
240	20.00	0.07	0.030	(0.037)	0.027	0.003
241	20.08	0.10	0.046	0.037	(0.041)	0.009
242	20.17	0.10	0.046	0.037	(0.041)	0.009
243	20.25	0.10	0.046	0.037	(0.041)	0.009
244	20.33	0.10	0.046	0.036	(0.041)	0.009
245	20.42	0.10	0.046	0.036	(0.041)	0.009
246	20.50	0.10	0.046	0.036	(0.041)	0.009

247	20.58	0.10	0.046	0.036	(0.041)	0.010
248	20.67	0.10	0.046	0.036	(0.041)	0.010
249	20.75	0.10	0.046	0.036	(0.041)	0.010
250	20.83	0.07	0.030	(0.036)	0.027	0.003
251	20.92	0.07	0.030	(0.035)	0.027	0.003
252	21.00	0.07	0.030	(0.035)	0.027	0.003
253	21.08	0.10	0.046	0.035	(0.041)	0.010
254	21.17	0.10	0.046	0.035	(0.041)	0.011
255	21.25	0.10	0.046	0.035	(0.041)	0.011
256	21.33	0.07	0.030	(0.035)	0.027	0.003
257	21.42	0.07	0.030	(0.035)	0.027	0.003
258	21.50	0.07	0.030	(0.034)	0.027	0.003
259	21.58	0.10	0.046	0.034	(0.041)	0.011
260	21.67	0.10	0.046	0.034	(0.041)	0.011
261	21.75	0.10	0.046	0.034	(0.041)	0.011
262	21.83	0.07	0.030	(0.034)	0.027	0.003
263	21.92	0.07	0.030	(0.034)	0.027	0.003
264	22.00	0.07	0.030	(0.034)	0.027	0.003
265	22.08	0.10	0.046	0.034	(0.041)	0.012
266	22.17	0.10	0.046	0.034	(0.041)	0.012
267	22.25	0.10	0.046	0.033	(0.041)	0.012
268	22.33	0.07	0.030	(0.033)	0.027	0.003
269	22.42	0.07	0.030	(0.033)	0.027	0.003
270	22.50	0.07	0.030	(0.033)	0.027	0.003
271	22.58	0.07	0.030	(0.033)	0.027	0.003
272	22.67	0.07	0.030	(0.033)	0.027	0.003
273	22.75	0.07	0.030	(0.033)	0.027	0.003
274	22.83	0.07	0.030	(0.033)	0.027	0.003
275	22.92	0.07	0.030	(0.033)	0.027	0.003
276	23.00	0.07	0.030	(0.033)	0.027	0.003
277	23.08	0.07	0.030	(0.033)	0.027	0.003
278	23.17	0.07	0.030	(0.032)	0.027	0.003
279	23.25	0.07	0.030	(0.032)	0.027	0.003
280	23.33	0.07	0.030	(0.032)	0.027	0.003
281	23.42	0.07	0.030	(0.032)	0.027	0.003
282	23.50	0.07	0.030	(0.032)	0.027	0.003
283	23.58	0.07	0.030	(0.032)	0.027	0.003
284	23.67	0.07	0.030	(0.032)	0.027	0.003
285	23.75	0.07	0.030	(0.032)	0.027	0.003
286	23.83	0.07	0.030	(0.032)	0.027	0.003
287	23.92	0.07	0.030	(0.032)	0.027	0.003
288	24.00	0.07	0.030	(0.032)	0.027	0.003
			(Loss Rate Not Used)			
Sum =		100.0		Sum =		29.8

Flood volume = Effective rainfall 2.49(In)
times area 3.0(Ac.)/[(In)/(Ft.)] = 0.6(Ac.Ft)
Total soil loss = 1.31(In)
Total soil loss = 0.329(Ac.Ft)
Total rainfall = 3.80(In)
Flood volume = 27062.1 Cubic Feet
Total soil loss = 14319.6 Cubic Feet

Peak flow rate of this hydrograph = 1.397(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0000	0.00 Q	|	|	|	|	
0+10	0.0001	0.01 Q	|	|	|	|	
0+15	0.0001	0.01 Q	|	|	|	|	
0+20	0.0002	0.01 Q	|	|	|	|	
0+25	0.0003	0.01 Q	|	|	|	|	
0+30	0.0004	0.01 Q	|	|	|	|	
0+35	0.0005	0.01 Q	|	|	|	|	
0+40	0.0006	0.01 Q	|	|	|	|	
0+45	0.0007	0.01 Q	|	|	|	|	
0+50	0.0008	0.02 Q	|	|	|	|	
0+55	0.0009	0.02 Q	|	|	|	|	
1+ 0	0.0010	0.02 Q	|	|	|	|	
1+ 5	0.0011	0.02 Q	|	|	|	|	
1+10	0.0012	0.01 Q	|	|	|	|	
1+15	0.0013	0.01 Q	|	|	|	|	
1+20	0.0014	0.01 Q	|	|	|	|	
1+25	0.0015	0.01 Q	|	|	|	|	
1+30	0.0016	0.01 Q	|	|	|	|	
1+35	0.0017	0.01 Q	|	|	|	|	
1+40	0.0018	0.01 Q	|	|	|	|	
1+45	0.0019	0.01 Q	|	|	|	|	
1+50	0.0020	0.02 Q	|	|	|	|	
1+55	0.0021	0.02 Q	|	|	|	|	
2+ 0	0.0023	0.02 Q	|	|	|	|	
2+ 5	0.0024	0.02 Q	|	|	|	|	

2+10	0.0025	0.02	Q	|	|	|	|
2+15	0.0026	0.02	Q	|	|	|	|
2+20	0.0028	0.02	Q	|	|	|	|
2+25	0.0029	0.02	Q	|	|	|	|
2+30	0.0030	0.02	Q	|	|	|	|
2+35	0.0032	0.02	Q	|	|	|	|
2+40	0.0033	0.02	Q	|	|	|	|
2+45	0.0035	0.02	Q	|	|	|	|
2+50	0.0036	0.02	Q	|	|	|	|
2+55	0.0038	0.02	Q	|	|	|	|
3+ 0	0.0040	0.02	Q	|	|	|	|
3+ 5	0.0041	0.02	Q	|	|	|	|
3+10	0.0043	0.02	Q	|	|	|	|
3+15	0.0044	0.02	Q	|	|	|	|
3+20	0.0046	0.02	Q	|	|	|	|
3+25	0.0047	0.02	Q	|	|	|	|
3+30	0.0049	0.02	Q	|	|	|	|
3+35	0.0051	0.02	Q	|	|	|	|
3+40	0.0052	0.02	Q	|	|	|	|
3+45	0.0054	0.02	Q	|	|	|	|
3+50	0.0055	0.02	Q	|	|	|	|
3+55	0.0057	0.03	Q	|	|	|	|
4+ 0	0.0059	0.03	Q	|	|	|	|
4+ 5	0.0061	0.03	Q	|	|	|	|
4+10	0.0063	0.03	Q	|	|	|	|
4+15	0.0065	0.03	Q	|	|	|	|
4+20	0.0067	0.03	Q	|	|	|	|
4+25	0.0070	0.04	Q	|	|	|	|
4+30	0.0073	0.04	Q	|	|	|	|
4+35	0.0076	0.05	Q	|	|	|	|
4+40	0.0079	0.05	Q	|	|	|	|
4+45	0.0083	0.05	Q	|	|	|	|
4+50	0.0087	0.07	Q	|	|	|	|
4+55	0.0093	0.09	Q	|	|	|	|
5+ 0	0.0100	0.09	Q	|	|	|	|
5+ 5	0.0105	0.07	Q	|	|	|	|
5+10	0.0107	0.04	Q	|	|	|	|
5+15	0.0110	0.03	Q	|	|	|	|
5+20	0.0112	0.04	Q	|	|	|	|
5+25	0.0116	0.05	Q	|	|	|	|
5+30	0.0120	0.06	Q	|	|	|	|
5+35	0.0125	0.08	Q	|	|	|	|
5+40	0.0132	0.10	Q	|	|	|	|
5+45	0.0139	0.11	Q	|	|	|	|

5+50	0.0147	0.11	Q	|	|	|	|
5+55	0.0155	0.11	Q	|	|	|	|
6+ 0	0.0162	0.11	QV	|	|	|	|
6+ 5	0.0171	0.13	QV	|	|	|	|
6+10	0.0182	0.15	QV	|	|	|	|
6+15	0.0193	0.16	QV	|	|	|	|
6+20	0.0204	0.16	QV	|	|	|	|
6+25	0.0215	0.16	QV	|	|	|	|
6+30	0.0226	0.16	QV	|	|	|	|
6+35	0.0239	0.18	QV	|	|	|	|
6+40	0.0253	0.21	QV	|	|	|	|
6+45	0.0267	0.21	QV	|	|	|	|
6+50	0.0282	0.21	QV	|	|	|	|
6+55	0.0297	0.22	QV	|	|	|	|
7+ 0	0.0312	0.22	Q V	|	|	|	|
7+ 5	0.0327	0.22	Q V	|	|	|	|
7+10	0.0342	0.22	Q V	|	|	|	|
7+15	0.0357	0.22	Q V	|	|	|	|
7+20	0.0374	0.24	Q V	|	|	|	|
7+25	0.0392	0.26	|QV	|	|	|	|
7+30	0.0410	0.27	|QV	|	|	|	|
7+35	0.0430	0.29	|QV	|	|	|	|
7+40	0.0451	0.31	|QV	|	|	|	|
7+45	0.0473	0.32	|Q V	|	|	|	|
7+50	0.0496	0.34	|Q V	|	|	|	|
7+55	0.0521	0.36	|Q V	|	|	|	|
8+ 0	0.0546	0.37	|Q V	|	|	|	|
8+ 5	0.0574	0.40	|Q V	|	|	|	|
8+10	0.0605	0.45	|Q V	|	|	|	|
8+15	0.0636	0.46	|Q V	|	|	|	|
8+20	0.0668	0.46	|Q V	|	|	|	|
8+25	0.0700	0.47	|Q V	|	|	|	|
8+30	0.0732	0.47	|Q V	|	|	|	|
8+35	0.0766	0.49	|Q V	|	|	|	|
8+40	0.0800	0.51	| Q V	|	|	|	|
8+45	0.0836	0.51	| Q V	|	|	|	|
8+50	0.0873	0.53	| Q V	|	|	|	|
8+55	0.0911	0.56	| Q V	|	|	|	|
9+ 0	0.0949	0.56	| Q V	|	|	|	|
9+ 5	0.0991	0.60	| Q V	|	|	|	|
9+10	0.1035	0.64	| Q V	|	|	|	|
9+15	0.1080	0.65	| Q V	|	|	|	|
9+20	0.1127	0.68	| Q V	|	|	|	|
9+25	0.1175	0.70	| Q V	|	|	|	|

9+30	0.1224	0.71	| Q	V |	|	|	|
9+35	0.1274	0.73	| Q	V |	|	|	|
9+40	0.1325	0.75	| Q	V |	|	|	|
9+45	0.1377	0.75	| Q	V |	|	|	|
9+50	0.1431	0.78	| Q	V|	|	|	|
9+55	0.1486	0.80	| Q	V|	|	|	|
10+ 0	0.1541	0.80	| Q	V|	|	|	|
10+ 5	0.1588	0.68	| Q	V	|	|	|
10+10	0.1625	0.54	| Q	V	|	|	|
10+15	0.1660	0.51	| Q	V	|	|	|
10+20	0.1694	0.50	|Q	V	|	|	|
10+25	0.1728	0.49	|Q	|V	|	|	|
10+30	0.1761	0.49	|Q	|V	|	|	|
10+35	0.1801	0.58	| Q	|V	|	|	|
10+40	0.1849	0.69	| Q	|V	|	|	|
10+45	0.1897	0.71	| Q	| V	|	|	|
10+50	0.1947	0.72	| Q	| V	|	|	|
10+55	0.1997	0.73	| Q	| V	|	|	|
11+ 0	0.2047	0.73	| Q	| V	|	|	|
11+ 5	0.2096	0.71	| Q	| V	|	|	|
11+10	0.2143	0.69	| Q	| V	|	|	|
11+15	0.2190	0.69	| Q	| V	|	|	|
11+20	0.2238	0.68	| Q	| V	|	|	|
11+25	0.2285	0.68	| Q	| V	|	|	|
11+30	0.2332	0.69	| Q	| V	|	|	|
11+35	0.2377	0.65	| Q	| V	|	|	|
11+40	0.2419	0.61	| Q	| V	|	|	|
11+45	0.2460	0.60	| Q	| V	|	|	|
11+50	0.2503	0.62	| Q	| V	|	|	|
11+55	0.2547	0.64	| Q	| V	|	|	|
12+ 0	0.2591	0.64	| Q	| V	|	|	|
12+ 5	0.2644	0.77	| Q	| V	|	|	|
12+10	0.2707	0.92	| Q	| V	|	|	|
12+15	0.2773	0.95	| Q	| V	|	|	|
12+20	0.2840	0.98	| Q	| V |	|	|	|
12+25	0.2910	1.01	| Q	| V |	|	|	|
12+30	0.2980	1.02	| Q	| V|	|	|	|
12+35	0.3053	1.05	| Q	| V|	|	|	|
12+40	0.3128	1.10	| Q	| V	|	|	|
12+45	0.3204	1.11	| Q	| V	|	|	|
12+50	0.3282	1.13	| Q	| |V	|	|	|
12+55	0.3362	1.15	| Q	| |V	|	|	|
13+ 0	0.3441	1.16	| Q	| | V	|	|	|
13+ 5	0.3528	1.25	| Q	| | V	|	|	|

13+10	0.3621	1.36	Q		V		
13+15	0.3716	1.38	Q		V		
13+20	0.3812	1.39	Q		V		
13+25	0.3908	1.40	Q		V		
13+30	0.4004	1.40	Q		V		
13+35	0.4087	1.20	Q		V		
13+40	0.4154	0.97	Q		V		
13+45	0.4218	0.92	Q		V		
13+50	0.4280	0.90	Q		V		
13+55	0.4342	0.90	Q		V		
14+ 0	0.4403	0.90	Q		V		
14+ 5	0.4470	0.97	Q		V		
14+10	0.4543	1.05	Q		V		
14+15	0.4616	1.07	Q		V		
14+20	0.4689	1.06	Q		V		
14+25	0.4761	1.05	Q		V		
14+30	0.4833	1.04	Q		V		
14+35	0.4905	1.04	Q		V		
14+40	0.4977	1.04	Q		V		
14+45	0.5048	1.04	Q		V		
14+50	0.5119	1.02	Q		V		
14+55	0.5188	1.00	Q		V		
15+ 0	0.5257	1.00	Q		V		
15+ 5	0.5324	0.98	Q		V		
15+10	0.5391	0.96	Q		V		
15+15	0.5457	0.96	Q		V		
15+20	0.5521	0.94	Q		V		
15+25	0.5584	0.92	Q		V		
15+30	0.5647	0.91	Q		V		
15+35	0.5705	0.84	Q		V		
15+40	0.5757	0.76	Q		V		
15+45	0.5808	0.74	Q		V		
15+50	0.5859	0.73	Q		V		
15+55	0.5909	0.73	Q		V		
16+ 0	0.5959	0.73	Q		V		
16+ 5	0.5991	0.46	Q		V		
16+10	0.6002	0.15	Q		V		
16+15	0.6008	0.09	Q		V		
16+20	0.6012	0.06	Q		V		
16+25	0.6015	0.04	Q		V		
16+30	0.6018	0.05	Q		V		
16+35	0.6020	0.03	Q		V		
16+40	0.6021	0.02	Q		V		
16+45	0.6022	0.02	Q		V		

16+50	0.6023	0.01	Q	|	|	V |
16+55	0.6024	0.01	Q	|	|	V |
17+ 0	0.6025	0.01	Q	|	|	V |
17+ 5	0.6029	0.05	Q	|	|	V |
17+10	0.6034	0.08	Q	|	|	V |
17+15	0.6041	0.09	Q	|	|	V |
17+20	0.6047	0.10	Q	|	|	V |
17+25	0.6054	0.10	Q	|	|	V |
17+30	0.6061	0.10	Q	|	|	V|
17+35	0.6068	0.10	Q	|	|	V|
17+40	0.6075	0.10	Q	|	|	V|
17+45	0.6082	0.10	Q	|	|	V|
17+50	0.6088	0.08	Q	|	|	V|
17+55	0.6092	0.06	Q	|	|	V|
18+ 0	0.6096	0.06	Q	|	|	V|
18+ 5	0.6100	0.06	Q	|	|	V|
18+10	0.6104	0.06	Q	|	|	V|
18+15	0.6108	0.06	Q	|	|	V|
18+20	0.6113	0.06	Q	|	|	V|
18+25	0.6117	0.06	Q	|	|	V|
18+30	0.6121	0.06	Q	|	|	V|
18+35	0.6124	0.04	Q	|	|	V|
18+40	0.6126	0.02	Q	|	|	V|
18+45	0.6127	0.02	Q	|	|	V|
18+50	0.6128	0.02	Q	|	|	V|
18+55	0.6129	0.01	Q	|	|	V|
19+ 0	0.6129	0.01	Q	|	|	V|
19+ 5	0.6130	0.01	Q	|	|	V|
19+10	0.6132	0.02	Q	|	|	V|
19+15	0.6133	0.02	Q	|	|	V|
19+20	0.6136	0.04	Q	|	|	V|
19+25	0.6140	0.06	Q	|	|	V|
19+30	0.6144	0.07	Q	|	|	V|
19+35	0.6148	0.05	Q	|	|	V|
19+40	0.6150	0.03	Q	|	|	V|
19+45	0.6152	0.03	Q	|	|	V|
19+50	0.6153	0.02	Q	|	|	V|
19+55	0.6154	0.01	Q	|	|	V|
20+ 0	0.6154	0.01	Q	|	|	V|
20+ 5	0.6156	0.02	Q	|	|	V|
20+10	0.6157	0.02	Q	|	|	V|
20+15	0.6159	0.03	Q	|	|	V|
20+20	0.6161	0.03	Q	|	|	V|
20+25	0.6163	0.03	Q	|	|	V|

20+30	0.6165	0.03	Q	|	|	| V|
20+35	0.6167	0.03	Q	|	|	| V|
20+40	0.6169	0.03	Q	|	|	| V|
20+45	0.6171	0.03	Q	|	|	| V|
20+50	0.6172	0.02	Q	|	|	| V|
20+55	0.6173	0.01	Q	|	|	| V|
21+ 0	0.6174	0.01	Q	|	|	| V|
21+ 5	0.6175	0.02	Q	|	|	| V|
21+10	0.6177	0.03	Q	|	|	| V|
21+15	0.6179	0.03	Q	|	|	| V|
21+20	0.6181	0.02	Q	|	|	| V|
21+25	0.6181	0.01	Q	|	|	| V|
21+30	0.6182	0.01	Q	|	|	| V|
21+35	0.6184	0.02	Q	|	|	| V|
21+40	0.6186	0.03	Q	|	|	| V|
21+45	0.6188	0.03	Q	|	|	| V|
21+50	0.6190	0.02	Q	|	|	| V|
21+55	0.6190	0.01	Q	|	|	| V|
22+ 0	0.6191	0.01	Q	|	|	| V|
22+ 5	0.6193	0.02	Q	|	|	| V|
22+10	0.6195	0.03	Q	|	|	| V|
22+15	0.6197	0.03	Q	|	|	| V|
22+20	0.6199	0.03	Q	|	|	| V|
22+25	0.6200	0.01	Q	|	|	| V|
22+30	0.6201	0.01	Q	|	|	| V|
22+35	0.6201	0.01	Q	|	|	| V|
22+40	0.6202	0.01	Q	|	|	| V|
22+45	0.6203	0.01	Q	|	|	| V|
22+50	0.6203	0.01	Q	|	|	| V|
22+55	0.6204	0.01	Q	|	|	| V|
23+ 0	0.6204	0.01	Q	|	|	| V|
23+ 5	0.6205	0.01	Q	|	|	| V|
23+10	0.6206	0.01	Q	|	|	| V|
23+15	0.6206	0.01	Q	|	|	| V|
23+20	0.6207	0.01	Q	|	|	| V|
23+25	0.6208	0.01	Q	|	|	| V|
23+30	0.6208	0.01	Q	|	|	| V|
23+35	0.6209	0.01	Q	|	|	| V|
23+40	0.6210	0.01	Q	|	|	| V|
23+45	0.6210	0.01	Q	|	|	| V|
23+50	0.6211	0.01	Q	|	|	| V|
23+55	0.6211	0.01	Q	|	|	| V|
24+ 0	0.6212	0.01	Q	|	|	| V|
24+ 5	0.6212	0.01	Q	|	|	| V|

24+10	0.6213	0.00	Q	|	|	|	V|
24+15	0.6213	0.00	Q	|	|	|	V|
24+20	0.6213	0.00	Q	|	|	|	V

Unit Hydrograph Analysis

Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2014, Version 9.0
Study date 05/21/18 File: 17380P100YR1HRC1100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 1 HOUR
AREA C

Drainage Area = 2.42(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.42(Ac.) = 0.004 Sq. Mi.
Length along longest watercourse = 658.00(Ft.)
Length along longest watercourse measured to centroid = 311.00(Ft.)
Length along longest watercourse = 0.125 Mi.
Length along longest watercourse measured to centroid = 0.059 Mi.
Difference in elevation = 5.13(Ft.)
Slope along watercourse = 41.1647 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.027 Hr.
Lag time = 1.65 Min.
25% of lag time = 0.41 Min.
40% of lag time = 0.66 Min.

Unit time = 5.00 Min.
Duration of storm = 1 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	0.40	0.97

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	1.10	2.66

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.400(In)
Area Averaged 100-Year Rainfall = 1.100(In)

Point rain (area averaged) = 1.100(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.100(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.420	69.00	0.900

Total Area Entered = 2.42(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Slope of intensity-duration curve for a 1 hour storm =0.5000

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	303.601	57.047	1.391
2	0.167	607.202	36.931	0.901
3	0.250	910.803	6.022	0.147
		Sum = 100.000	Sum=	2.439

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	4.20	0.554	0.037	(0.100)	0.518
2	0.17	4.30	0.568	0.037	(0.102)	0.531
3	0.25	5.00	0.660	0.037	(0.119)	0.623
4	0.33	5.00	0.660	0.037	(0.119)	0.623
5	0.42	5.80	0.766	0.037	(0.138)	0.729
6	0.50	6.50	0.858	0.037	(0.154)	0.821
7	0.58	7.40	0.977	0.037	(0.176)	0.940
8	0.67	8.60	1.135	0.037	(0.204)	1.098
9	0.75	12.30	1.624	0.037	(0.292)	1.587
10	0.83	29.10	3.841	0.037	(0.691)	3.804
11	0.92	6.80	0.898	0.037	(0.162)	0.861
12	1.00	5.00	0.660	0.037	(0.119)	0.623
			(Loss Rate Not Used)			
Sum =		100.0		Sum =		12.8

Flood volume = Effective rainfall 1.06(In)
times area 2.4(Ac.)/[(In)/(Ft.)] = 0.2(Ac.Ft)
Total soil loss = 0.04(In)
Total soil loss = 0.007(Ac.Ft)
Total rainfall = 1.10(In)
Flood volume = 9339.3 Cubic Feet
Total soil loss = 323.5 Cubic Feet

Peak flow rate of this hydrograph = 6.887(CFS)

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1-HOUR STORM

Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0 2.5 5.0 7.5 10.0
0+ 5	0.0050	0.72	V Q | | | |
0+10	0.0133	1.21	| V Q | | | |
0+15	0.0231	1.42	| VQ | | | |
0+20	0.0334	1.51	| Q | | | |
0+25	0.0449	1.67	| Q V | | | |
0+30	0.0579	1.89	| Q V | | |
0+35	0.0728	2.16	| Q | V | | |
0+40	0.0900	2.50	| Q| V | | |
0+45	0.1130	3.34	| | Q |V | |
0+50	0.1604	6.89	| | | Q V| |
0+55	0.1939	4.86	| | Q| | V |
1+ 0	0.2090	2.20	| Q | | | V |
1+ 5	0.2138	0.69	| Q | | | V|
1+10	0.2144	0.09	Q | | | V

Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR3HRC3100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 3 HOUR
AREA C

Drainage Area = 2.42(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.42(Ac.) = 0.004 Sq. Mi.
Length along longest watercourse = 658.00(Ft.)
Length along longest watercourse measured to centroid = 311.00(Ft.)
Length along longest watercourse = 0.125 Mi.
Length along longest watercourse measured to centroid = 0.059 Mi.
Difference in elevation = 5.13(Ft.)
Slope along watercourse = 41.1647 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.027 Hr.
Lag time = 1.65 Min.
25% of lag time = 0.41 Min.
40% of lag time = 0.66 Min.

Unit time = 5.00 Min.
Duration of storm = 3 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	0.70	1.69

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	1.90	4.60

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 0.700(In)
Area Averaged 100-Year Rainfall = 1.900(In)

Point rain (area averaged) = 1.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 1.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.420	69.00	0.900

Total Area Entered = 2.42(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	303.601	57.047	1.391
2	0.167	607.202	36.931	0.901
3	0.250	910.803	6.022	0.147
		Sum = 100.000	Sum=	2.439

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	1.30	0.296	0.037	(0.053)	0.260
2	0.17	1.30	0.296	0.037	(0.053)	0.260
3	0.25	1.10	0.251	0.037	(0.045)	0.214
4	0.33	1.50	0.342	0.037	(0.062)	0.305
5	0.42	1.50	0.342	0.037	(0.062)	0.305
6	0.50	1.80	0.410	0.037	(0.074)	0.374
7	0.58	1.50	0.342	0.037	(0.062)	0.305
8	0.67	1.80	0.410	0.037	(0.074)	0.374
9	0.75	1.80	0.410	0.037	(0.074)	0.374
10	0.83	1.50	0.342	0.037	(0.062)	0.305
11	0.92	1.60	0.365	0.037	(0.066)	0.328
12	1.00	1.80	0.410	0.037	(0.074)	0.374
13	1.08	2.20	0.502	0.037	(0.090)	0.465
14	1.17	2.20	0.502	0.037	(0.090)	0.465
15	1.25	2.20	0.502	0.037	(0.090)	0.465
16	1.33	2.00	0.456	0.037	(0.082)	0.419
17	1.42	2.60	0.593	0.037	(0.107)	0.556
18	1.50	2.70	0.616	0.037	(0.111)	0.579
19	1.58	2.40	0.547	0.037	(0.098)	0.510
20	1.67	2.70	0.616	0.037	(0.111)	0.579
21	1.75	3.30	0.752	0.037	(0.135)	0.716
22	1.83	3.10	0.707	0.037	(0.127)	0.670
23	1.92	2.90	0.661	0.037	(0.119)	0.624
24	2.00	3.00	0.684	0.037	(0.123)	0.647
25	2.08	3.10	0.707	0.037	(0.127)	0.670
26	2.17	4.20	0.958	0.037	(0.172)	0.921
27	2.25	5.00	1.140	0.037	(0.205)	1.103
28	2.33	3.50	0.798	0.037	(0.144)	0.761

29	2.42	6.80	1.550	0.037	(0.279)	1.514
30	2.50	7.30	1.664	0.037	(0.300)	1.628
31	2.58	8.20	1.870	0.037	(0.337)	1.833
32	2.67	5.90	1.345	0.037	(0.242)	1.308
33	2.75	2.00	0.456	0.037	(0.082)	0.419
34	2.83	1.80	0.410	0.037	(0.074)	0.374
35	2.92	1.80	0.410	0.037	(0.074)	0.374
36	3.00	0.60	0.137	(0.037)	0.025	0.112

(Loss Rate Not Used)

Sum = 100.0 Sum = 21.5

Flood volume = Effective rainfall 1.79(In)
times area 2.4(Ac.)/[(In)/(Ft.)] = 0.4(Ac.Ft)
Total soil loss = 0.11(In)
Total soil loss = 0.022(Ac.Ft)
Total rainfall = 1.90(In)
Flood volume = 15728.9 Cubic Feet
Total soil loss = 961.7 Cubic Feet

Peak flow rate of this hydrograph = 4.240(CFS)

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3-HOUR STORM
Runoff Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0025	0.36	VQ				
0+10	0.0066	0.60	V Q				
0+15	0.0105	0.57	|VQ				
0+20	0.0150	0.66	|VQ				
0+25	0.0201	0.73	| Q				
0+30	0.0258	0.84	| VQ				
0+35	0.0314	0.81	| Q				
0+40	0.0373	0.85	| QV				
0+45	0.0435	0.90	| QV				
0+50	0.0491	0.82	| Q V				
0+55	0.0545	0.79	| Q V				
1+ 0	0.0604	0.86	| Q V				
1+ 5	0.0675	1.03	| Q V				
1+10	0.0753	1.12	| Q V|				
1+15	0.0831	1.13	| Q V|				

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1+20    0.0904    1.07 |  Q   V      |      |      |
1+25    0.0988    1.22 |  Q   V      |      |      |
1+30    0.1083    1.37 |  Q  |V      |      |      |
1+35    0.1173    1.31 |  Q  | V     |      |      |
1+40    0.1266    1.35 |  Q  |  V    |      |      |
1+45    0.1376    1.59 |  Q  |  V    |      |      |
1+50    0.1490    1.66 |  Q  |  V    |      |      |
1+55    0.1599    1.58 |  Q  |   V   |      |      |
2+ 0    0.1707    1.56 |  Q  |   V   |      |      |
2+ 5    0.1817    1.61 |  Q  |    V  |      |      |
2+10    0.1954    1.98 |  Q  |     |V      |      |
2+15    0.2123    2.46 |  Q  |     | V     |      |
2+20    0.2274    2.19 |  Q  |     |  V    |      |
2+25    0.2478    2.95 |     |Q    |   V   |      |
2+30    0.2735    3.74 |     |  Q  |    V  |      |
2+35    0.3027    4.24 |     |  Q  |     | V    |
2+40    0.3283    3.71 |     |  Q  |     |   V  |
2+45    0.3423    2.03 |  Q  |     |     |    V |
2+50    0.3498    1.09 |  Q  |     |     |     V|
2+55    0.3561    0.92 |  Q  |     |     |     V|
3+ 0    0.3599    0.55 |Q    |     |     |     V|
3+ 5    0.3610    0.16 Q      |     |     |     V|
3+10    0.3611    0.02 Q      |     |     |      V
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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380100YR6HRC6100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 6 HOUR
AREA C

Drainage Area = 2.42(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.42(Ac.) = 0.004 Sq. Mi.
Length along longest watercourse = 658.00(Ft.)
Length along longest watercourse measured to centroid = 311.00(Ft.)
Length along longest watercourse = 0.125 Mi.
Length along longest watercourse measured to centroid = 0.059 Mi.
Difference in elevation = 5.13(Ft.)
Slope along watercourse = 41.1647 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.027 Hr.
Lag time = 1.65 Min.
25% of lag time = 0.41 Min.
40% of lag time = 0.66 Min.

Unit time = 5.00 Min.
Duration of storm = 6 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	1.00	2.42

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	2.50	6.05

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.000(In)
Area Averaged 100-Year Rainfall = 2.500(In)

Point rain (area averaged) = 2.500(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 2.500(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.420	69.00	0.900

Total Area Entered = 2.42(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

U n i t H y d r o g r a p h
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	303.601	57.047	1.391
2	0.167	607.202	36.931	0.901
3	0.250	910.803	6.022	0.147
		Sum = 100.000	Sum=	2.439

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.50	0.150	(0.037)	0.027	0.123
2	0.17	0.60	0.180	(0.037)	0.032	0.148
3	0.25	0.60	0.180	(0.037)	0.032	0.148
4	0.33	0.60	0.180	(0.037)	0.032	0.148
5	0.42	0.60	0.180	(0.037)	0.032	0.148
6	0.50	0.70	0.210	0.037	(0.038)	0.173
7	0.58	0.70	0.210	0.037	(0.038)	0.173
8	0.67	0.70	0.210	0.037	(0.038)	0.173
9	0.75	0.70	0.210	0.037	(0.038)	0.173
10	0.83	0.70	0.210	0.037	(0.038)	0.173
11	0.92	0.70	0.210	0.037	(0.038)	0.173
12	1.00	0.80	0.240	0.037	(0.043)	0.203
13	1.08	0.80	0.240	0.037	(0.043)	0.203
14	1.17	0.80	0.240	0.037	(0.043)	0.203
15	1.25	0.80	0.240	0.037	(0.043)	0.203
16	1.33	0.80	0.240	0.037	(0.043)	0.203
17	1.42	0.80	0.240	0.037	(0.043)	0.203
18	1.50	0.80	0.240	0.037	(0.043)	0.203
19	1.58	0.80	0.240	0.037	(0.043)	0.203
20	1.67	0.80	0.240	0.037	(0.043)	0.203
21	1.75	0.80	0.240	0.037	(0.043)	0.203
22	1.83	0.80	0.240	0.037	(0.043)	0.203
23	1.92	0.80	0.240	0.037	(0.043)	0.203
24	2.00	0.90	0.270	0.037	(0.049)	0.233
25	2.08	0.80	0.240	0.037	(0.043)	0.203
26	2.17	0.90	0.270	0.037	(0.049)	0.233
27	2.25	0.90	0.270	0.037	(0.049)	0.233
28	2.33	0.90	0.270	0.037	(0.049)	0.233

29	2.42	0.90	0.270	0.037	(0.049)	0.233
30	2.50	0.90	0.270	0.037	(0.049)	0.233
31	2.58	0.90	0.270	0.037	(0.049)	0.233
32	2.67	0.90	0.270	0.037	(0.049)	0.233
33	2.75	1.00	0.300	0.037	(0.054)	0.263
34	2.83	1.00	0.300	0.037	(0.054)	0.263
35	2.92	1.00	0.300	0.037	(0.054)	0.263
36	3.00	1.00	0.300	0.037	(0.054)	0.263
37	3.08	1.00	0.300	0.037	(0.054)	0.263
38	3.17	1.10	0.330	0.037	(0.059)	0.293
39	3.25	1.10	0.330	0.037	(0.059)	0.293
40	3.33	1.10	0.330	0.037	(0.059)	0.293
41	3.42	1.20	0.360	0.037	(0.065)	0.323
42	3.50	1.30	0.390	0.037	(0.070)	0.353
43	3.58	1.40	0.420	0.037	(0.076)	0.383
44	3.67	1.40	0.420	0.037	(0.076)	0.383
45	3.75	1.50	0.450	0.037	(0.081)	0.413
46	3.83	1.50	0.450	0.037	(0.081)	0.413
47	3.92	1.60	0.480	0.037	(0.086)	0.443
48	4.00	1.60	0.480	0.037	(0.086)	0.443
49	4.08	1.70	0.510	0.037	(0.092)	0.473
50	4.17	1.80	0.540	0.037	(0.097)	0.503
51	4.25	1.90	0.570	0.037	(0.103)	0.533
52	4.33	2.00	0.600	0.037	(0.108)	0.563
53	4.42	2.10	0.630	0.037	(0.113)	0.593
54	4.50	2.10	0.630	0.037	(0.113)	0.593
55	4.58	2.20	0.660	0.037	(0.119)	0.623
56	4.67	2.30	0.690	0.037	(0.124)	0.653
57	4.75	2.40	0.720	0.037	(0.130)	0.683
58	4.83	2.40	0.720	0.037	(0.130)	0.683
59	4.92	2.50	0.750	0.037	(0.135)	0.713
60	5.00	2.60	0.780	0.037	(0.140)	0.743
61	5.08	3.10	0.930	0.037	(0.167)	0.893
62	5.17	3.60	1.080	0.037	(0.194)	1.043
63	5.25	3.90	1.170	0.037	(0.211)	1.133
64	5.33	4.20	1.260	0.037	(0.227)	1.223
65	5.42	4.70	1.410	0.037	(0.254)	1.373
66	5.50	5.60	1.680	0.037	(0.302)	1.643
67	5.58	1.90	0.570	0.037	(0.103)	0.533
68	5.67	0.90	0.270	0.037	(0.049)	0.233
69	5.75	0.60	0.180	(0.037)	0.032	0.148
70	5.83	0.50	0.150	(0.037)	0.027	0.123
71	5.92	0.30	0.090	(0.037)	0.016	0.074
72	6.00	0.20	0.060	(0.037)	0.011	0.049

(Loss Rate Not Used)

Sum = 100.0 Sum = 27.4

Flood volume = Effective rainfall 2.29(In)
times area 2.4(Ac.)/[(In)/(Ft.)] = 0.5(Ac.Ft)
Total soil loss = 0.21(In)
Total soil loss = 0.043(Ac.Ft)
Total rainfall = 2.50(In)
Flood volume = 20084.9 Cubic Feet
Total soil loss = 1876.4 Cubic Feet

Peak flow rate of this hydrograph = 3.705(CFS)

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6 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0012	0.17	Q				
0+10	0.0034	0.32	VQ				
0+15	0.0058	0.36	VQ				
0+20	0.0083	0.36	VQ				
0+25	0.0108	0.36	VQ				
0+30	0.0135	0.40	Q				
0+35	0.0164	0.42	Q				
0+40	0.0193	0.42	Q				
0+45	0.0222	0.42	Q				
0+50	0.0251	0.42	QV				
0+55	0.0280	0.42	QV				
1+ 0	0.0312	0.46	QV				
1+ 5	0.0346	0.49	Q V				
1+10	0.0380	0.50	Q V				
1+15	0.0414	0.50	Q V				
1+20	0.0448	0.50	Q V				
1+25	0.0483	0.50	Q V				
1+30	0.0517	0.50	Q V				
1+35	0.0551	0.50	Q V				
1+40	0.0585	0.50	Q V				
1+45	0.0619	0.50	Q V				
1+50	0.0653	0.50	Q V				
1+55	0.0688	0.50	Q V				

```
2+ 0    0.0725    0.54 | Q  V |       |       |       |
2+ 5    0.0761    0.52 | Q  V |       |       |       |
2+10    0.0798    0.54 | Q  V |       |       |       |
2+15    0.0837    0.56 | Q   V|       |       |       |
2+20    0.0876    0.57 | Q   V|       |       |       |
2+25    0.0915    0.57 | Q   V|       |       |       |
2+30    0.0954    0.57 | Q    V       |       |       |
2+35    0.0993    0.57 | Q    V       |       |       |
2+40    0.1033    0.57 | Q    V       |       |       |
2+45    0.1075    0.61 | Q     V      |       |       |
2+50    0.1119    0.64 | Q     V      |       |       |
2+55    0.1163    0.64 | Q      V     |       |       |
3+ 0    0.1207    0.64 | Q      V     |       |       |
3+ 5    0.1251    0.64 | Q      V     |       |       |
3+10    0.1298    0.68 | Q     |V      |       |       |
3+15    0.1347    0.71 | Q     |V      |       |       |
3+20    0.1397    0.72 | Q     | V     |       |       |
3+25    0.1449    0.76 | Q     | V     |       |       |
3+30    0.1506    0.83 | Q     |  V    |       |       |
3+35    0.1568    0.90 | Q     |  V    |       |       |
3+40    0.1632    0.93 | Q     |   V   |       |       |
3+45    0.1699    0.98 | Q     |   V   |       |       |
3+50    0.1768    1.00 |  Q    |   V   |       |       |
3+55    0.1840    1.05 |  Q    |   V   |       |       |
4+ 0    0.1915    1.08 |  Q    |    V  |       |       |
4+ 5    0.1992    1.12 |  Q    |    V  |       |       |
4+10    0.2074    1.19 |  Q    |     V |       |       |
4+15    0.2161    1.27 |  Q    |     V |       |       |
4+20    0.2253    1.34 |  Q    |     V |       |       |
4+25    0.2351    1.41 |  Q    |      V       |       |
4+30    0.2450    1.44 |  Q    |      |V      |       |
4+35    0.2552    1.49 |  Q    |      | V     |       |
4+40    0.2660    1.56 |  Q    |      |  V    |       |
4+45    0.2772    1.63 |  Q    |      |   V   |       |
4+50    0.2887    1.66 |  Q    |      |    V  |       |
4+55    0.3004    1.71 |  Q    |      |    V  |       |
5+ 0    0.3127    1.78 |   Q   |      |    V  |       |
5+ 5    0.3266    2.02 |   Q   |      |    V  |       |
5+10    0.3429    2.37 |    Q  |      |     V |       |
5+15    0.3611    2.65 |     Q        |      |V      |
5+20    0.3809    2.88 |      |Q      |       | V     |
5+25    0.4028    3.18 |      | Q     |       |  V    |
5+30    0.4283    3.70 |      |  Q    |       |    V  |
5+35    0.4450    2.42 |     Q|       |       |     V |
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5+40     0.4522    1.05 |  Q   |       |       |      V|
5+45     0.4556    0.49 |Q     |       |       |      V|
5+50     0.4580    0.34 |Q     |       |       |      V|
5+55     0.4596    0.24 Q       |       |       |      V|
6+ 0     0.4607    0.15 Q       |       |       |      V|
6+ 5     0.4610    0.06 Q       |       |       |      V|
6+10     0.4611    0.01 Q       |       |       |      V
-------------------------------------------------------------------------
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Unit Hydrograph Analysis

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Study date 05/21/18 File: 17380P100YR24HRC24100.out

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Riverside County Synthetic Unit Hydrology Method
RCFC & WCD Manual date - April 1978

Program License Serial Number 6310

English (in-lb) Input Units Used
English Rainfall Data (Inches) Input Values Used

English Units used in output format

17-380
PROPOSED CONDITION
100 YEAR 24 HOUR
AREA C

Drainage Area = 2.42(Ac.) = 0.004 Sq. Mi.
Drainage Area for Depth-Area Areal Adjustment = 2.42(Ac.) = 0.004 Sq. Mi.
Length along longest watercourse = 658.00(Ft.)
Length along longest watercourse measured to centroid = 311.00(Ft.)
Length along longest watercourse = 0.125 Mi.
Length along longest watercourse measured to centroid = 0.059 Mi.
Difference in elevation = 5.13(Ft.)
Slope along watercourse = 41.1647 Ft./Mi.
Average Manning's 'N' = 0.015
Lag time = 0.027 Hr.
Lag time = 1.65 Min.
25% of lag time = 0.41 Min.
40% of lag time = 0.66 Min.

Unit time = 5.00 Min.
Duration of storm = 24 Hour(s)
User Entered Base Flow = 0.00(CFS)

2 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	1.70	4.11

100 YEAR Area rainfall data:

Area(Ac.)[1]	Rainfall(In)[2]	Weighting[1*2]
2.42	3.90	9.44

STORM EVENT (YEAR) = 100.00
Area Averaged 2-Year Rainfall = 1.700(In)
Area Averaged 100-Year Rainfall = 3.900(In)

Point rain (area averaged) = 3.900(In)
Areal adjustment factor = 100.00 %
Adjusted average point rain = 3.900(In)

Sub-Area Data:

Area(Ac.)	Runoff Index	Impervious %
2.420	69.00	0.900

Total Area Entered = 2.42(Ac.)

RI AMC2	RI AMC-3	Infil. Rate (In/Hr)	Impervious (Dec.%)	Adj. Infil. Rate (In/Hr)	Area% (Dec.)	F (In/Hr)
69.0	84.4	0.194	0.900	0.037	1.000	0.037

Sum (F) = 0.037
Area averaged mean soil loss (F) (In/Hr) = 0.037
Minimum soil loss rate ((In/Hr)) = 0.018
(for 24 hour storm duration)
Soil low loss rate (decimal) = 0.180

Unit Hydrograph
VALLEY S-Curve

Unit Hydrograph Data

Unit time period (hrs)		Time % of lag Graph %	Distribution (CFS)	Unit Hydrograph
1	0.083	303.601	57.047	1.391
2	0.167	607.202	36.931	0.901
3	0.250	910.803	6.022	0.147
		Sum = 100.000	Sum=	2.439

The following loss rate calculations reflect use of the minimum calculated loss rate subtracted from the Storm Rain to produce the maximum Effective Rain value

Unit Time (Hr.)		Pattern Percent	Storm Rain (In/Hr)	Loss rate(In./Hr) Max	Low	Effective (In/Hr)
1	0.08	0.07	0.031	(0.065)	0.006	0.026
2	0.17	0.07	0.031	(0.065)	0.006	0.026
3	0.25	0.07	0.031	(0.065)	0.006	0.026
4	0.33	0.10	0.047	(0.065)	0.008	0.038
5	0.42	0.10	0.047	(0.064)	0.008	0.038
6	0.50	0.10	0.047	(0.064)	0.008	0.038
7	0.58	0.10	0.047	(0.064)	0.008	0.038
8	0.67	0.10	0.047	(0.064)	0.008	0.038
9	0.75	0.10	0.047	(0.063)	0.008	0.038
10	0.83	0.13	0.062	(0.063)	0.011	0.051
11	0.92	0.13	0.062	(0.063)	0.011	0.051
12	1.00	0.13	0.062	(0.063)	0.011	0.051
13	1.08	0.10	0.047	(0.062)	0.008	0.038
14	1.17	0.10	0.047	(0.062)	0.008	0.038
15	1.25	0.10	0.047	(0.062)	0.008	0.038
16	1.33	0.10	0.047	(0.062)	0.008	0.038
17	1.42	0.10	0.047	(0.061)	0.008	0.038
18	1.50	0.10	0.047	(0.061)	0.008	0.038
19	1.58	0.10	0.047	(0.061)	0.008	0.038
20	1.67	0.10	0.047	(0.061)	0.008	0.038
21	1.75	0.10	0.047	(0.060)	0.008	0.038
22	1.83	0.13	0.062	(0.060)	0.011	0.051
23	1.92	0.13	0.062	(0.060)	0.011	0.051
24	2.00	0.13	0.062	(0.060)	0.011	0.051
25	2.08	0.13	0.062	(0.059)	0.011	0.051
26	2.17	0.13	0.062	(0.059)	0.011	0.051
27	2.25	0.13	0.062	(0.059)	0.011	0.051
28	2.33	0.13	0.062	(0.059)	0.011	0.051

29	2.42	0.13	0.062	(0.058)	0.011	0.051
30	2.50	0.13	0.062	(0.058)	0.011	0.051
31	2.58	0.17	0.078	(0.058)	0.014	0.064
32	2.67	0.17	0.078	(0.058)	0.014	0.064
33	2.75	0.17	0.078	(0.057)	0.014	0.064
34	2.83	0.17	0.078	(0.057)	0.014	0.064
35	2.92	0.17	0.078	(0.057)	0.014	0.064
36	3.00	0.17	0.078	(0.057)	0.014	0.064
37	3.08	0.17	0.078	(0.057)	0.014	0.064
38	3.17	0.17	0.078	(0.056)	0.014	0.064
39	3.25	0.17	0.078	(0.056)	0.014	0.064
40	3.33	0.17	0.078	(0.056)	0.014	0.064
41	3.42	0.17	0.078	(0.056)	0.014	0.064
42	3.50	0.17	0.078	(0.055)	0.014	0.064
43	3.58	0.17	0.078	(0.055)	0.014	0.064
44	3.67	0.17	0.078	(0.055)	0.014	0.064
45	3.75	0.17	0.078	(0.055)	0.014	0.064
46	3.83	0.20	0.094	(0.054)	0.017	0.077
47	3.92	0.20	0.094	(0.054)	0.017	0.077
48	4.00	0.20	0.094	(0.054)	0.017	0.077
49	4.08	0.20	0.094	(0.054)	0.017	0.077
50	4.17	0.20	0.094	(0.054)	0.017	0.077
51	4.25	0.20	0.094	(0.053)	0.017	0.077
52	4.33	0.23	0.109	(0.053)	0.020	0.090
53	4.42	0.23	0.109	(0.053)	0.020	0.090
54	4.50	0.23	0.109	(0.053)	0.020	0.090
55	4.58	0.23	0.109	(0.052)	0.020	0.090
56	4.67	0.23	0.109	(0.052)	0.020	0.090
57	4.75	0.23	0.109	(0.052)	0.020	0.090
58	4.83	0.27	0.125	(0.052)	0.022	0.102
59	4.92	0.27	0.125	(0.051)	0.022	0.102
60	5.00	0.27	0.125	(0.051)	0.022	0.102
61	5.08	0.20	0.094	(0.051)	0.017	0.077
62	5.17	0.20	0.094	(0.051)	0.017	0.077
63	5.25	0.20	0.094	(0.051)	0.017	0.077
64	5.33	0.23	0.109	(0.050)	0.020	0.090
65	5.42	0.23	0.109	(0.050)	0.020	0.090
66	5.50	0.23	0.109	(0.050)	0.020	0.090
67	5.58	0.27	0.125	(0.050)	0.022	0.102
68	5.67	0.27	0.125	(0.049)	0.022	0.102
69	5.75	0.27	0.125	(0.049)	0.022	0.102
70	5.83	0.27	0.125	(0.049)	0.022	0.102
71	5.92	0.27	0.125	(0.049)	0.022	0.102
72	6.00	0.27	0.125	(0.049)	0.022	0.102

73	6.08	0.30	0.140	(0.048)	0.025	0.115
74	6.17	0.30	0.140	(0.048)	0.025	0.115
75	6.25	0.30	0.140	(0.048)	0.025	0.115
76	6.33	0.30	0.140	(0.048)	0.025	0.115
77	6.42	0.30	0.140	(0.048)	0.025	0.115
78	6.50	0.30	0.140	(0.047)	0.025	0.115
79	6.58	0.33	0.156	(0.047)	0.028	0.128
80	6.67	0.33	0.156	(0.047)	0.028	0.128
81	6.75	0.33	0.156	(0.047)	0.028	0.128
82	6.83	0.33	0.156	(0.046)	0.028	0.128
83	6.92	0.33	0.156	(0.046)	0.028	0.128
84	7.00	0.33	0.156	(0.046)	0.028	0.128
85	7.08	0.33	0.156	(0.046)	0.028	0.128
86	7.17	0.33	0.156	(0.046)	0.028	0.128
87	7.25	0.33	0.156	(0.045)	0.028	0.128
88	7.33	0.37	0.172	(0.045)	0.031	0.141
89	7.42	0.37	0.172	(0.045)	0.031	0.141
90	7.50	0.37	0.172	(0.045)	0.031	0.141
91	7.58	0.40	0.187	(0.045)	0.034	0.154
92	7.67	0.40	0.187	(0.044)	0.034	0.154
93	7.75	0.40	0.187	(0.044)	0.034	0.154
94	7.83	0.43	0.203	(0.044)	0.037	0.166
95	7.92	0.43	0.203	(0.044)	0.037	0.166
96	8.00	0.43	0.203	(0.044)	0.037	0.166
97	8.08	0.50	0.234	(0.043)	0.042	0.192
98	8.17	0.50	0.234	(0.043)	0.042	0.192
99	8.25	0.50	0.234	(0.043)	0.042	0.192
100	8.33	0.50	0.234	(0.043)	0.042	0.192
101	8.42	0.50	0.234	(0.043)	0.042	0.192
102	8.50	0.50	0.234	(0.042)	0.042	0.192
103	8.58	0.53	0.250	0.042	(0.045)	0.207
104	8.67	0.53	0.250	0.042	(0.045)	0.208
105	8.75	0.53	0.250	0.042	(0.045)	0.208
106	8.83	0.57	0.265	0.042	(0.048)	0.224
107	8.92	0.57	0.265	0.041	(0.048)	0.224
108	9.00	0.57	0.265	0.041	(0.048)	0.224
109	9.08	0.63	0.296	0.041	(0.053)	0.255
110	9.17	0.63	0.296	0.041	(0.053)	0.256
111	9.25	0.63	0.296	0.041	(0.053)	0.256
112	9.33	0.67	0.312	0.040	(0.056)	0.272
113	9.42	0.67	0.312	0.040	(0.056)	0.272
114	9.50	0.67	0.312	0.040	(0.056)	0.272
115	9.58	0.70	0.328	0.040	(0.059)	0.288
116	9.67	0.70	0.328	0.040	(0.059)	0.288

117	9.75	0.70	0.328	0.039	(0.059)	0.288
118	9.83	0.73	0.343	0.039	(0.062)	0.304
119	9.92	0.73	0.343	0.039	(0.062)	0.304
120	10.00	0.73	0.343	0.039	(0.062)	0.304
121	10.08	0.50	0.234	0.039	(0.042)	0.195
122	10.17	0.50	0.234	0.039	(0.042)	0.195
123	10.25	0.50	0.234	0.038	(0.042)	0.196
124	10.33	0.50	0.234	0.038	(0.042)	0.196
125	10.42	0.50	0.234	0.038	(0.042)	0.196
126	10.50	0.50	0.234	0.038	(0.042)	0.196
127	10.58	0.67	0.312	0.038	(0.056)	0.274
128	10.67	0.67	0.312	0.037	(0.056)	0.275
129	10.75	0.67	0.312	0.037	(0.056)	0.275
130	10.83	0.67	0.312	0.037	(0.056)	0.275
131	10.92	0.67	0.312	0.037	(0.056)	0.275
132	11.00	0.67	0.312	0.037	(0.056)	0.275
133	11.08	0.63	0.296	0.036	(0.053)	0.260
134	11.17	0.63	0.296	0.036	(0.053)	0.260
135	11.25	0.63	0.296	0.036	(0.053)	0.260
136	11.33	0.63	0.296	0.036	(0.053)	0.260
137	11.42	0.63	0.296	0.036	(0.053)	0.261
138	11.50	0.63	0.296	0.036	(0.053)	0.261
139	11.58	0.57	0.265	0.035	(0.048)	0.230
140	11.67	0.57	0.265	0.035	(0.048)	0.230
141	11.75	0.57	0.265	0.035	(0.048)	0.230
142	11.83	0.60	0.281	0.035	(0.051)	0.246
143	11.92	0.60	0.281	0.035	(0.051)	0.246
144	12.00	0.60	0.281	0.035	(0.051)	0.246
145	12.08	0.83	0.390	0.034	(0.070)	0.356
146	12.17	0.83	0.390	0.034	(0.070)	0.356
147	12.25	0.83	0.390	0.034	(0.070)	0.356
148	12.33	0.87	0.406	0.034	(0.073)	0.372
149	12.42	0.87	0.406	0.034	(0.073)	0.372
150	12.50	0.87	0.406	0.034	(0.073)	0.372
151	12.58	0.93	0.437	0.033	(0.079)	0.403
152	12.67	0.93	0.437	0.033	(0.079)	0.404
153	12.75	0.93	0.437	0.033	(0.079)	0.404
154	12.83	0.97	0.452	0.033	(0.081)	0.420
155	12.92	0.97	0.452	0.033	(0.081)	0.420
156	13.00	0.97	0.452	0.033	(0.081)	0.420
157	13.08	1.13	0.530	0.032	(0.095)	0.498
158	13.17	1.13	0.530	0.032	(0.095)	0.498
159	13.25	1.13	0.530	0.032	(0.095)	0.498
160	13.33	1.13	0.530	0.032	(0.095)	0.499

161	13.42	1.13	0.530	0.032	(0.095)	0.499
162	13.50	1.13	0.530	0.032	(0.095)	0.499
163	13.58	0.77	0.359	0.031	(0.065)	0.327
164	13.67	0.77	0.359	0.031	(0.065)	0.328
165	13.75	0.77	0.359	0.031	(0.065)	0.328
166	13.83	0.77	0.359	0.031	(0.065)	0.328
167	13.92	0.77	0.359	0.031	(0.065)	0.328
168	14.00	0.77	0.359	0.031	(0.065)	0.328
169	14.08	0.90	0.421	0.030	(0.076)	0.391
170	14.17	0.90	0.421	0.030	(0.076)	0.391
171	14.25	0.90	0.421	0.030	(0.076)	0.391
172	14.33	0.87	0.406	0.030	(0.073)	0.376
173	14.42	0.87	0.406	0.030	(0.073)	0.376
174	14.50	0.87	0.406	0.030	(0.073)	0.376
175	14.58	0.87	0.406	0.030	(0.073)	0.376
176	14.67	0.87	0.406	0.029	(0.073)	0.376
177	14.75	0.87	0.406	0.029	(0.073)	0.376
178	14.83	0.83	0.390	0.029	(0.070)	0.361
179	14.92	0.83	0.390	0.029	(0.070)	0.361
180	15.00	0.83	0.390	0.029	(0.070)	0.361
181	15.08	0.80	0.374	0.029	(0.067)	0.346
182	15.17	0.80	0.374	0.028	(0.067)	0.346
183	15.25	0.80	0.374	0.028	(0.067)	0.346
184	15.33	0.77	0.359	0.028	(0.065)	0.331
185	15.42	0.77	0.359	0.028	(0.065)	0.331
186	15.50	0.77	0.359	0.028	(0.065)	0.331
187	15.58	0.63	0.296	0.028	(0.053)	0.269
188	15.67	0.63	0.296	0.028	(0.053)	0.269
189	15.75	0.63	0.296	0.027	(0.053)	0.269
190	15.83	0.63	0.296	0.027	(0.053)	0.269
191	15.92	0.63	0.296	0.027	(0.053)	0.269
192	16.00	0.63	0.296	0.027	(0.053)	0.269
193	16.08	0.13	0.062	(0.027)	0.011	0.051
194	16.17	0.13	0.062	(0.027)	0.011	0.051
195	16.25	0.13	0.062	(0.027)	0.011	0.051
196	16.33	0.13	0.062	(0.026)	0.011	0.051
197	16.42	0.13	0.062	(0.026)	0.011	0.051
198	16.50	0.13	0.062	(0.026)	0.011	0.051
199	16.58	0.10	0.047	(0.026)	0.008	0.038
200	16.67	0.10	0.047	(0.026)	0.008	0.038
201	16.75	0.10	0.047	(0.026)	0.008	0.038
202	16.83	0.10	0.047	(0.026)	0.008	0.038
203	16.92	0.10	0.047	(0.026)	0.008	0.038
204	17.00	0.10	0.047	(0.025)	0.008	0.038

205	17.08	0.17	0.078	(0.025)	0.014	0.064
206	17.17	0.17	0.078	(0.025)	0.014	0.064
207	17.25	0.17	0.078	(0.025)	0.014	0.064
208	17.33	0.17	0.078	(0.025)	0.014	0.064
209	17.42	0.17	0.078	(0.025)	0.014	0.064
210	17.50	0.17	0.078	(0.025)	0.014	0.064
211	17.58	0.17	0.078	(0.025)	0.014	0.064
212	17.67	0.17	0.078	(0.024)	0.014	0.064
213	17.75	0.17	0.078	(0.024)	0.014	0.064
214	17.83	0.13	0.062	(0.024)	0.011	0.051
215	17.92	0.13	0.062	(0.024)	0.011	0.051
216	18.00	0.13	0.062	(0.024)	0.011	0.051
217	18.08	0.13	0.062	(0.024)	0.011	0.051
218	18.17	0.13	0.062	(0.024)	0.011	0.051
219	18.25	0.13	0.062	(0.024)	0.011	0.051
220	18.33	0.13	0.062	(0.023)	0.011	0.051
221	18.42	0.13	0.062	(0.023)	0.011	0.051
222	18.50	0.13	0.062	(0.023)	0.011	0.051
223	18.58	0.10	0.047	(0.023)	0.008	0.038
224	18.67	0.10	0.047	(0.023)	0.008	0.038
225	18.75	0.10	0.047	(0.023)	0.008	0.038
226	18.83	0.07	0.031	(0.023)	0.006	0.026
227	18.92	0.07	0.031	(0.023)	0.006	0.026
228	19.00	0.07	0.031	(0.023)	0.006	0.026
229	19.08	0.10	0.047	(0.022)	0.008	0.038
230	19.17	0.10	0.047	(0.022)	0.008	0.038
231	19.25	0.10	0.047	(0.022)	0.008	0.038
232	19.33	0.13	0.062	(0.022)	0.011	0.051
233	19.42	0.13	0.062	(0.022)	0.011	0.051
234	19.50	0.13	0.062	(0.022)	0.011	0.051
235	19.58	0.10	0.047	(0.022)	0.008	0.038
236	19.67	0.10	0.047	(0.022)	0.008	0.038
237	19.75	0.10	0.047	(0.022)	0.008	0.038
238	19.83	0.07	0.031	(0.022)	0.006	0.026
239	19.92	0.07	0.031	(0.021)	0.006	0.026
240	20.00	0.07	0.031	(0.021)	0.006	0.026
241	20.08	0.10	0.047	(0.021)	0.008	0.038
242	20.17	0.10	0.047	(0.021)	0.008	0.038
243	20.25	0.10	0.047	(0.021)	0.008	0.038
244	20.33	0.10	0.047	(0.021)	0.008	0.038
245	20.42	0.10	0.047	(0.021)	0.008	0.038
246	20.50	0.10	0.047	(0.021)	0.008	0.038
247	20.58	0.10	0.047	(0.021)	0.008	0.038
248	20.67	0.10	0.047	(0.021)	0.008	0.038

249	20.75	0.10	0.047	(0.021)	0.008	0.038
250	20.83	0.07	0.031	(0.020)	0.006	0.026
251	20.92	0.07	0.031	(0.020)	0.006	0.026
252	21.00	0.07	0.031	(0.020)	0.006	0.026
253	21.08	0.10	0.047	(0.020)	0.008	0.038
254	21.17	0.10	0.047	(0.020)	0.008	0.038
255	21.25	0.10	0.047	(0.020)	0.008	0.038
256	21.33	0.07	0.031	(0.020)	0.006	0.026
257	21.42	0.07	0.031	(0.020)	0.006	0.026
258	21.50	0.07	0.031	(0.020)	0.006	0.026
259	21.58	0.10	0.047	(0.020)	0.008	0.038
260	21.67	0.10	0.047	(0.020)	0.008	0.038
261	21.75	0.10	0.047	(0.020)	0.008	0.038
262	21.83	0.07	0.031	(0.020)	0.006	0.026
263	21.92	0.07	0.031	(0.020)	0.006	0.026
264	22.00	0.07	0.031	(0.019)	0.006	0.026
265	22.08	0.10	0.047	(0.019)	0.008	0.038
266	22.17	0.10	0.047	(0.019)	0.008	0.038
267	22.25	0.10	0.047	(0.019)	0.008	0.038
268	22.33	0.07	0.031	(0.019)	0.006	0.026
269	22.42	0.07	0.031	(0.019)	0.006	0.026
270	22.50	0.07	0.031	(0.019)	0.006	0.026
271	22.58	0.07	0.031	(0.019)	0.006	0.026
272	22.67	0.07	0.031	(0.019)	0.006	0.026
273	22.75	0.07	0.031	(0.019)	0.006	0.026
274	22.83	0.07	0.031	(0.019)	0.006	0.026
275	22.92	0.07	0.031	(0.019)	0.006	0.026
276	23.00	0.07	0.031	(0.019)	0.006	0.026
277	23.08	0.07	0.031	(0.019)	0.006	0.026
278	23.17	0.07	0.031	(0.019)	0.006	0.026
279	23.25	0.07	0.031	(0.019)	0.006	0.026
280	23.33	0.07	0.031	(0.019)	0.006	0.026
281	23.42	0.07	0.031	(0.019)	0.006	0.026
282	23.50	0.07	0.031	(0.019)	0.006	0.026
283	23.58	0.07	0.031	(0.019)	0.006	0.026
284	23.67	0.07	0.031	(0.018)	0.006	0.026
285	23.75	0.07	0.031	(0.018)	0.006	0.026
286	23.83	0.07	0.031	(0.018)	0.006	0.026
287	23.92	0.07	0.031	(0.018)	0.006	0.026
288	24.00	0.07	0.031	(0.018)	0.006	0.026

(Loss Rate Not Used)

Sum = 100.0 Sum = 40.9

Flood volume = Effective rainfall 3.41(In)

times area 2.4(Ac.)/[(In)/(Ft.)] = 0.7(Ac.Ft)

Total soil loss = 0.49(In)
Total soil loss = 0.099(Ac.Ft)
Total rainfall = 3.90(In)
Flood volume = 29966.9 Cubic Feet
Total soil loss = 4292.9 Cubic Feet

Peak flow rate of this hydrograph = 1.217(CFS)

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24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	2.5	5.0	7.5	10.0
0+ 5	0.0002	0.04 Q	|	|	|	|	
0+10	0.0006	0.06 Q	|	|	|	|	
0+15	0.0011	0.06 Q	|	|	|	|	
0+20	0.0016	0.08 Q	|	|	|	|	
0+25	0.0023	0.09 Q	|	|	|	|	
0+30	0.0029	0.09 Q	|	|	|	|	
0+35	0.0036	0.09 Q	|	|	|	|	
0+40	0.0042	0.09 Q	|	|	|	|	
0+45	0.0048	0.09 Q	|	|	|	|	
0+50	0.0056	0.11 Q	|	|	|	|	
0+55	0.0065	0.12 Q	|	|	|	|	
1+ 0	0.0073	0.12 Q	|	|	|	|	
1+ 5	0.0081	0.11 Q	|	|	|	|	
1+10	0.0087	0.10 Q	|	|	|	|	
1+15	0.0094	0.09 Q	|	|	|	|	
1+20	0.0100	0.09 Q	|	|	|	|	
1+25	0.0106	0.09 Q	|	|	|	|	
1+30	0.0113	0.09 Q	|	|	|	|	
1+35	0.0119	0.09 Q	|	|	|	|	
1+40	0.0126	0.09 Q	|	|	|	|	
1+45	0.0132	0.09 Q	|	|	|	|	
1+50	0.0140	0.11 Q	|	|	|	|	
1+55	0.0148	0.12 Q	|	|	|	|	
2+ 0	0.0157	0.12 Q	|	|	|	|	
2+ 5	0.0166	0.12 Q	|	|	|	|	
2+10	0.0174	0.12 QV	|	|	|	|	
2+15	0.0183	0.12 QV	|	|	|	|	

2+20	0.0191	0.12	QV	|	|	|	|
2+25	0.0200	0.12	QV	|	|	|	|
2+30	0.0209	0.12	QV	|	|	|	|
2+35	0.0218	0.14	QV	|	|	|	|
2+40	0.0229	0.15	QV	|	|	|	|
2+45	0.0240	0.16	QV	|	|	|	|
2+50	0.0251	0.16	QV	|	|	|	|
2+55	0.0261	0.16	QV	|	|	|	|
3+ 0	0.0272	0.16	QV	|	|	|	|
3+ 5	0.0283	0.16	QV	|	|	|	|
3+10	0.0294	0.16	QV	|	|	|	|
3+15	0.0304	0.16	QV	|	|	|	|
3+20	0.0315	0.16	QV	|	|	|	|
3+25	0.0326	0.16	QV	|	|	|	|
3+30	0.0337	0.16	QV	|	|	|	|
3+35	0.0347	0.16	Q V	|	|	|	|
3+40	0.0358	0.16	Q V	|	|	|	|
3+45	0.0369	0.16	Q V	|	|	|	|
3+50	0.0381	0.17	Q V	|	|	|	|
3+55	0.0394	0.19	Q V	|	|	|	|
4+ 0	0.0406	0.19	Q V	|	|	|	|
4+ 5	0.0419	0.19	Q V	|	|	|	|
4+10	0.0432	0.19	Q V	|	|	|	|
4+15	0.0445	0.19	Q V	|	|	|	|
4+20	0.0459	0.21	Q V	|	|	|	|
4+25	0.0474	0.22	Q V	|	|	|	|
4+30	0.0489	0.22	Q V	|	|	|	|
4+35	0.0504	0.22	Q V	|	|	|	|
4+40	0.0519	0.22	Q V	|	|	|	|
4+45	0.0534	0.22	Q V	|	|	|	|
4+50	0.0551	0.24	Q V	|	|	|	|
4+55	0.0568	0.25	Q V	|	|	|	|
5+ 0	0.0585	0.25	Q V	|	|	|	|
5+ 5	0.0600	0.21	Q V	|	|	|	|
5+10	0.0613	0.19	Q V	|	|	|	|
5+15	0.0626	0.19	Q V	|	|	|	|
5+20	0.0640	0.21	Q V	|	|	|	|
5+25	0.0655	0.22	Q V	|	|	|	|
5+30	0.0670	0.22	Q V	|	|	|	|
5+35	0.0686	0.24	Q V	|	|	|	|
5+40	0.0703	0.25	Q V	|	|	|	|
5+45	0.0720	0.25	Q V	|	|	|	|
5+50	0.0738	0.25	Q V	|	|	|	|
5+55	0.0755	0.25	Q V	|	|	|	|

6+ 0	0.0772	0.25	Q	V	|	|	|	|
6+ 5	0.0790	0.27	|Q	V	|	|	|	|
6+10	0.0810	0.28	|Q	V	|	|	|	|
6+15	0.0829	0.28	|Q	V	|	|	|	|
6+20	0.0848	0.28	|Q	V	|	|	|	|
6+25	0.0868	0.28	|Q	V	|	|	|	|
6+30	0.0887	0.28	|Q	V	|	|	|	|
6+35	0.0908	0.30	|Q	V	|	|	|	|
6+40	0.0929	0.31	|Q	V	|	|	|	|
6+45	0.0950	0.31	|Q	V	|	|	|	|
6+50	0.0972	0.31	|Q	V	|	|	|	|
6+55	0.0993	0.31	|Q	V	|	|	|	|
7+ 0	0.1015	0.31	|Q	V	|	|	|	|
7+ 5	0.1036	0.31	|Q	V	|	|	|	|
7+10	0.1058	0.31	|Q	V	|	|	|	|
7+15	0.1079	0.31	|Q	V	|	|	|	|
7+20	0.1102	0.33	|Q	V	|	|	|	|
7+25	0.1126	0.34	|Q	V	|	|	|	|
7+30	0.1149	0.34	|Q	V	|	|	|	|
7+35	0.1174	0.36	|Q	V	|	|	|	|
7+40	0.1200	0.37	|Q	V	|	|	|	|
7+45	0.1226	0.37	|Q	V	|	|	|	|
7+50	0.1253	0.39	|Q	V	|	|	|	|
7+55	0.1280	0.40	|Q	V	|	|	|	|
8+ 0	0.1308	0.41	|Q	V	|	|	|	|
8+ 5	0.1339	0.44	|Q	V	|	|	|	|
8+10	0.1371	0.46	|Q	V	|	|	|	|
8+15	0.1403	0.47	|Q	V	|	|	|	|
8+20	0.1435	0.47	|Q	V	|	|	|	|
8+25	0.1468	0.47	|Q	V	|	|	|	|
8+30	0.1500	0.47	|Q	V	|	|	|	|
8+35	0.1534	0.49	|Q	V	|	|	|	|
8+40	0.1568	0.50	| Q	V	|	|	|	|
8+45	0.1603	0.51	| Q	V	|	|	|	|
8+50	0.1640	0.53	| Q	V	|	|	|	|
8+55	0.1677	0.54	| Q	V	|	|	|	|
9+ 0	0.1715	0.55	| Q	V	|	|	|	|
9+ 5	0.1755	0.59	| Q	V	|	|	|	|
9+10	0.1798	0.62	| Q	V	|	|	|	|
9+15	0.1841	0.62	| Q	V	|	|	|	|
9+20	0.1885	0.65	| Q	V	|	|	|	|
9+25	0.1931	0.66	| Q	|V	|	|	|	|
9+30	0.1977	0.66	| Q	|V	|	|	|	|
9+35	0.2024	0.69	| Q	|V	|	|	|	|

9+40	0.2072	0.70	| Q	| V	|	|	|
9+45	0.2120	0.70	| Q	| V	|	|	|
9+50	0.2170	0.73	| Q	| V	|	|	|
9+55	0.2221	0.74	| Q	| V	|	|	|
10+ 0	0.2272	0.74	| Q	| V	|	|	|
10+ 5	0.2313	0.59	| Q	| V	|	|	|
10+10	0.2347	0.49	|Q	| V	|	|	|
10+15	0.2380	0.48	|Q	| V	|	|	|
10+20	0.2413	0.48	|Q	| V	|	|	|
10+25	0.2446	0.48	|Q	| V	|	|	|
10+30	0.2479	0.48	|Q	| V	|	|	|
10+35	0.2519	0.59	| Q	| V	|	|	|
10+40	0.2565	0.66	| Q	| V	|	|	|
10+45	0.2611	0.67	| Q	| V	|	|	|
10+50	0.2657	0.67	| Q	| V	|	|	|
10+55	0.2703	0.67	| Q	| V	|	|	|
11+ 0	0.2749	0.67	| Q	| V	|	|	|
11+ 5	0.2794	0.65	| Q	| V	|	|	|
11+10	0.2838	0.64	| Q	| V	|	|	|
11+15	0.2882	0.63	| Q	| V	|	|	|
11+20	0.2925	0.64	| Q	| V	|	|	|
11+25	0.2969	0.64	| Q	| V	|	|	|
11+30	0.3013	0.64	| Q	| V	|	|	|
11+35	0.3054	0.59	| Q	| V	|	|	|
11+40	0.3093	0.57	| Q	| V	|	|	|
11+45	0.3132	0.56	| Q	| V	|	|	|
11+50	0.3172	0.58	| Q	| V	|	|	|
11+55	0.3213	0.60	| Q	| V	|	|	|
12+ 0	0.3254	0.60	| Q	| V	|	|	|
12+ 5	0.3306	0.75	| Q	| V	|	|	|
12+10	0.3365	0.85	| Q	| V	|	|	|
12+15	0.3425	0.87	| Q	| V	|	|	|
12+20	0.3486	0.89	| Q	| V	|	|	|
12+25	0.3548	0.91	| Q	| V	|	|	|
12+30	0.3611	0.91	| Q	| V	|	|	|
12+35	0.3676	0.95	| Q	| |V	|	|	|
12+40	0.3744	0.98	| Q	| |V	|	|	|
12+45	0.3812	0.99	| Q	| | V	|	|	|
12+50	0.3881	1.01	| Q	| | V	|	|	|
12+55	0.3951	1.02	| Q	| | V	|	|	|
13+ 0	0.4022	1.02	| Q	| | V	|	|	|
13+ 5	0.4100	1.13	| Q	| | V	|	|	|
13+10	0.4183	1.20	| Q	| | V	|	|	|
13+15	0.4267	1.22	| Q	| | V	|	|	|

13+20	0.4350	1.22	Q		V		
13+25	0.4434	1.22	Q		V		
13+30	0.4518	1.22	Q		V		
13+35	0.4585	0.98	Q		V		
13+40	0.4642	0.82	Q		V		
13+45	0.4697	0.80	Q		V		
13+50	0.4752	0.80	Q		V		
13+55	0.4807	0.80	Q		V		
14+ 0	0.4863	0.80	Q		V		
14+ 5	0.4924	0.89	Q		V		
14+10	0.4989	0.94	Q		V		
14+15	0.5055	0.95	Q		V		
14+20	0.5119	0.93	Q		V		
14+25	0.5182	0.92	Q		V		
14+30	0.5245	0.92	Q		V		
14+35	0.5308	0.92	Q		V		
14+40	0.5372	0.92	Q		V		
14+45	0.5435	0.92	Q		V		
14+50	0.5497	0.90	Q		V		
14+55	0.5557	0.88	Q		V		
15+ 0	0.5618	0.88	Q		V		
15+ 5	0.5677	0.86	Q		V		
15+10	0.5736	0.85	Q		V		
15+15	0.5794	0.84	Q		V		
15+20	0.5851	0.82	Q		V		
15+25	0.5906	0.81	Q		V		
15+30	0.5962	0.81	Q		V		
15+35	0.6011	0.72	Q		V		
15+40	0.6057	0.66	Q		V		
15+45	0.6102	0.66	Q		V		
15+50	0.6148	0.66	Q		V		
15+55	0.6193	0.66	Q		V		
16+ 0	0.6238	0.66	Q		V		
16+ 5	0.6263	0.35	Q		V		
16+10	0.6273	0.16	Q		V		
16+15	0.6282	0.12	Q		V		
16+20	0.6291	0.12	Q		V		
16+25	0.6299	0.12	Q		V		
16+30	0.6308	0.12	Q		V		
16+35	0.6315	0.11	Q		V		
16+40	0.6322	0.10	Q		V		
16+45	0.6328	0.09	Q		V		
16+50	0.6335	0.09	Q		V		
16+55	0.6341	0.09	Q		V		

17+ 0	0.6347	0.09	Q	|	|	| V |
17+ 5	0.6356	0.13	Q	|	|	| V |
17+10	0.6367	0.15	Q	|	|	| V |
17+15	0.6378	0.16	Q	|	|	| V |
17+20	0.6388	0.16	Q	|	|	| V |
17+25	0.6399	0.16	Q	|	|	| V |
17+30	0.6410	0.16	Q	|	|	| V |
17+35	0.6421	0.16	Q	|	|	| V |
17+40	0.6431	0.16	Q	|	|	| V |
17+45	0.6442	0.16	Q	|	|	| V |
17+50	0.6452	0.14	Q	|	|	| V |
17+55	0.6460	0.13	Q	|	|	| V |
18+ 0	0.6469	0.12	Q	|	|	| V |
18+ 5	0.6478	0.12	Q	|	|	| V |
18+10	0.6486	0.12	Q	|	|	| V |
18+15	0.6495	0.12	Q	|	|	| V |
18+20	0.6503	0.12	Q	|	|	| V |
18+25	0.6512	0.12	Q	|	|	| V |
18+30	0.6521	0.12	Q	|	|	| V |
18+35	0.6528	0.11	Q	|	|	| V |
18+40	0.6534	0.10	Q	|	|	| V |
18+45	0.6541	0.09	Q	|	|	| V |
18+50	0.6546	0.08	Q	|	|	| V |
18+55	0.6551	0.06	Q	|	|	| V |
19+ 0	0.6555	0.06	Q	|	|	| V |
19+ 5	0.6560	0.08	Q	|	|	| V |
19+10	0.6567	0.09	Q	|	|	| V |
19+15	0.6573	0.09	Q	|	|	| V |
19+20	0.6581	0.11	Q	|	|	| V |
19+25	0.6589	0.12	Q	|	|	| V |
19+30	0.6598	0.12	Q	|	|	| V |
19+35	0.6605	0.11	Q	|	|	| V |
19+40	0.6612	0.10	Q	|	|	| V |
19+45	0.6618	0.09	Q	|	|	| V |
19+50	0.6624	0.08	Q	|	|	| V |
19+55	0.6628	0.06	Q	|	|	| V |
20+ 0	0.6632	0.06	Q	|	|	| V |
20+ 5	0.6638	0.08	Q	|	|	| V |
20+10	0.6644	0.09	Q	|	|	| V |
20+15	0.6651	0.09	Q	|	|	| V |
20+20	0.6657	0.09	Q	|	|	| V |
20+25	0.6663	0.09	Q	|	|	| V |
20+30	0.6670	0.09	Q	|	|	| V |
20+35	0.6676	0.09	Q	|	|	| V |

20+40	0.6683	0.09	Q	|	|	V |
20+45	0.6689	0.09	Q	|	|	V |
20+50	0.6694	0.08	Q	|	|	V |
20+55	0.6699	0.06	Q	|	|	V |
21+ 0	0.6703	0.06	Q	|	|	V |
21+ 5	0.6709	0.08	Q	|	|	V|
21+10	0.6715	0.09	Q	|	|	V|
21+15	0.6722	0.09	Q	|	|	V|
21+20	0.6727	0.08	Q	|	|	V|
21+25	0.6731	0.06	Q	|	|	V|
21+30	0.6735	0.06	Q	|	|	V|
21+35	0.6741	0.08	Q	|	|	V|
21+40	0.6747	0.09	Q	|	|	V|
21+45	0.6754	0.09	Q	|	|	V|
21+50	0.6759	0.08	Q	|	|	V|
21+55	0.6763	0.06	Q	|	|	V|
22+ 0	0.6768	0.06	Q	|	|	V|
22+ 5	0.6773	0.08	Q	|	|	V|
22+10	0.6780	0.09	Q	|	|	V|
22+15	0.6786	0.09	Q	|	|	V|
22+20	0.6791	0.08	Q	|	|	V|
22+25	0.6796	0.06	Q	|	|	V|
22+30	0.6800	0.06	Q	|	|	V|
22+35	0.6804	0.06	Q	|	|	V|
22+40	0.6809	0.06	Q	|	|	V|
22+45	0.6813	0.06	Q	|	|	V|
22+50	0.6817	0.06	Q	|	|	V|
22+55	0.6821	0.06	Q	|	|	V|
23+ 0	0.6826	0.06	Q	|	|	V|
23+ 5	0.6830	0.06	Q	|	|	V|
23+10	0.6834	0.06	Q	|	|	V|
23+15	0.6839	0.06	Q	|	|	V|
23+20	0.6843	0.06	Q	|	|	V|
23+25	0.6847	0.06	Q	|	|	V|
23+30	0.6852	0.06	Q	|	|	V|
23+35	0.6856	0.06	Q	|	|	V|
23+40	0.6860	0.06	Q	|	|	V|
23+45	0.6864	0.06	Q	|	|	V|
23+50	0.6869	0.06	Q	|	|	V|
23+55	0.6873	0.06	Q	|	|	V|
24+ 0	0.6877	0.06	Q	|	|	V|
24+ 5	0.6879	0.03	Q	|	|	V|
24+10	0.6879	0.00	Q	|	|	V|

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	2.830	5	810	74,904	------	------	------	Drainage Area A - 24 hour
2	Manual	0.000	5	n/a	0	------	------	------	Drainage Area A - 6 hour
3	Manual	0.000	5	n/a	0	------	------	------	Drainage Area A - 3 hour
4	Manual	0.000	5	n/a	0	------	------	------	Drainage Area A - 1 hour
7	Reservoir	0.164	5	1440	74,824	1	1551.01	64,397	DET 1 - 24 hr Out
8	Reservoir	0.000	5	n/a	0	2	1548.50	0.000	DET 1 - 6 hr Out
9	Reservoir	0.000	5	n/a	0	3	1548.50	0.000	DET 1 - 3 hr Out
10	Reservoir	0.000	5	n/a	0	4	1548.50	0.000	DET 1 - 1 hr Out

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	7.440	5	810	183,228	------	------	------	Drainage Area A - 24 hour
2	Manual	21.28	5	330	122,820	------	------	------	Drainage Area A - 6 hour
3	Manual	24.26	5	155	96,183	------	------	------	Drainage Area A - 3 hour
4	Manual	34.67	5	55	57,099	------	------	------	Drainage Area A - 1 hour
7	Reservoir	6.901	5	815	183,139	1	1552.12	96,028	DET 1 - 24 hr Out
8	Reservoir	20.07	5	335	122,740	2	1552.75	100,865	DET 1 - 6 hr Out
9	Reservoir	3.040	5	185	96,103	3	1551.88	91,651	DET 1 - 3 hr Out
10	Reservoir	0.156	5	85	57,018	4	1550.79	56,523	DET 1 - 1 hr Out

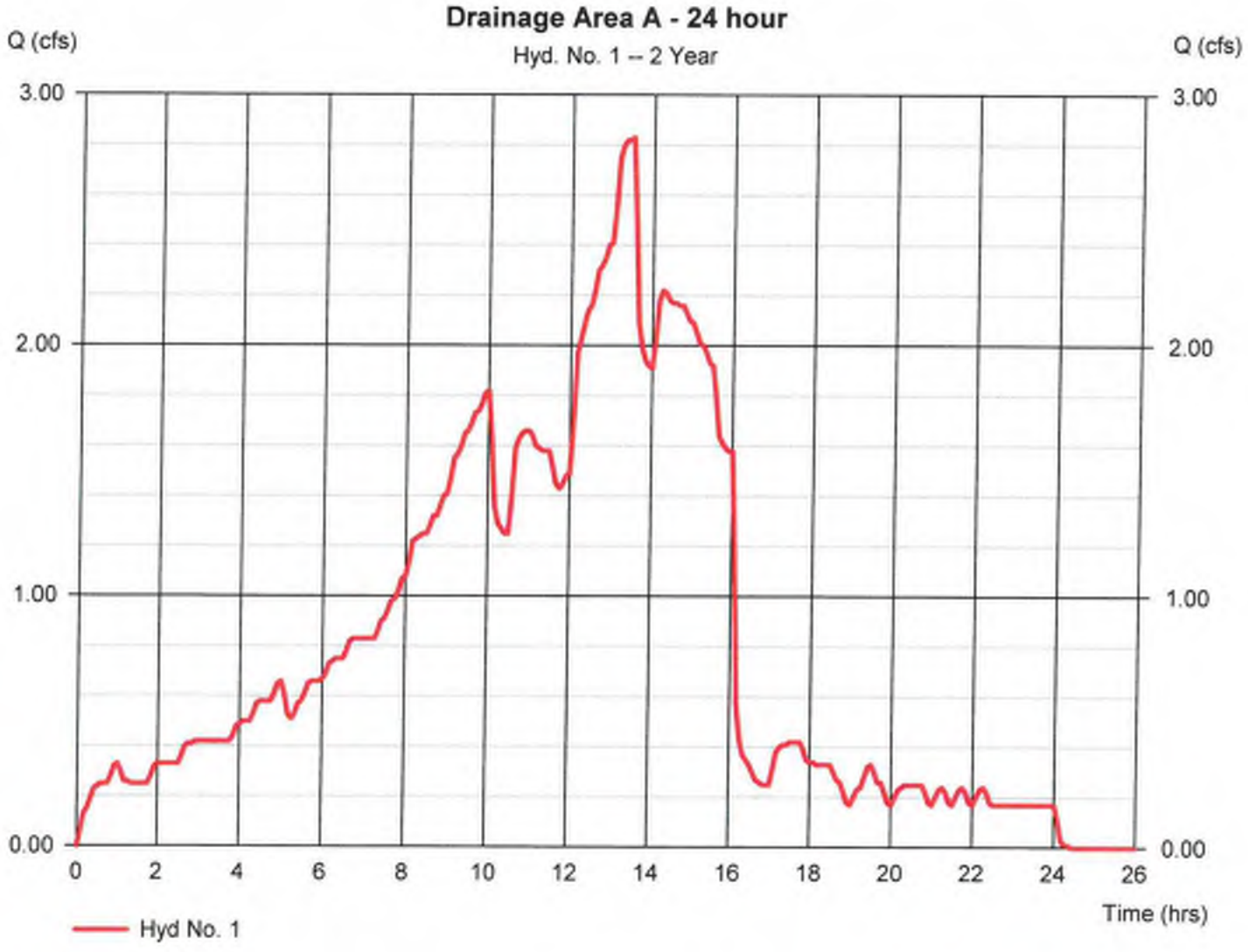
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 1

Drainage Area A - 24 hour

Hydrograph type	= Manual	Peak discharge	= 2.830 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.50 hrs
Time interval	= 5 min	Hyd. volume	= 74,904 cuft



Hydrograph Report

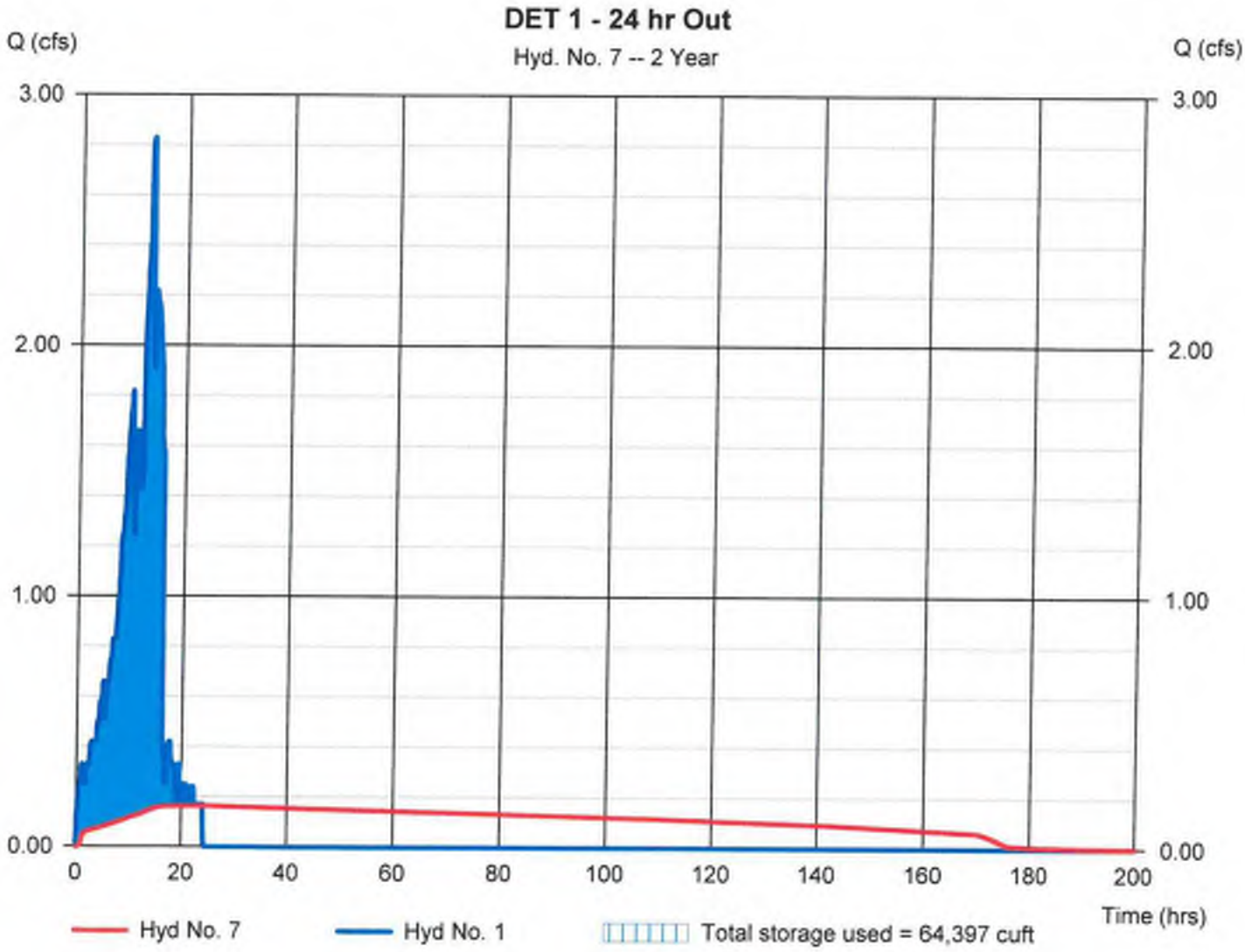
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 07 / 11 / 2018

Hyd. No. 7

DET 1 - 24 hr Out

Hydrograph type	= Reservoir	Peak discharge	= 0.164 cfs
Storm frequency	= 2 yrs	Time to peak	= 24.00 hrs
Time interval	= 5 min	Hyd. volume	= 74,824 cuft
Inflow hyd. No.	= 1 - Drainage Area A - 24 hou	Max. Elevation	= 1551.01 ft
Reservoir name	= DETENTION SYSTEM A	Max. Storage	= 64,397 cuft

Storage Indication method used.



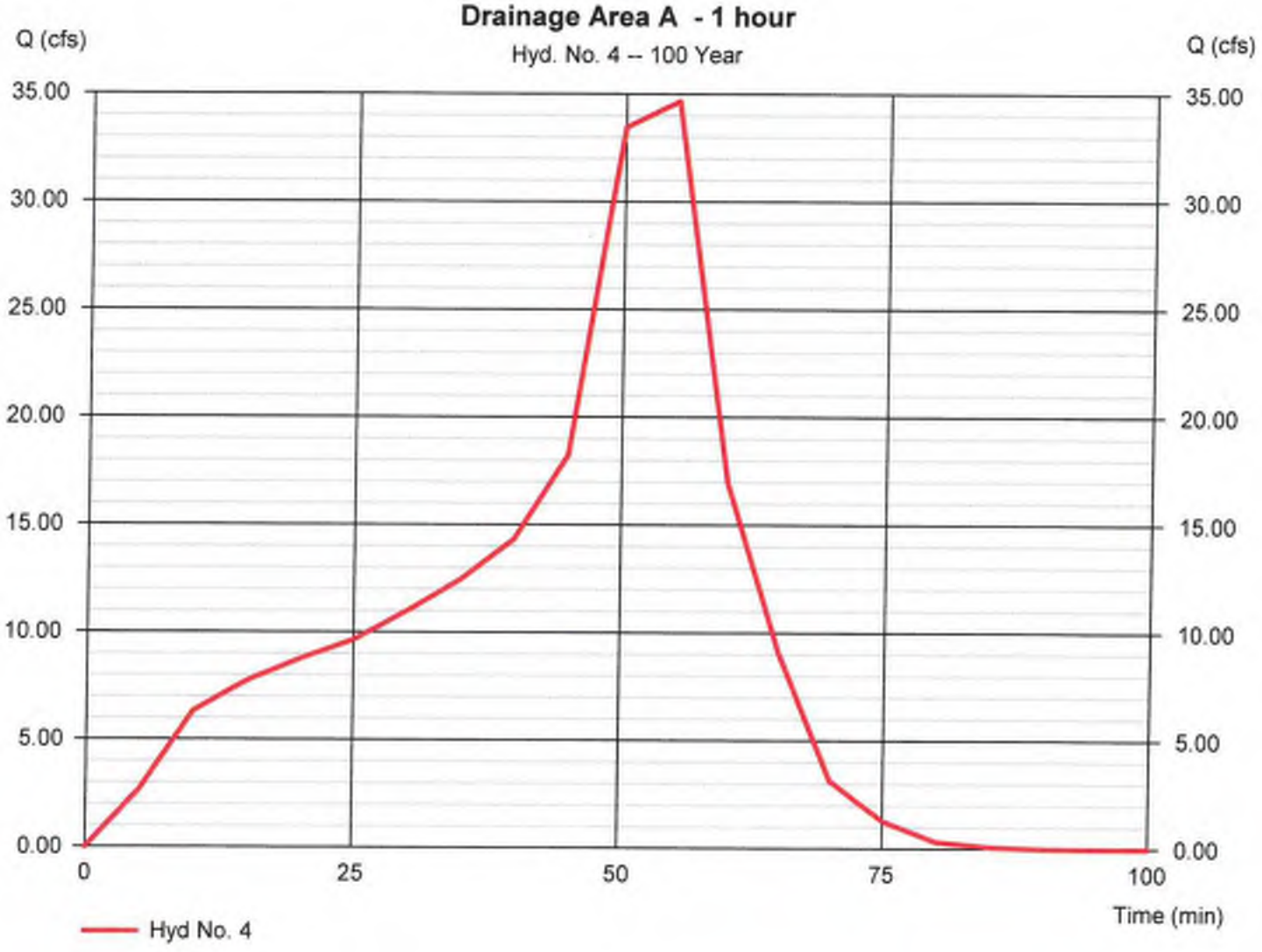
Hydrograph Report

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Hyd. No. 4

Drainage Area A - 1 hour

Hydrograph type	= Manual	Peak discharge	= 34.67 cfs
Storm frequency	= 100 yrs	Time to peak	= 55 min
Time interval	= 5 min	Hyd. volume	= 57,099 cuft



Hydrograph Report

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Hyd. No. 3

Drainage Area A - 3 hour

Hydrograph type	= Manual	Peak discharge	= 24.26 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.58 hrs
Time interval	= 5 min	Hyd. volume	= 96,183 cuft



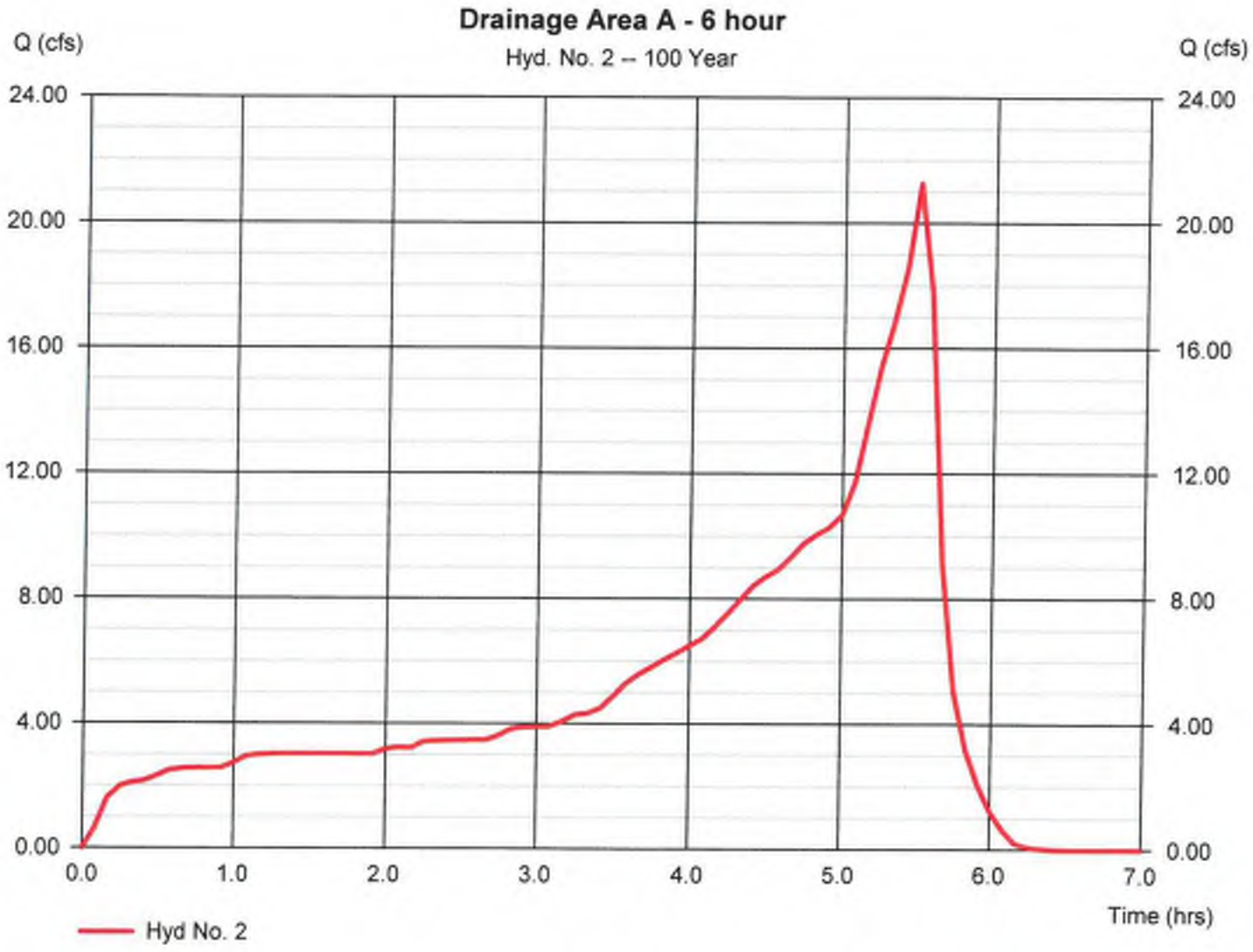
Hydrograph Report

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Hyd. No. 2

Drainage Area A - 6 hour

Hydrograph type	= Manual	Peak discharge	= 21.28 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.50 hrs
Time interval	= 5 min	Hyd. volume	= 122,820 cuft



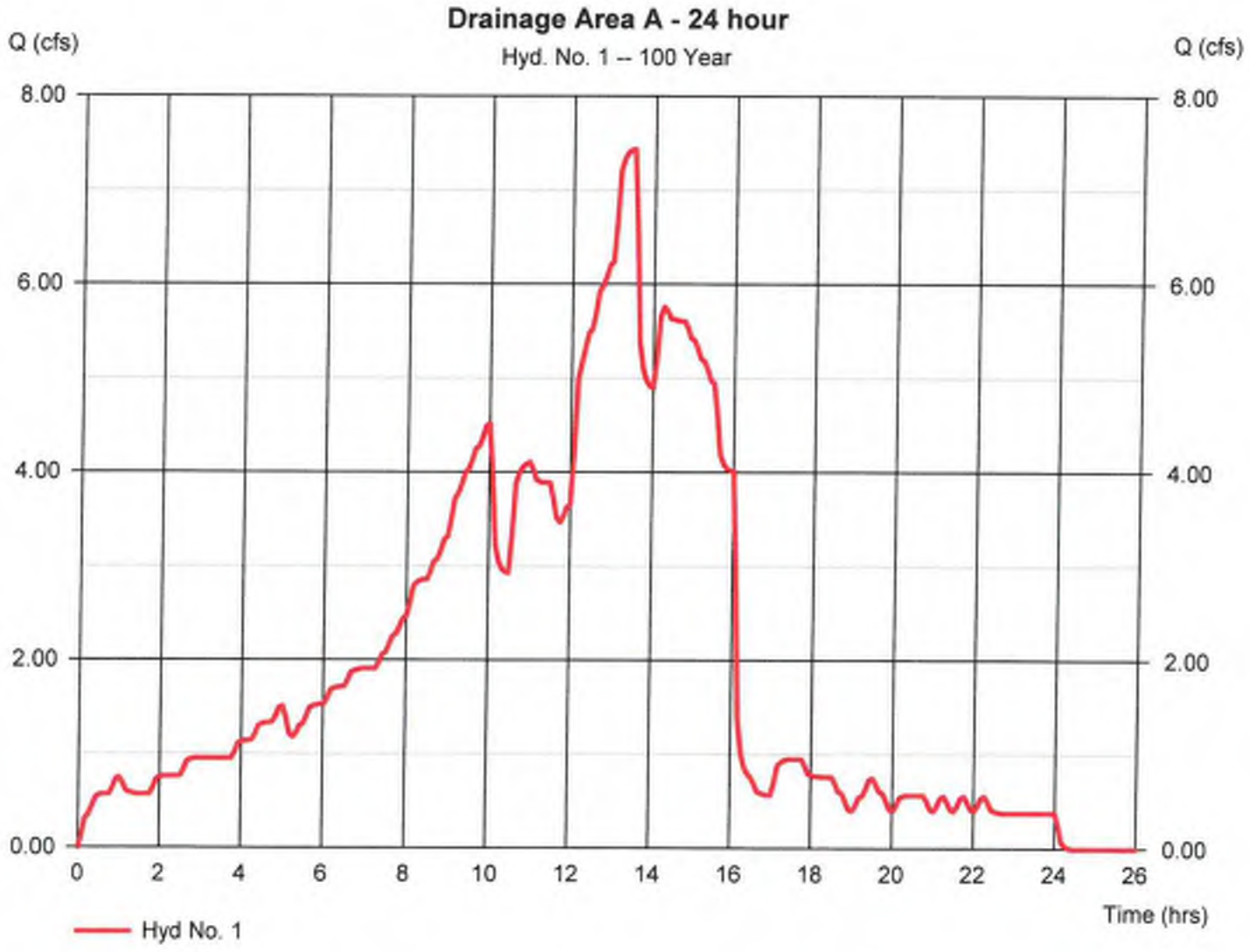
Hydrograph Report

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Hyd. No. 1

Drainage Area A - 24 hour

Hydrograph type	= Manual	Peak discharge	= 7.440 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.50 hrs
Time interval	= 5 min	Hyd. volume	= 183,228 cuft



Hydrograph Report

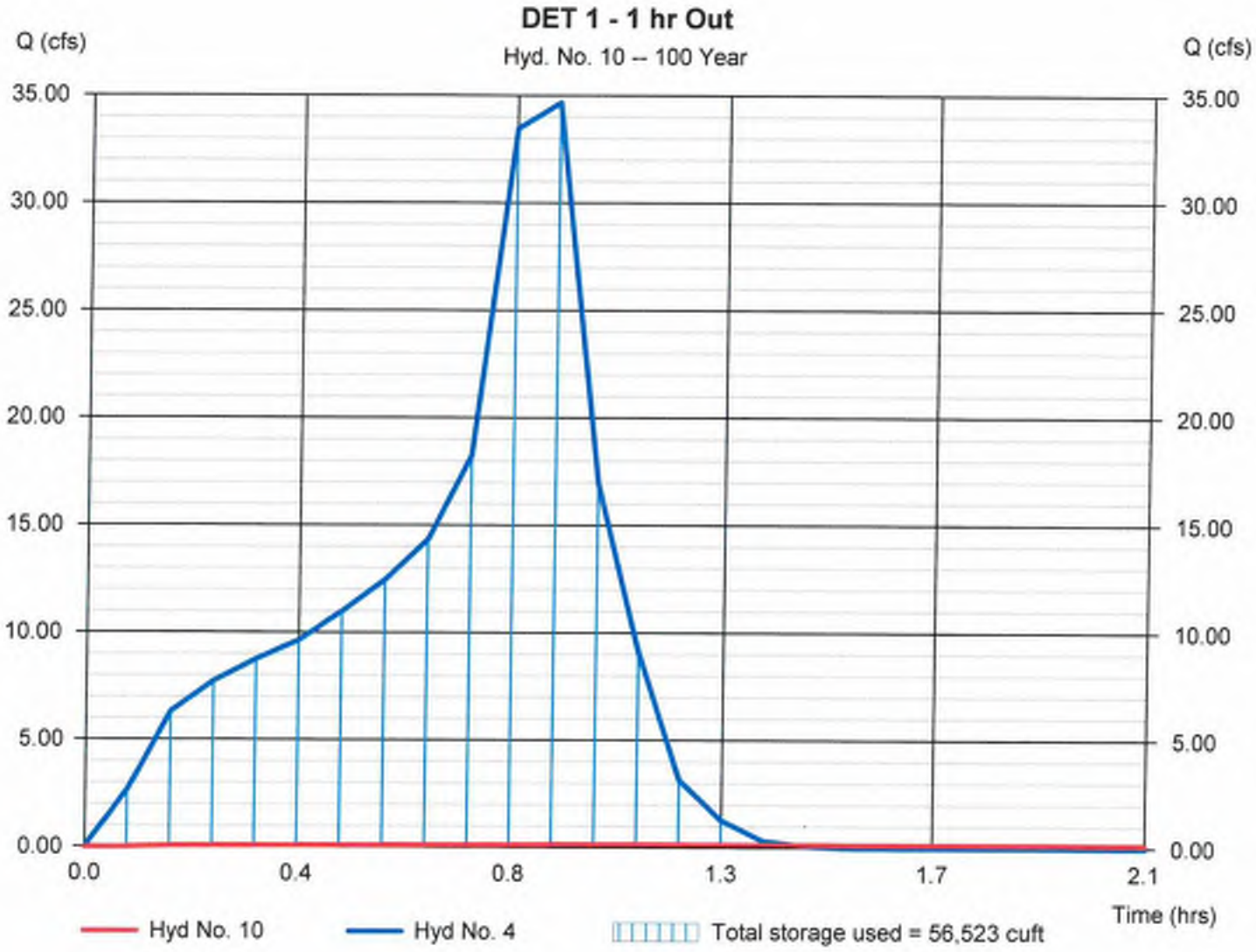
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Hyd. No. 10

DET 1 - 1 hr Out

Hydrograph type	= Reservoir	Peak discharge	= 0.156 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.42 hrs
Time interval	= 5 min	Hyd. volume	= 57,018 cuft
Inflow hyd. No.	= 4 - Drainage Area A - 1 hour	Max. Elevation	= 1550.79 ft
Reservoir name	= DETENTION SYSTEM A	Max. Storage	= 56,523 cuft

Storage Indication method used.



Hydrograph Report

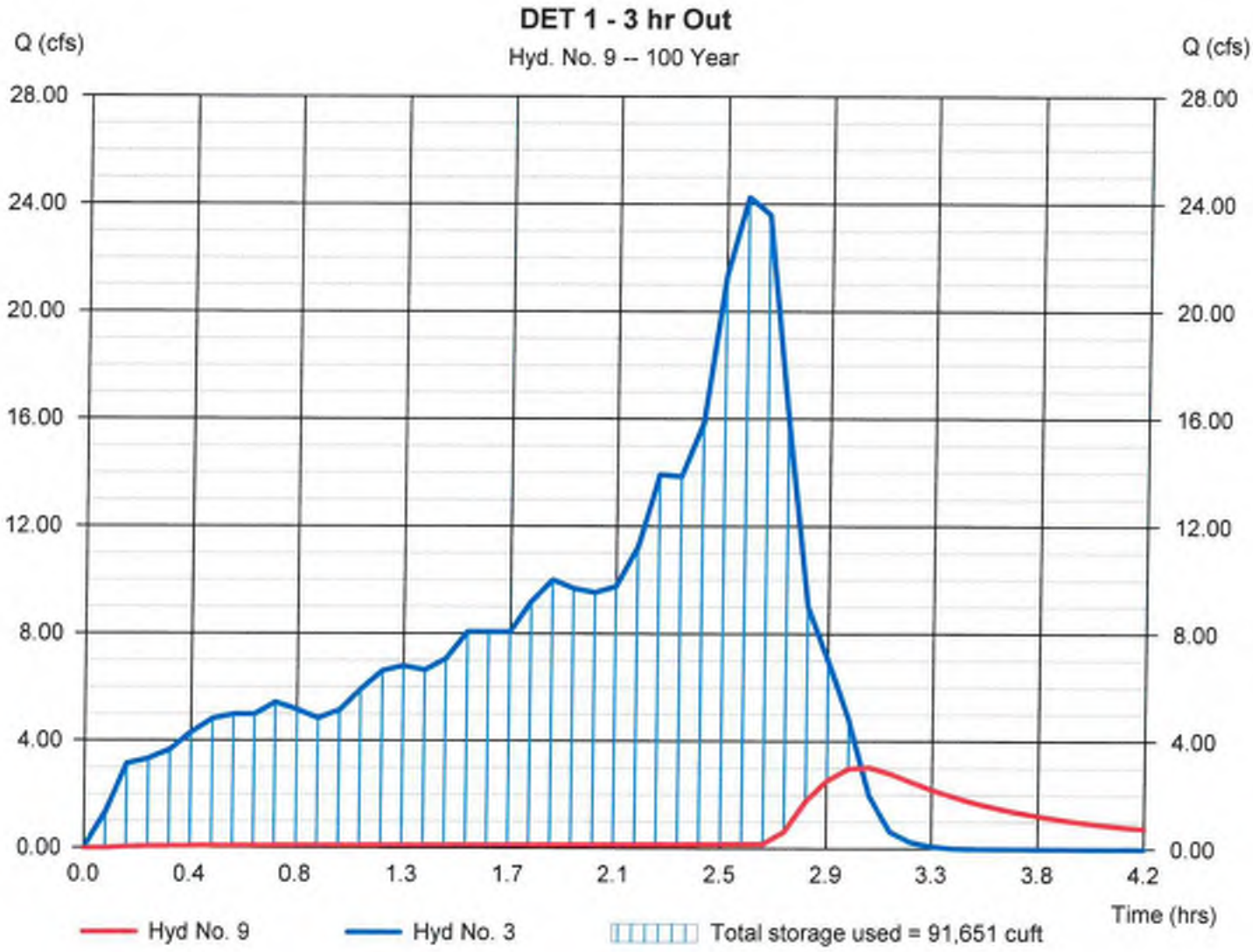
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Hyd. No. 9

DET 1 - 3 hr Out

Hydrograph type	= Reservoir	Peak discharge	= 3.040 cfs
Storm frequency	= 100 yrs	Time to peak	= 3.08 hrs
Time interval	= 5 min	Hyd. volume	= 96,103 cuft
Inflow hyd. No.	= 3 - Drainage Area A - 3 hour	Max. Elevation	= 1551.88 ft
Reservoir name	= DETENTION SYSTEM A	Max. Storage	= 91,651 cuft

Storage Indication method used.



Hydrograph Report

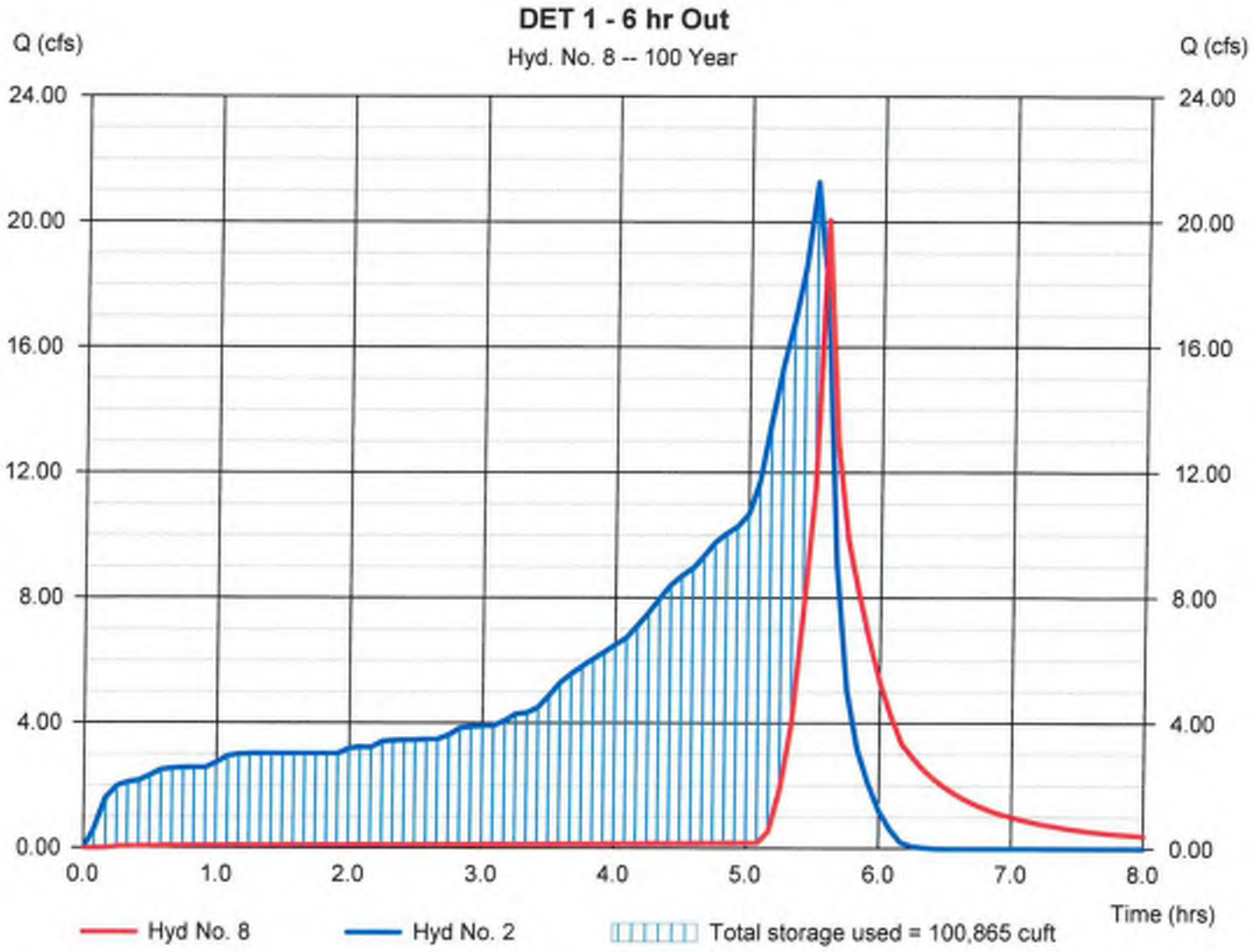
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Hyd. No. 8

DET 1 - 6 hr Out

Hydrograph type	= Reservoir	Peak discharge	= 20.07 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.58 hrs
Time interval	= 5 min	Hyd. volume	= 122,740 cuft
Inflow hyd. No.	= 2 - Drainage Area A - 6 hour	Max. Elevation	= 1552.75 ft
Reservoir name	= DETENTION SYSTEM A	Max. Storage	= 100,865 cuft

Storage Indication method used.



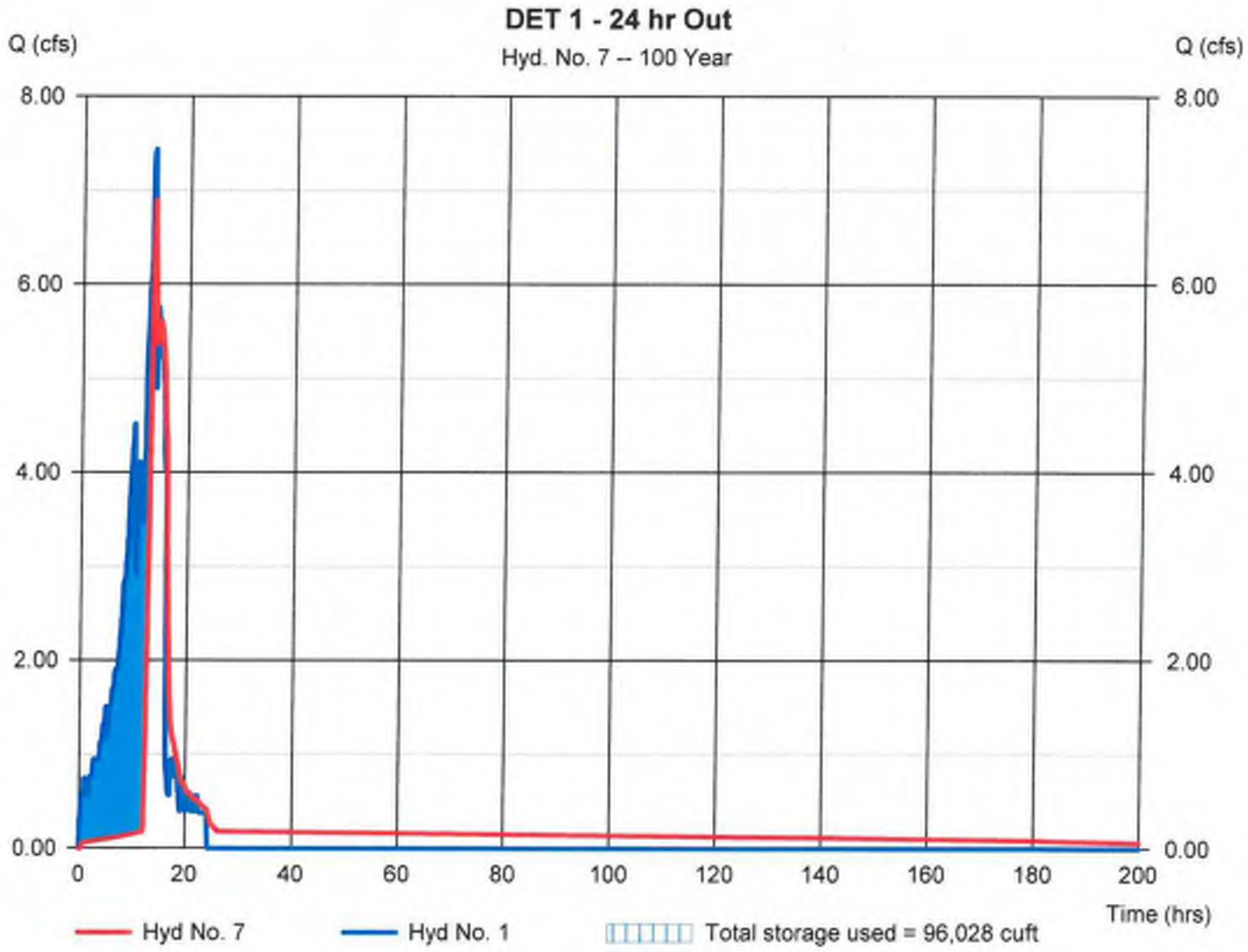
Hydrograph Report

Hyd. No. 7

DET 1 - 24 hr Out

Hydrograph type	= Reservoir	Peak discharge	= 6.901 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.58 hrs
Time interval	= 5 min	Hyd. volume	= 183,139 cuft
Inflow hyd. No.	= 1 - Drainage Area A - 24 hour	Max. Elevation	= 1552.12 ft
Reservoir name	= DETENTION SYSTEM A	Max. Storage	= 96,028 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - DETENTION SYSTEM A

Pond Data

UG Chambers -Invert elev. = 1548.50 ft, Rise x Span = 3.50 x 3.50 ft, Barrel Len = 750.00 ft, No. Barrels = 14, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1548.50	n/a	0	0
0.43	1548.93	n/a	1,361	1,361
0.85	1549.35	n/a	7,428	8,788
1.27	1549.78	n/a	12,059	20,847
1.70	1550.20	n/a	14,335	35,182
2.13	1550.63	n/a	15,350	50,532
2.55	1551.05	n/a	15,349	65,882
2.97	1551.47	n/a	14,347	80,229
3.40	1551.90	n/a	12,050	92,278
3.83	1552.32	n/a	7,405	99,684
4.25	1552.75	n/a	1,358	101,042

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	0.00	0.00	0.00
Span (in)	= 2.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1548.50	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

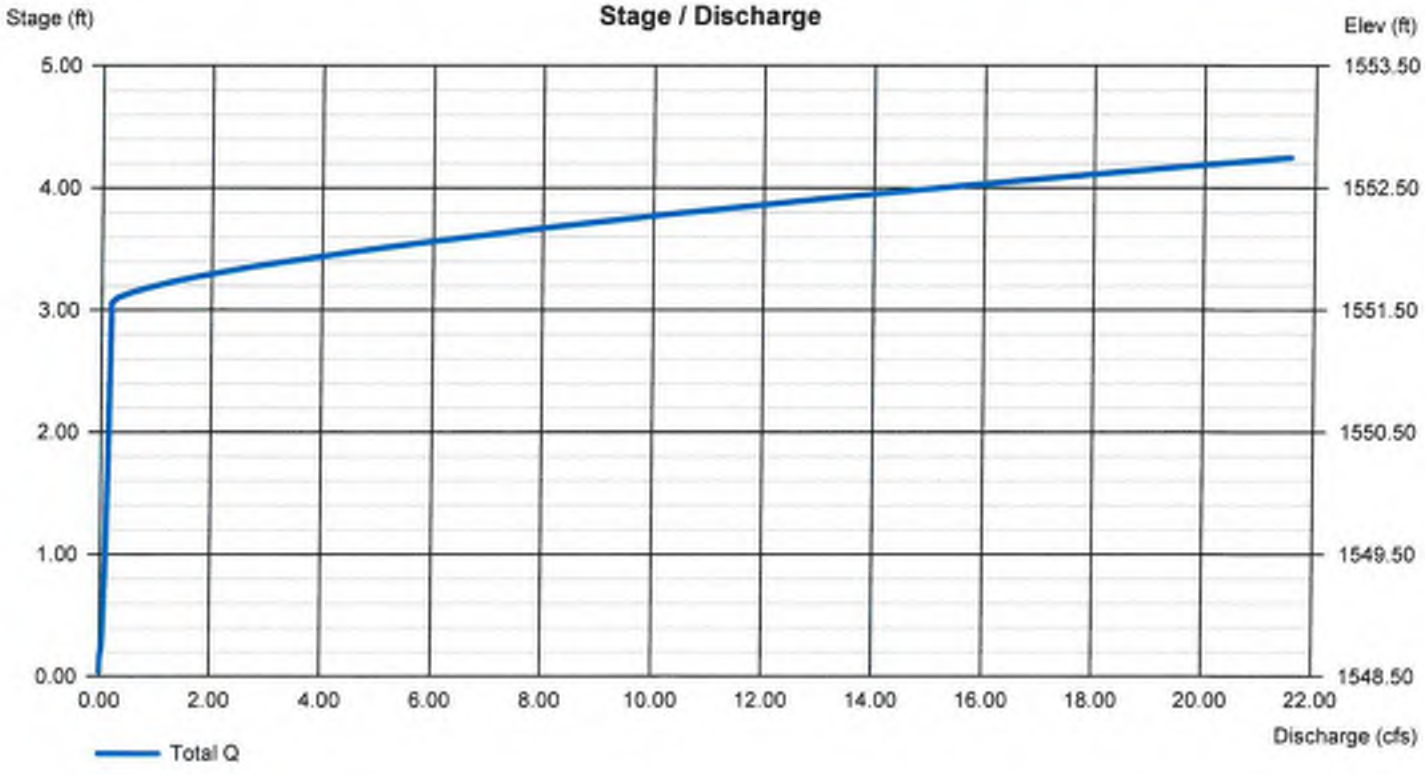
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 5.00	0.00	0.00	0.00
Crest El. (ft)	= 1551.57	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	2.940	5	810	77,763	------	------	------	Drainage Area B - 24 hour
2	Manual	0.000	5	n/a	0	------	------	------	Drainage Area B - 6 hour
3	Manual	0.000	5	n/a	0	------	------	------	Drianage Area B - 3 hour
4	Manual	0.000	5	n/a	0	------	------	------	Drainage Area B - 1 hour
6	Reservoir	0.370	5	985	77,702	1	1551.07	57,475	DET 2 - 24 hr
7	Reservoir	0.000	5	n/a	0	2	1548.50	0.000	DET 2 - 6 hr
8	Reservoir	0.000	5	n/a	0	3	1548.50	0.000	DET 2 - 3 hr
9	Reservoir	0.000	5	n/a	0	4	1548.50	0.000	DET 2 - 1 hr

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	7.730	5	810	190,287	------	------	------	Drainage Area B - 24 hour
2	Manual	22.10	5	330	127,854	------	------	------	Drainage Area B - 6 hour
3	Manual	25.20	5	155	99,945	------	------	------	Drianage Area B - 3 hour
4	Manual	36.01	5	55	59,313	------	------	------	Drainage Area B - 1 hour
6	Reservoir	6.986	5	815	190,226	1	1551.73	75,152	DET 2 - 24 hr
7	Reservoir	18.73	5	335	127,793	2	1552.36	84,657	DET 2 - 6 hr
8	Reservoir	12.55	5	170	99,884	3	1552.08	81,035	DET 2 - 3 hr
9	Reservoir	0.371	5	80	59,252	4	1551.09	58,033	DET 2 - 1 hr

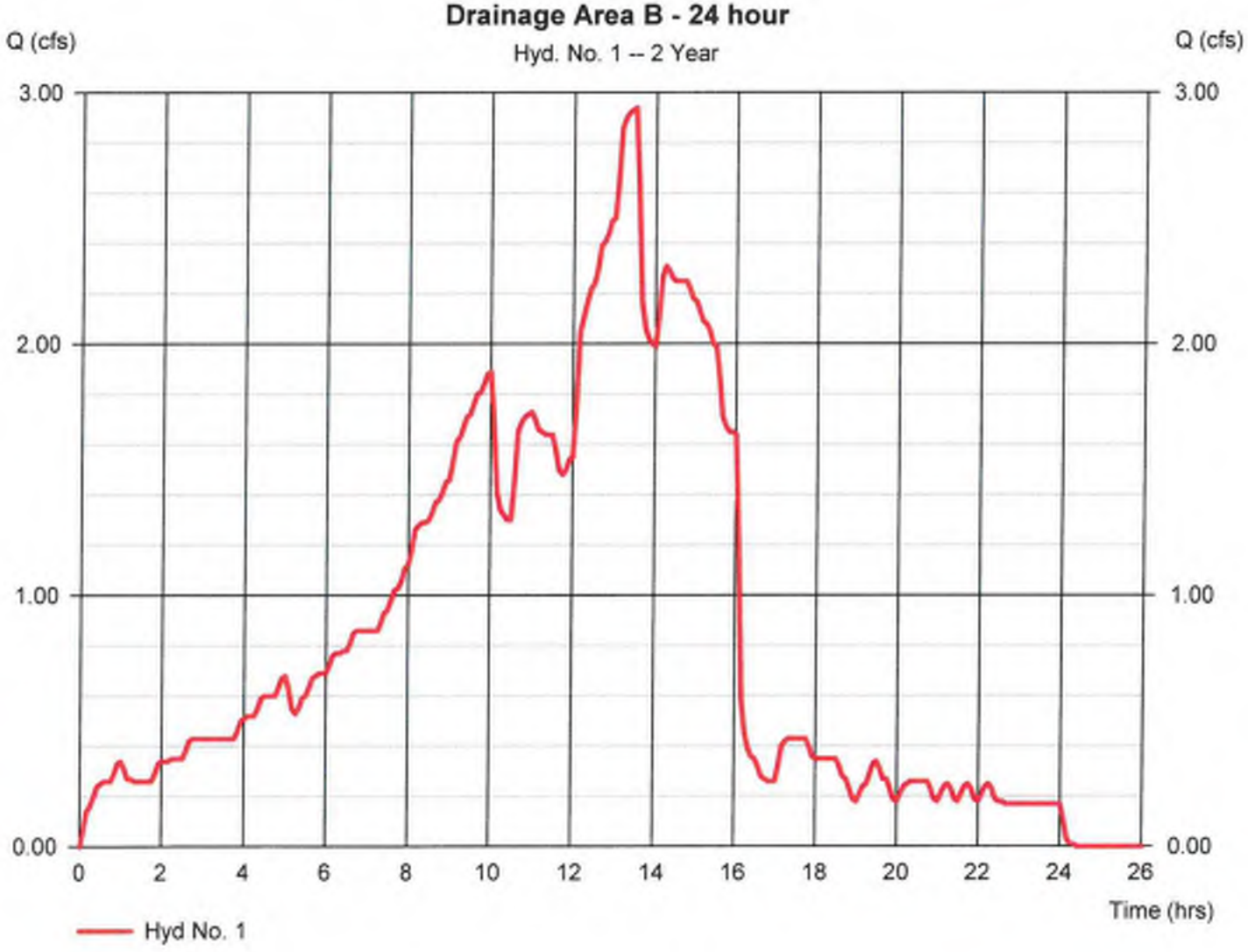
Hydrograph Report

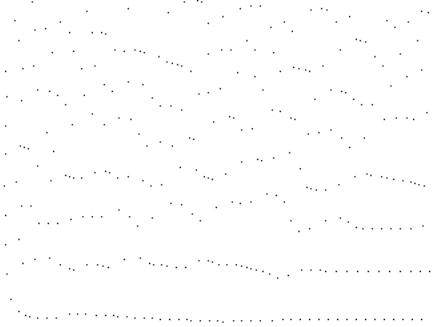
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 1

Drainage Area B - 24 hour

Hydrograph type	= Manual	Peak discharge	= 2.940 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.50 hrs
Time interval	= 5 min	Hyd. volume	= 77,763 cuft





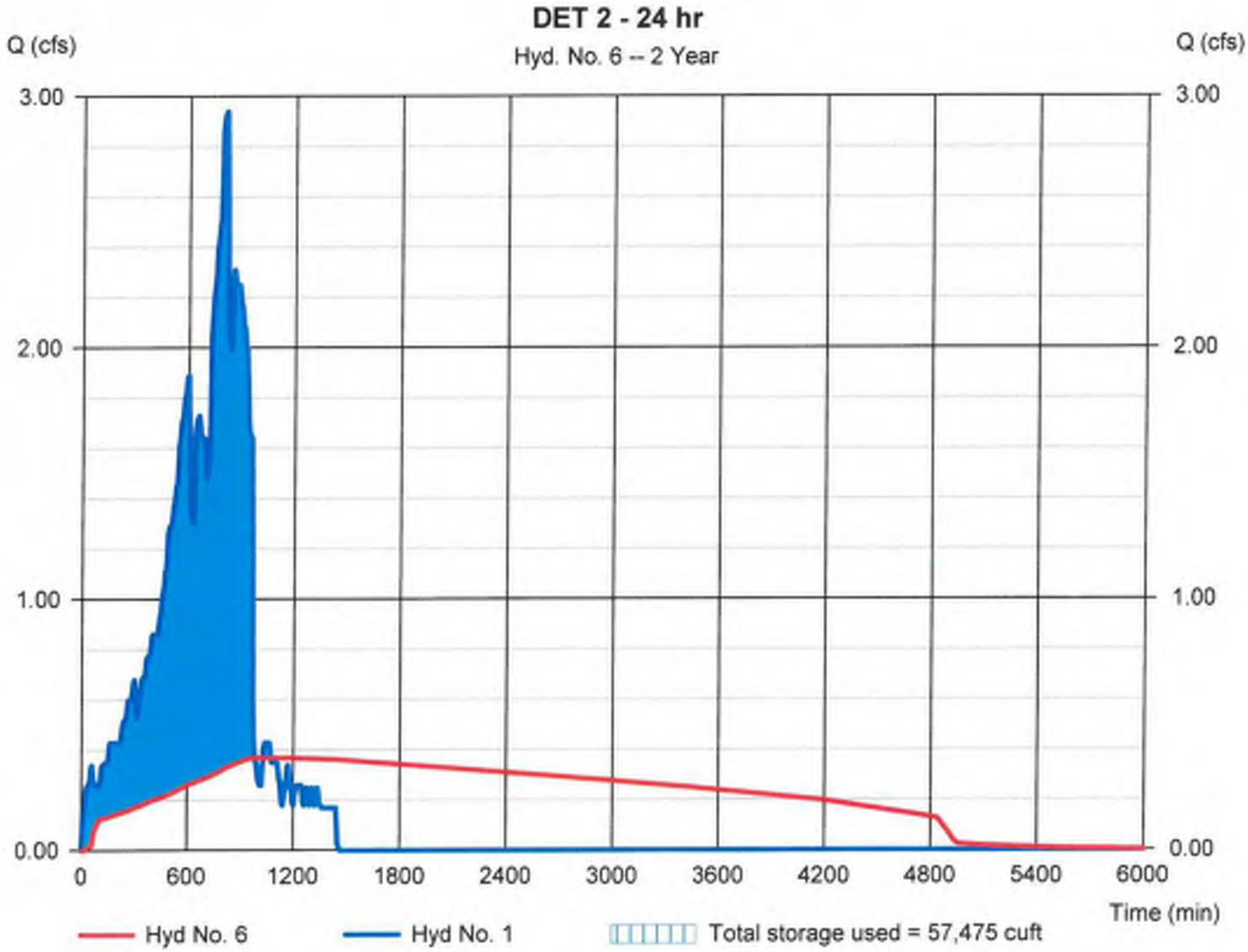
Hydrograph Report

Hyd. No. 6

DET 2 - 24 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.370 cfs
Storm frequency	= 2 yrs	Time to peak	= 985 min
Time interval	= 5 min	Hyd. volume	= 77,702 cuft
Inflow hyd. No.	= 1 - Drainage Area B - 24 hour	Max. Elevation	= 1551.07 ft
Reservoir name	= System 2	Max. Storage	= 57,475 cuft

Storage Indication method used.



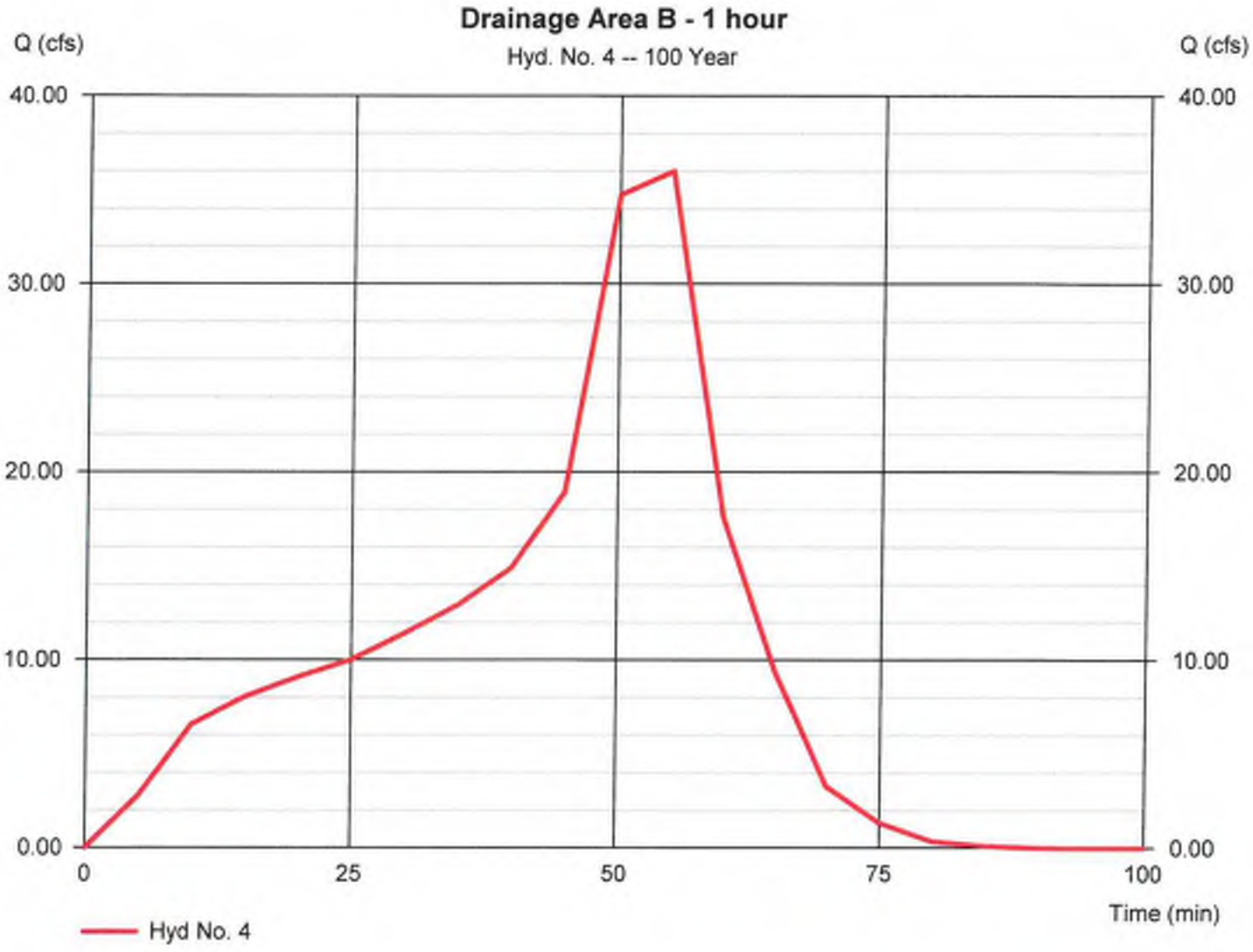
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 4

Drainage Area B - 1 hour

Hydrograph type	= Manual	Peak discharge	= 36.01 cfs
Storm frequency	= 100 yrs	Time to peak	= 55 min
Time interval	= 5 min	Hyd. volume	= 59,313 cuft



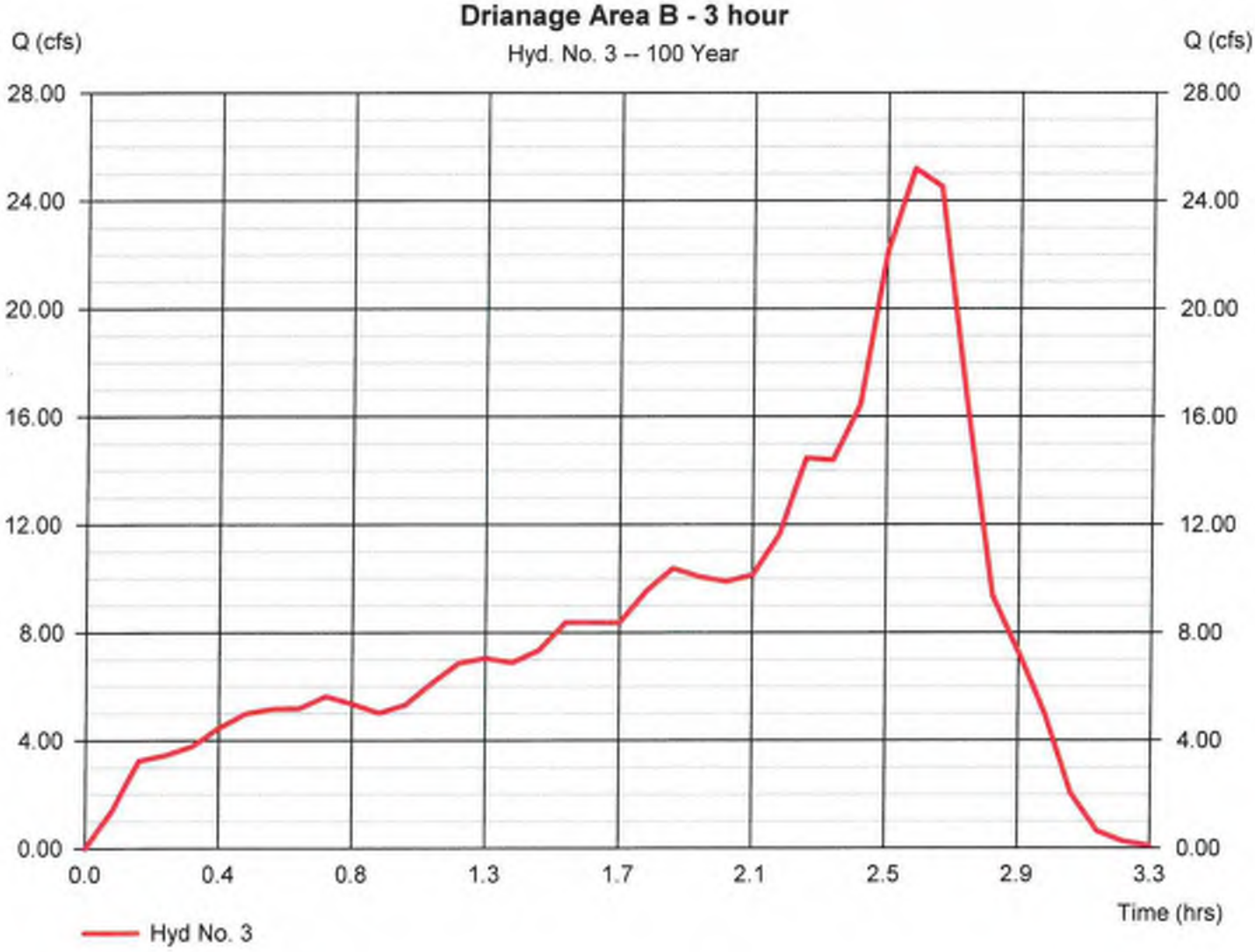
Hydrograph Report

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Hyd. No. 3

Drianage Area B - 3 hour

Hydrograph type	= Manual	Peak discharge	= 25.20 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.58 hrs
Time interval	= 5 min	Hyd. volume	= 99,945 cuft



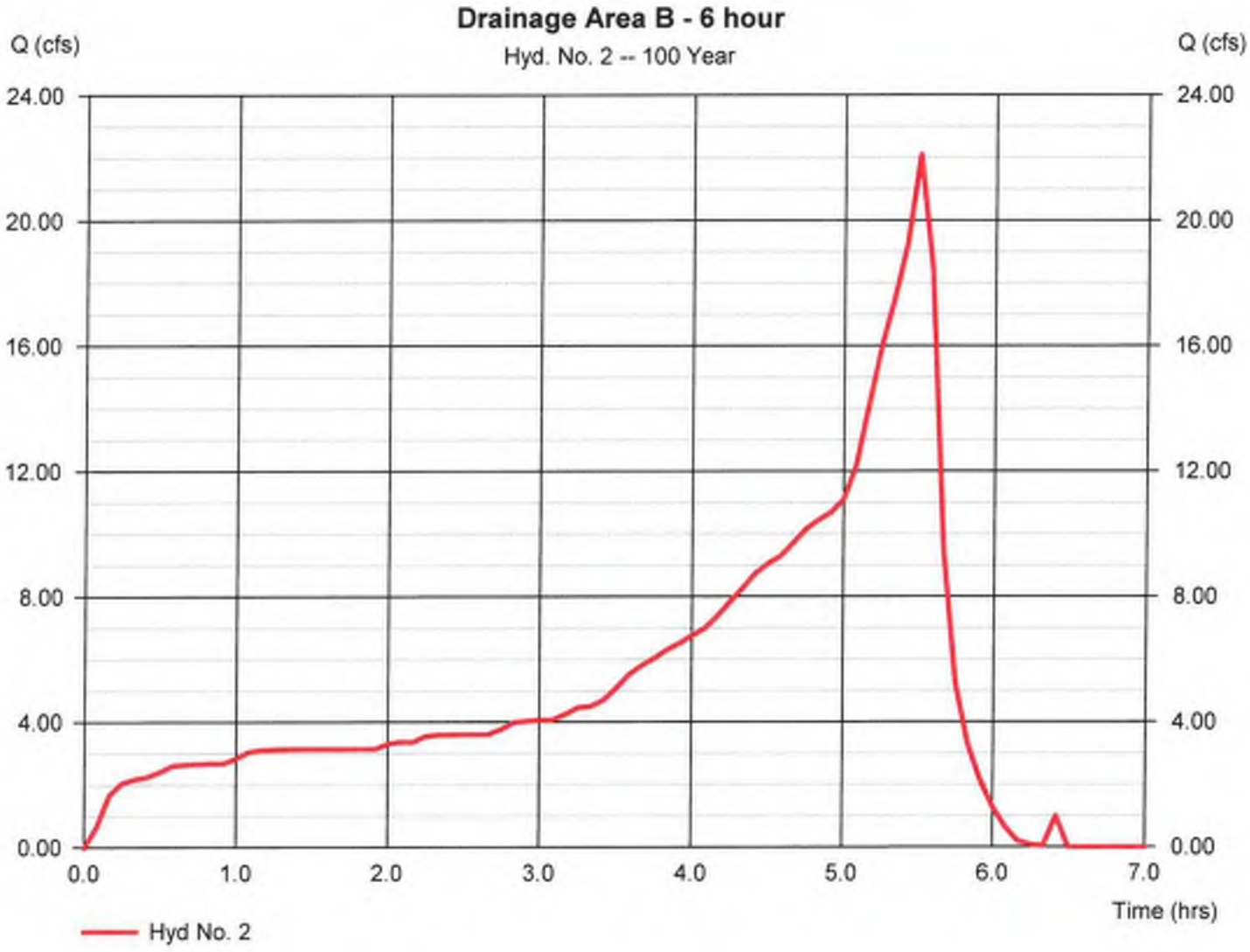
Hydrograph Report

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Hyd. No. 2

Drainage Area B - 6 hour

Hydrograph type	= Manual	Peak discharge	= 22.10 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.50 hrs
Time interval	= 5 min	Hyd. volume	= 127,854 cuft



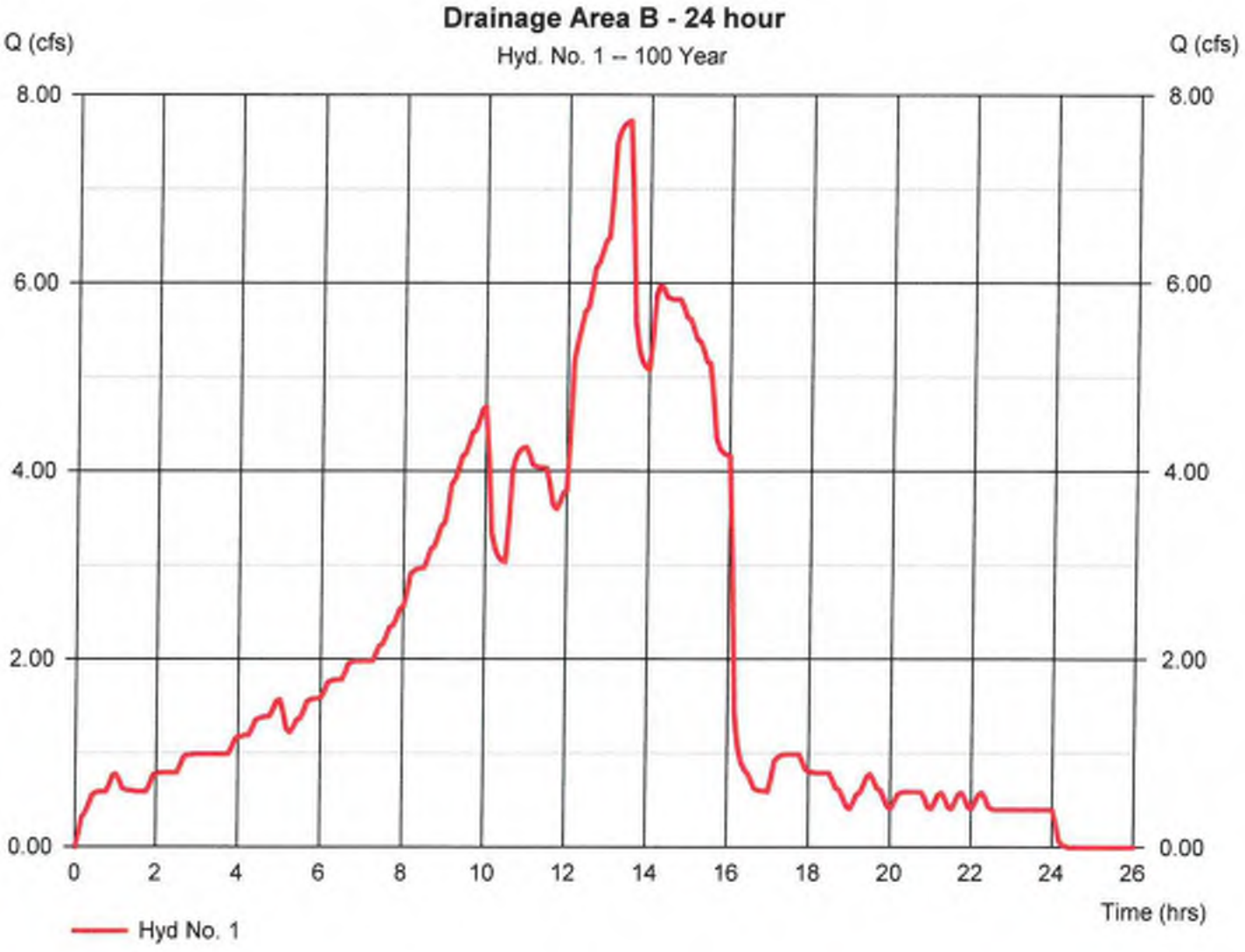
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 1

Drainage Area B - 24 hour

Hydrograph type	= Manual	Peak discharge	= 7.730 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.50 hrs
Time interval	= 5 min	Hyd. volume	= 190,287 cuft



Hydrograph Report

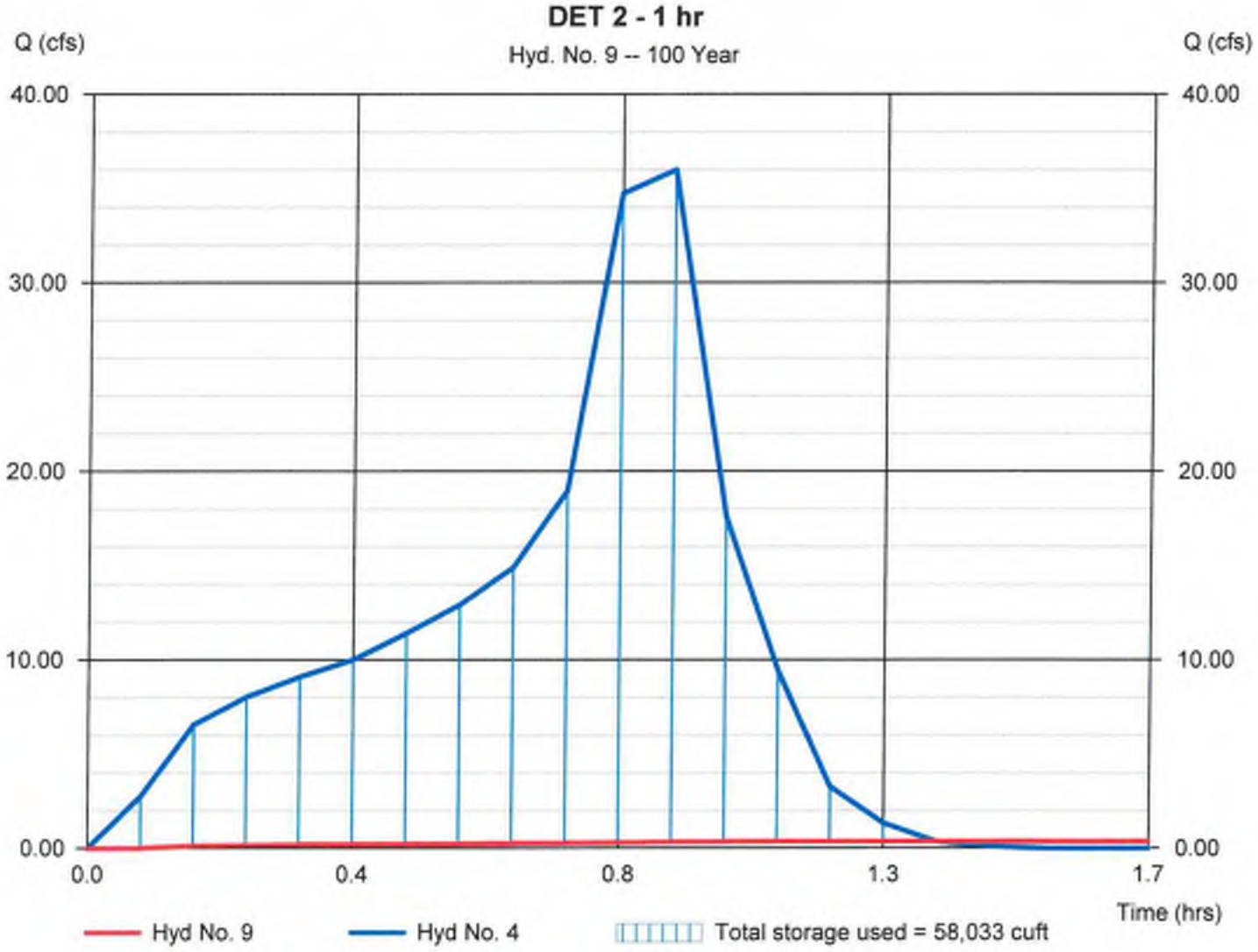
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 9

DET 2 - 1 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.371 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.33 hrs
Time interval	= 5 min	Hyd. volume	= 59,252 cuft
Inflow hyd. No.	= 4 - Drainage Area B - 1 hour	Max. Elevation	= 1551.09 ft
Reservoir name	= System 2	Max. Storage	= 58,033 cuft

Storage Indication method used.



Hydrograph Report

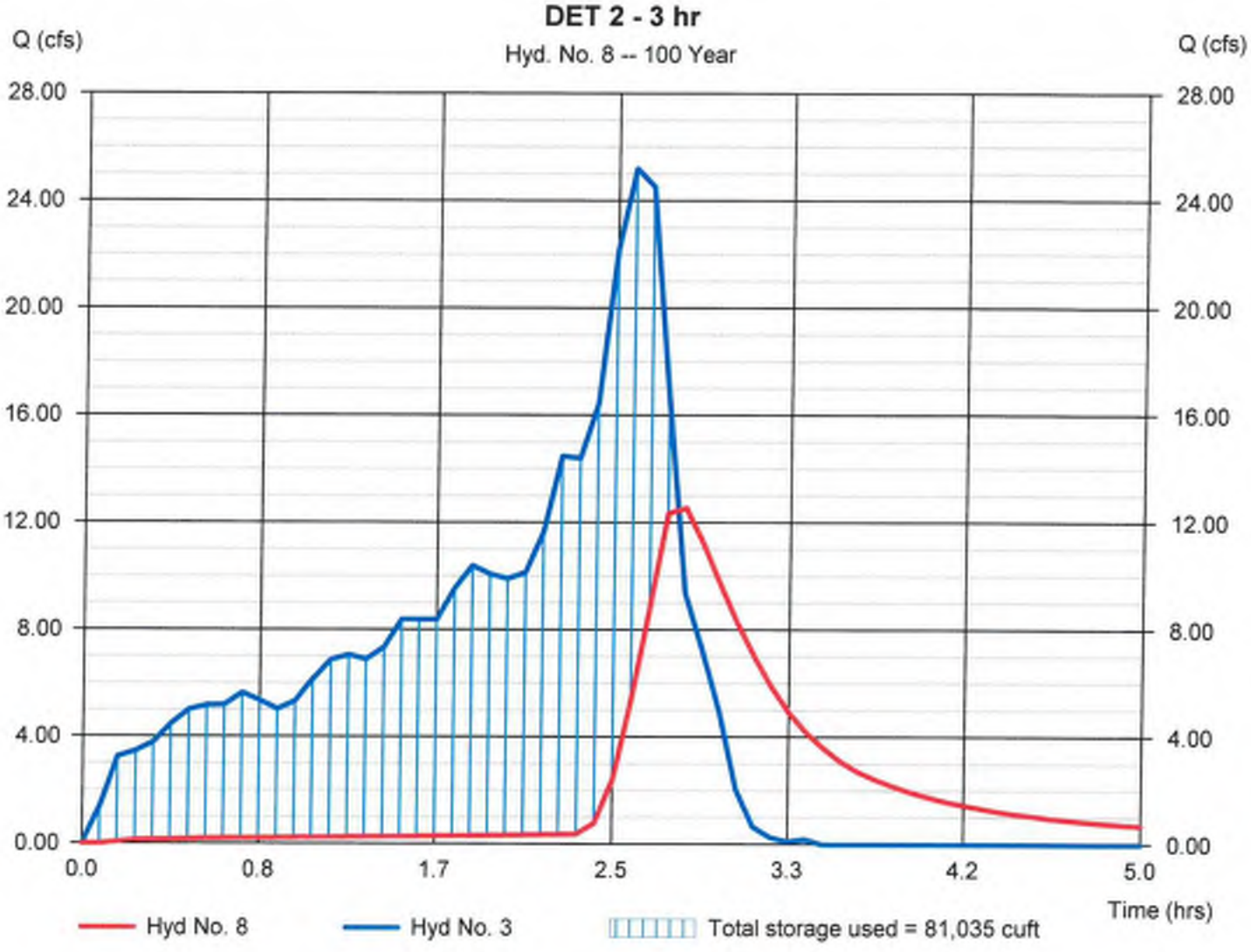
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 8

DET 2 - 3 hr

Hydrograph type	= Reservoir	Peak discharge	= 12.55 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.83 hrs
Time interval	= 5 min	Hyd. volume	= 99,884 cuft
Inflow hyd. No.	= 3 - Drianage Area B - 3 hour	Max. Elevation	= 1552.08 ft
Reservoir name	= System 2	Max. Storage	= 81,035 cuft

Storage Indication method used.



Hydrograph Report

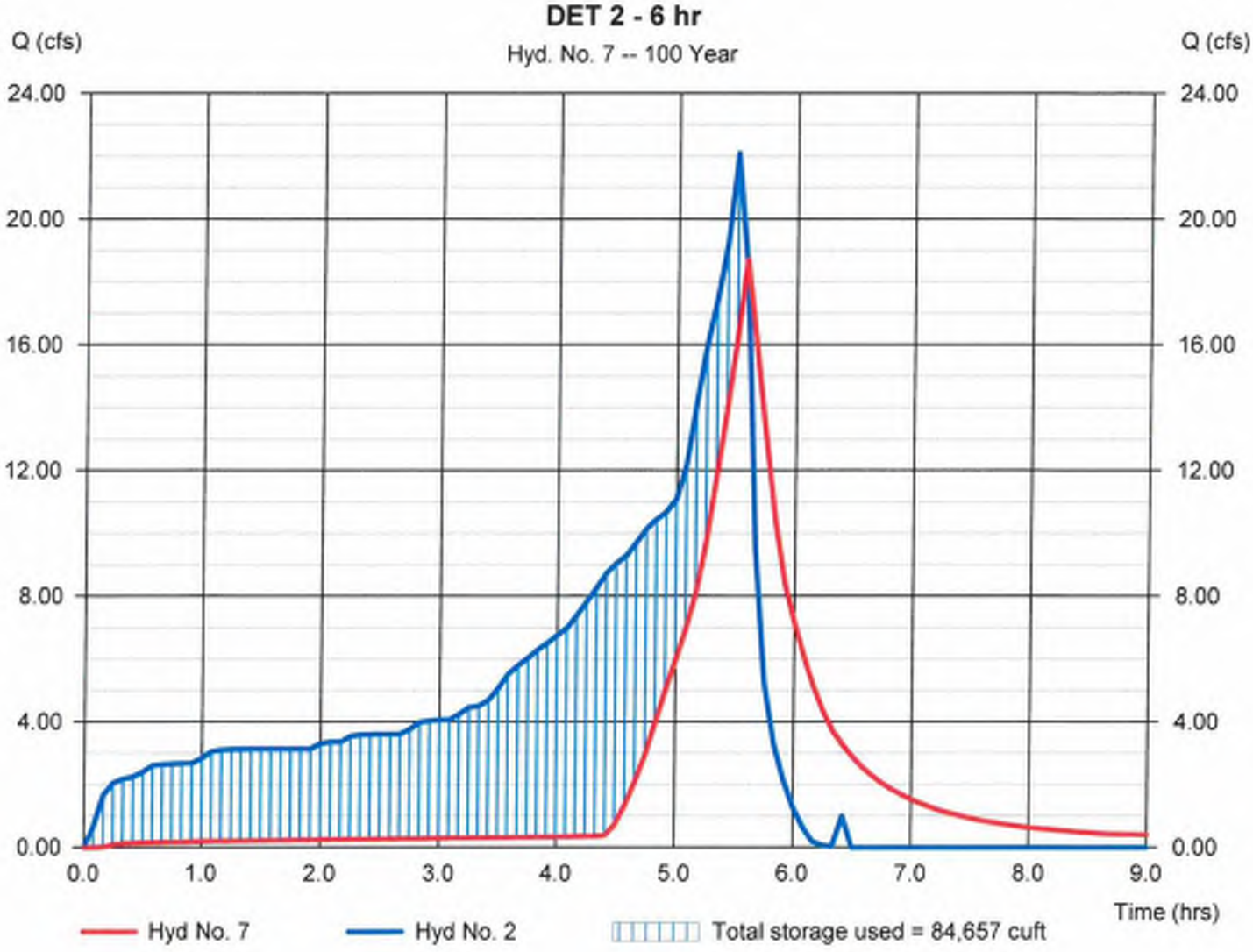
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 7

DET 2 - 6 hr

Hydrograph type	= Reservoir	Peak discharge	= 18.73 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.58 hrs
Time interval	= 5 min	Hyd. volume	= 127,793 cuft
Inflow hyd. No.	= 2 - Drainage Area B - 6 hour	Max. Elevation	= 1552.36 ft
Reservoir name	= System 2	Max. Storage	= 84,657 cuft

Storage Indication method used.



Hydrograph Report

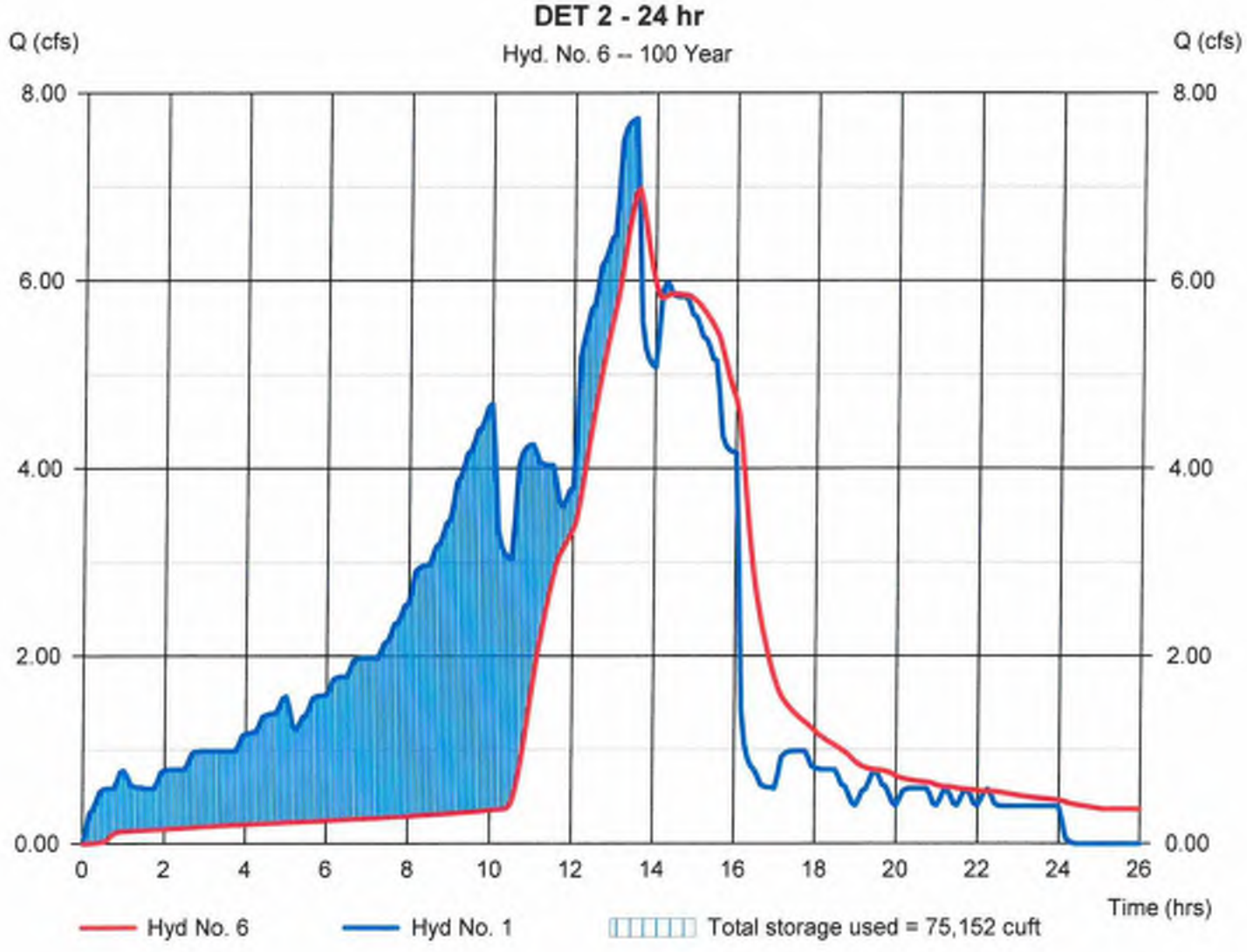
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Wednesday, 07 / 11 / 2018

Hyd. No. 6

DET 2 - 24 hr

Hydrograph type	= Reservoir	Peak discharge	= 6.986 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.58 hrs
Time interval	= 5 min	Hyd. volume	= 190,226 cuft
Inflow hyd. No.	= 1 - Drainage Area B - 24 hour	Max. Elevation	= 1551.74 ft
Reservoir name	= System 2	Max. Storage	= 75,152 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - System 2

Pond Data

UG Chambers -Invert elev. = 1548.50 ft, Rise x Span = 3.50 x 3.50 ft, Barrel Len = 685.00 ft, No. Barrels = 13, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1548.50	n/a	0	0
0.42	1548.92	n/a	1,276	1,276
0.84	1549.34	n/a	6,496	7,772
1.26	1549.76	n/a	10,222	17,994
1.67	1550.17	n/a	12,027	30,021
2.09	1550.59	n/a	12,836	42,856
2.51	1551.01	n/a	12,835	55,691
2.93	1551.43	n/a	12,037	67,728
3.35	1551.85	n/a	10,202	77,930
3.77	1552.27	n/a	6,489	84,419
4.18	1552.69	n/a	1,274	85,693

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	0.00	0.00	0.00
Span (in)	= 3.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1548.50	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

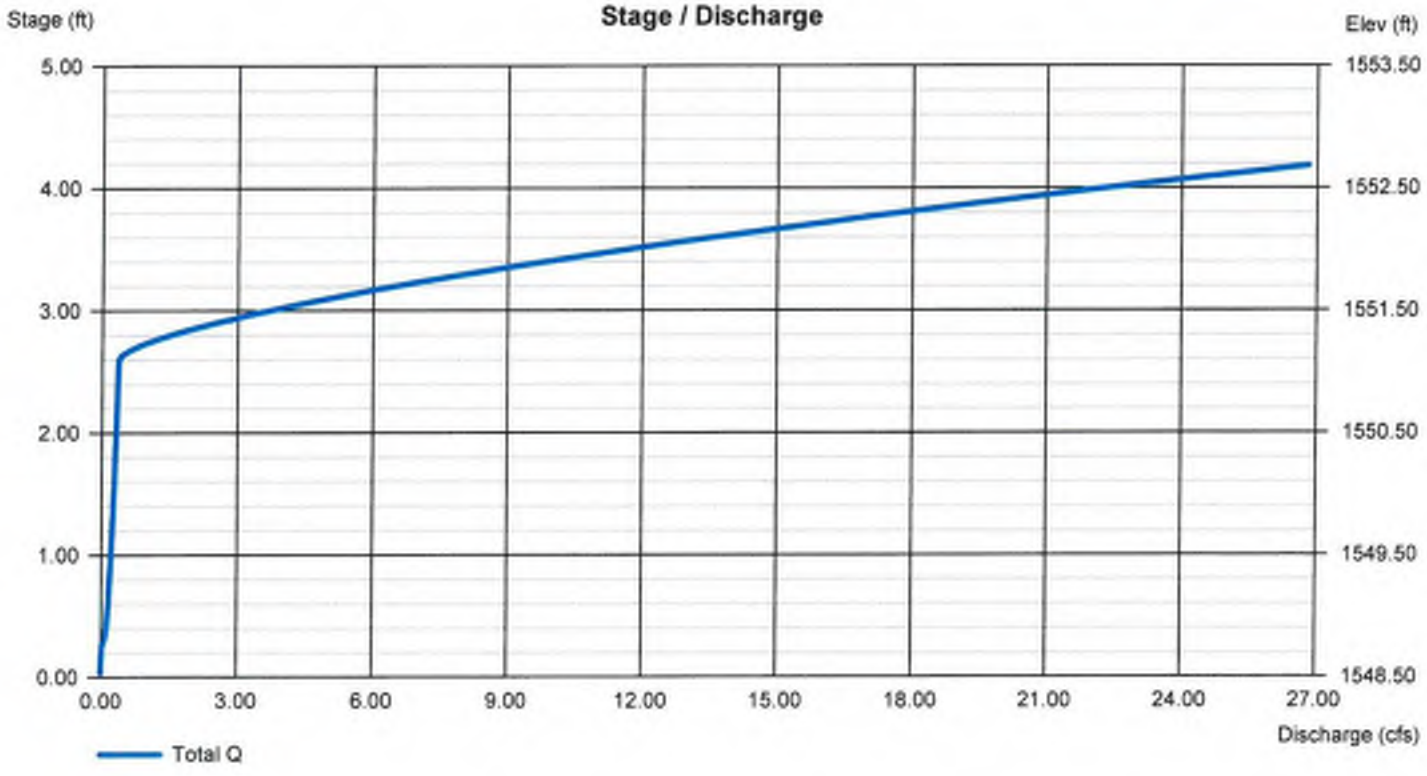
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 1551.11	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	0.460	5	790	12,219	------	------	------	Drainage Area C - 24 hour
2	Manual	0.000	5	n/a	0	------	------	------	Drainage Area C - 6 hour
3	Manual	0.000	5	n/a	0	------	------	------	Drinage Area C - 3 hour
4	Manual	0.000	5	n/a	0	------	------	------	Drainage Area C - 1 hour
6	Reservoir	0.145	5	965	12,163	1	1549.39	6,295	DET 3 - 24 hr
7	Reservoir	0.000	5	n/a	0	2	1548.50	0.000	DET 3 - 6 hr
8	Reservoir	0.000	5	n/a	0	3	1548.50	0.000	DET 3 - 3 hr
9	Reservoir	0.000	5	n/a	0	4	1548.50	0.000	DET 3 - 1 hr

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	1.220	5	795	29,937	------	------	------	Drainage Area C - 24 hour
2	Manual	3.700	5	330	20,166	------	------	------	Drainage Area C - 6 hour
3	Manual	4.240	5	155	15,927	------	------	------	Drinage Area C - 3 hour
4	Manual	6.890	5	50	10,518	------	------	------	Drainage Area C - 1 hour
6	Reservoir	0.902	5	890	29,881	1	1549.84	13,206	DET 3 - 24 hr
7	Reservoir	1.852	5	335	20,110	2	1549.95	15,008	DET 3 - 6 hr
8	Reservoir	0.987	5	175	15,871	3	1549.85	13,392	DET 3 - 3 hr
9	Reservoir	0.167	5	85	10,462	4	1549.64	9,899	DET 3 - 1 hr

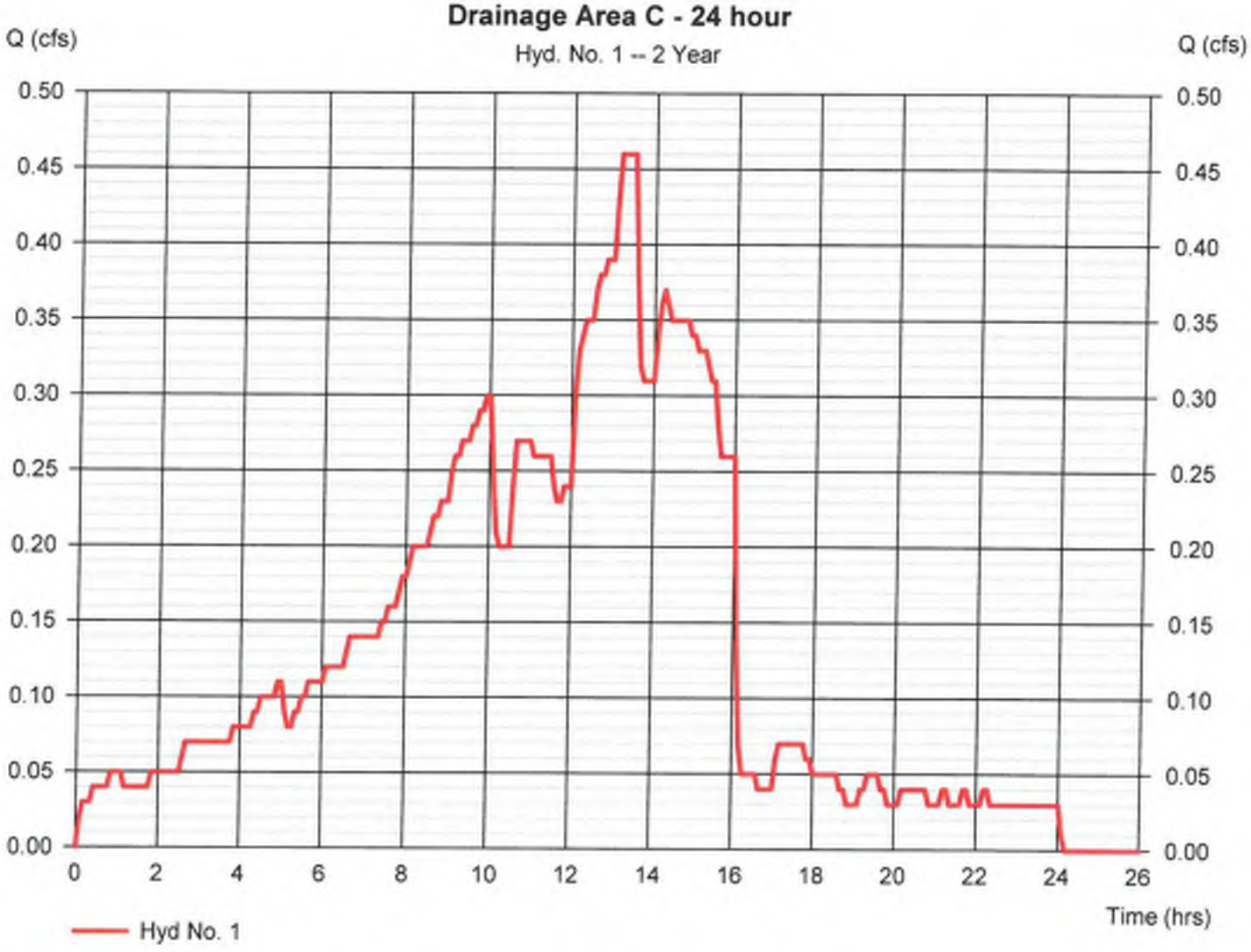
Hydrograph Report

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Hyd. No. 1

Drainage Area C - 24 hour

Hydrograph type	= Manual	Peak discharge	= 0.460 cfs
Storm frequency	= 2 yrs	Time to peak	= 13.17 hrs
Time interval	= 5 min	Hyd. volume	= 12,219 cuft



Hydrograph Report

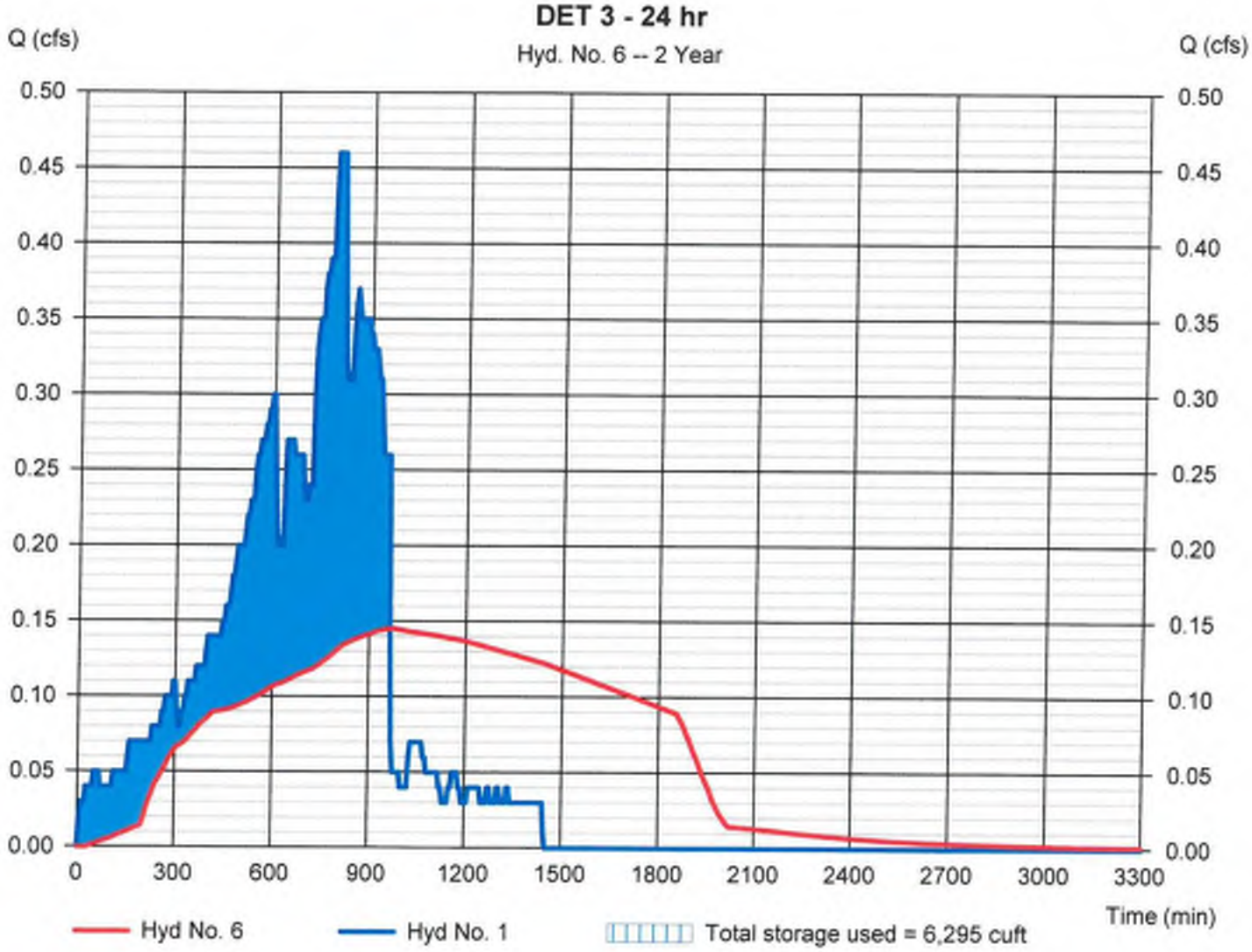
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 07 / 11 / 2018

Hyd. No. 6

DET 3 - 24 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.145 cfs
Storm frequency	= 2 yrs	Time to peak	= 965 min
Time interval	= 5 min	Hyd. volume	= 12,163 cuft
Inflow hyd. No.	= 1 - Drainage Area C - 24 hour	Max. Elevation	= 1549.39 ft
Reservoir name	= System 3	Max. Storage	= 6,295 cuft

Storage Indication method used.



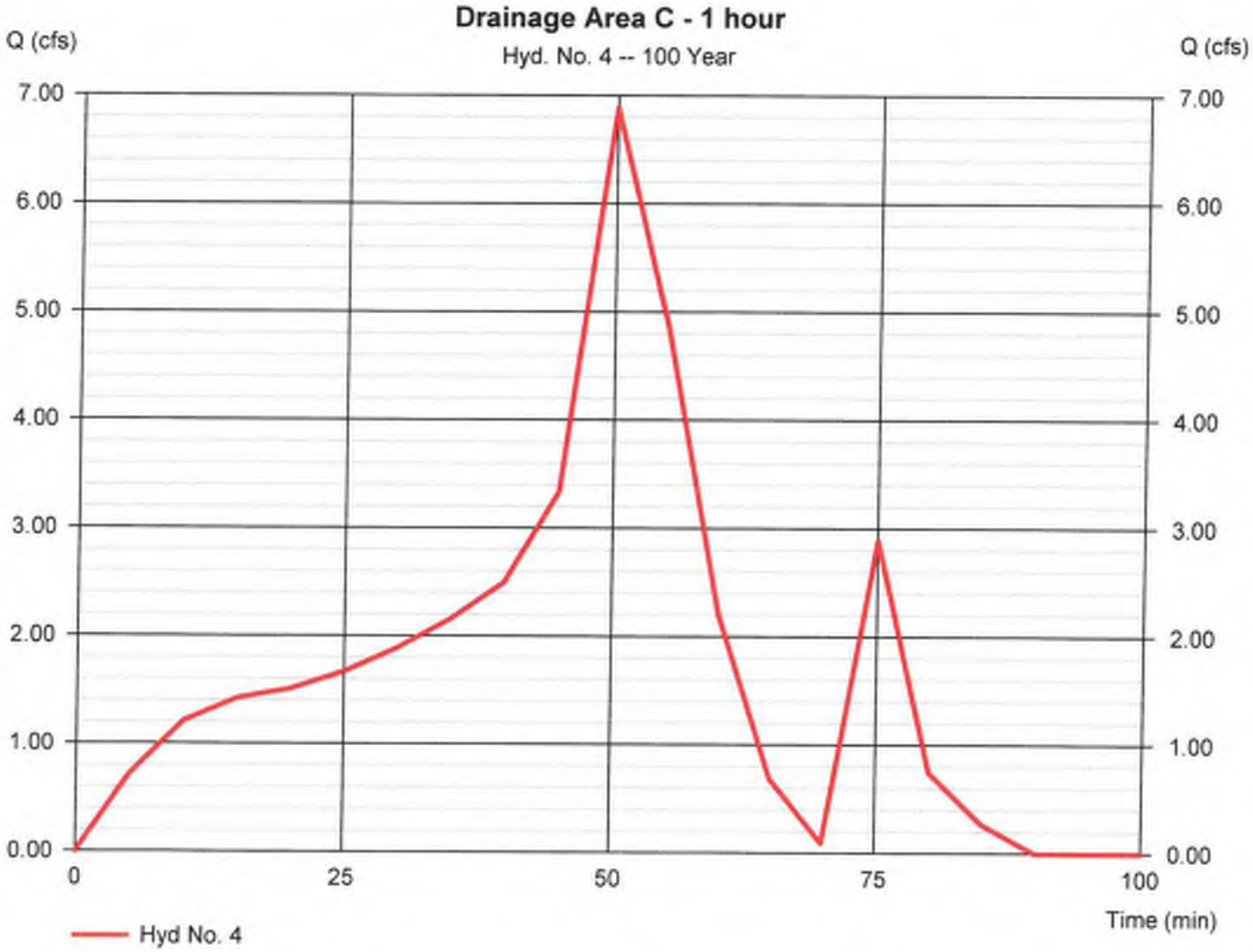
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Thursday, 07 / 12 / 2018

Hyd. No. 4

Drainage Area C - 1 hour

Hydrograph type	= Manual	Peak discharge	= 6.890 cfs
Storm frequency	= 100 yrs	Time to peak	= 50 min
Time interval	= 5 min	Hyd. volume	= 10,518 cuft



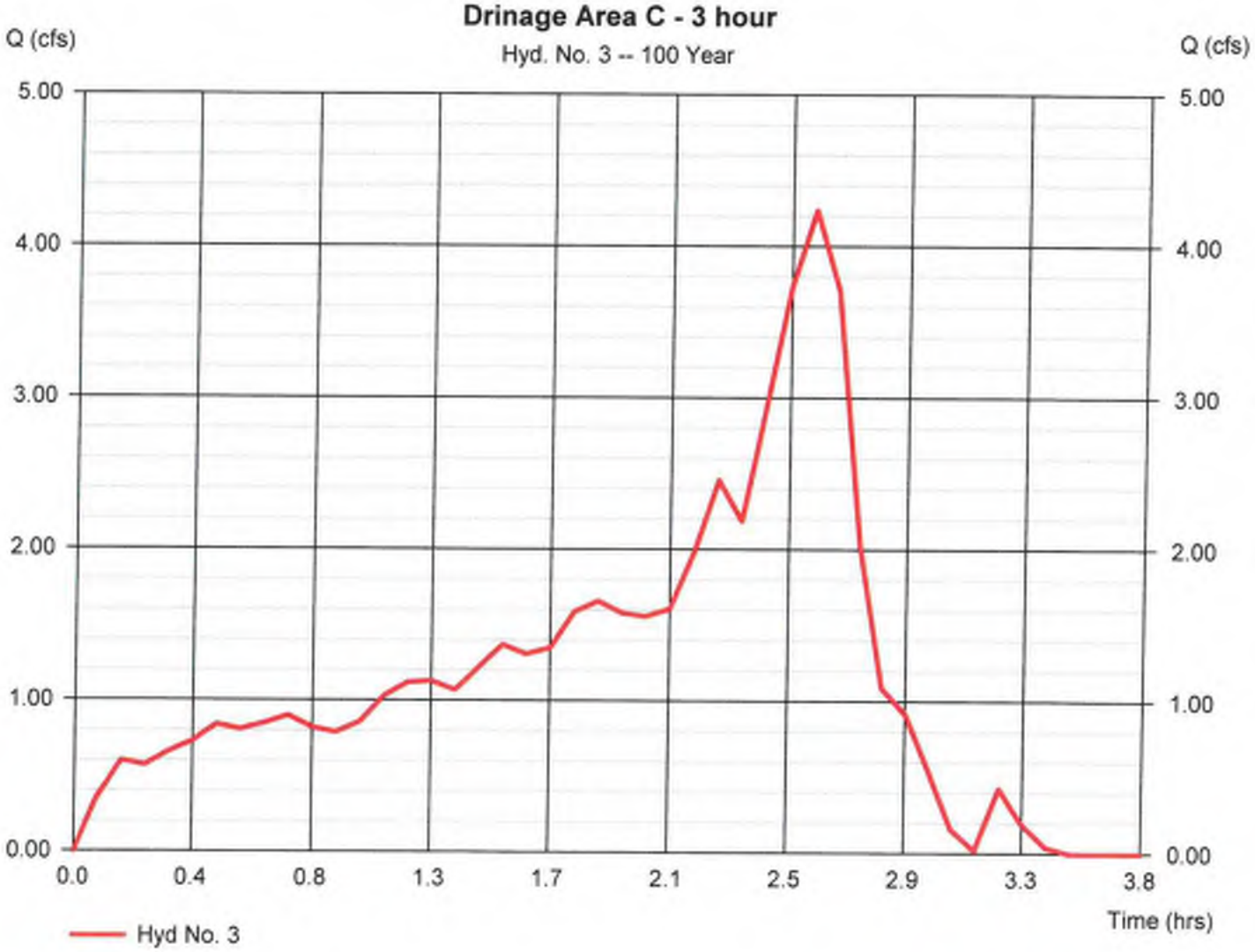
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Thursday, 07 / 12 / 2018

Hyd. No. 3

Drinage Area C - 3 hour

Hydrograph type	= Manual	Peak discharge	= 4.240 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.58 hrs
Time interval	= 5 min	Hyd. volume	= 15,927 cuft



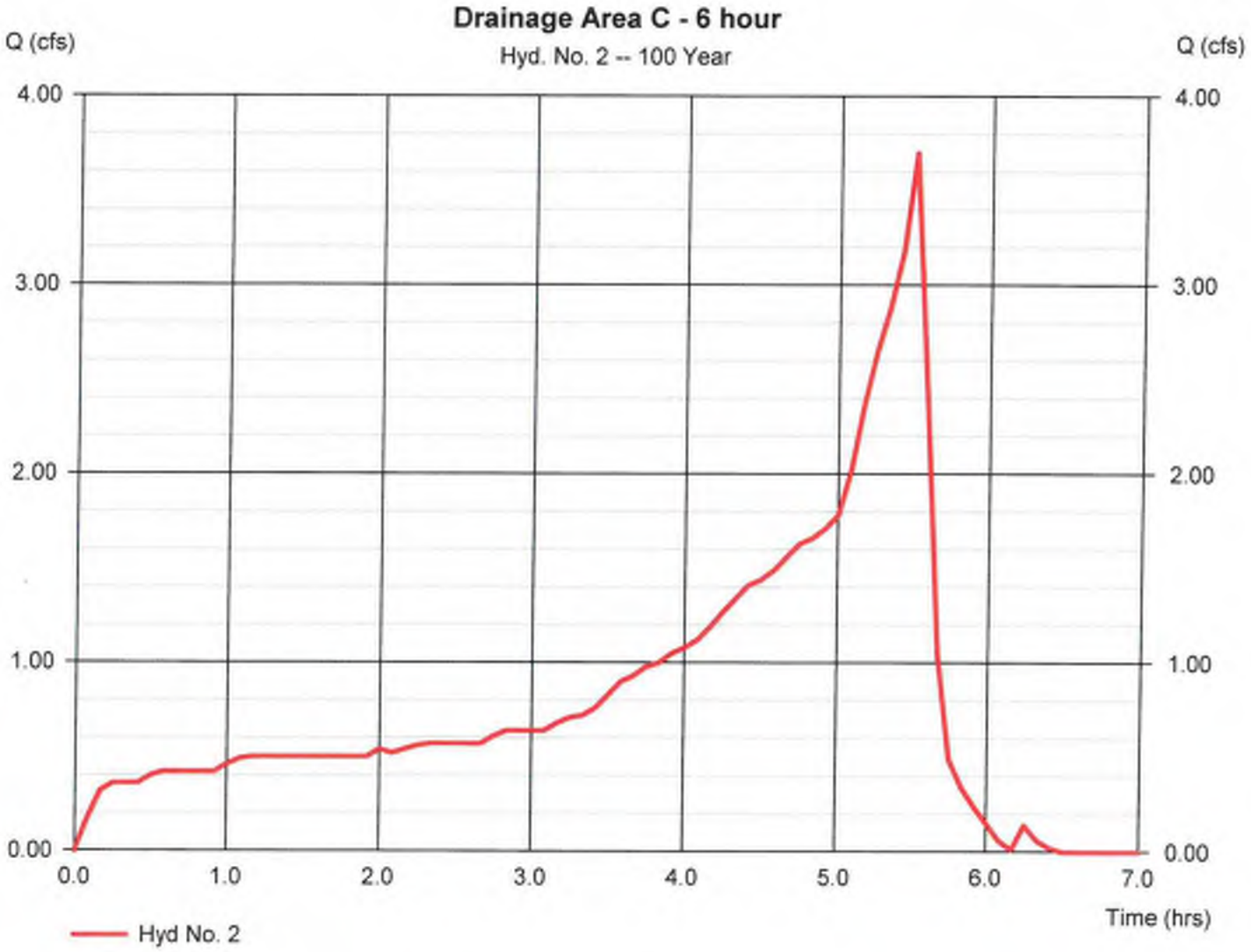
Hydrograph Report

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Hyd. No. 2

Drainage Area C - 6 hour

Hydrograph type	= Manual	Peak discharge	= 3.700 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.50 hrs
Time interval	= 5 min	Hyd. volume	= 20,166 cuft



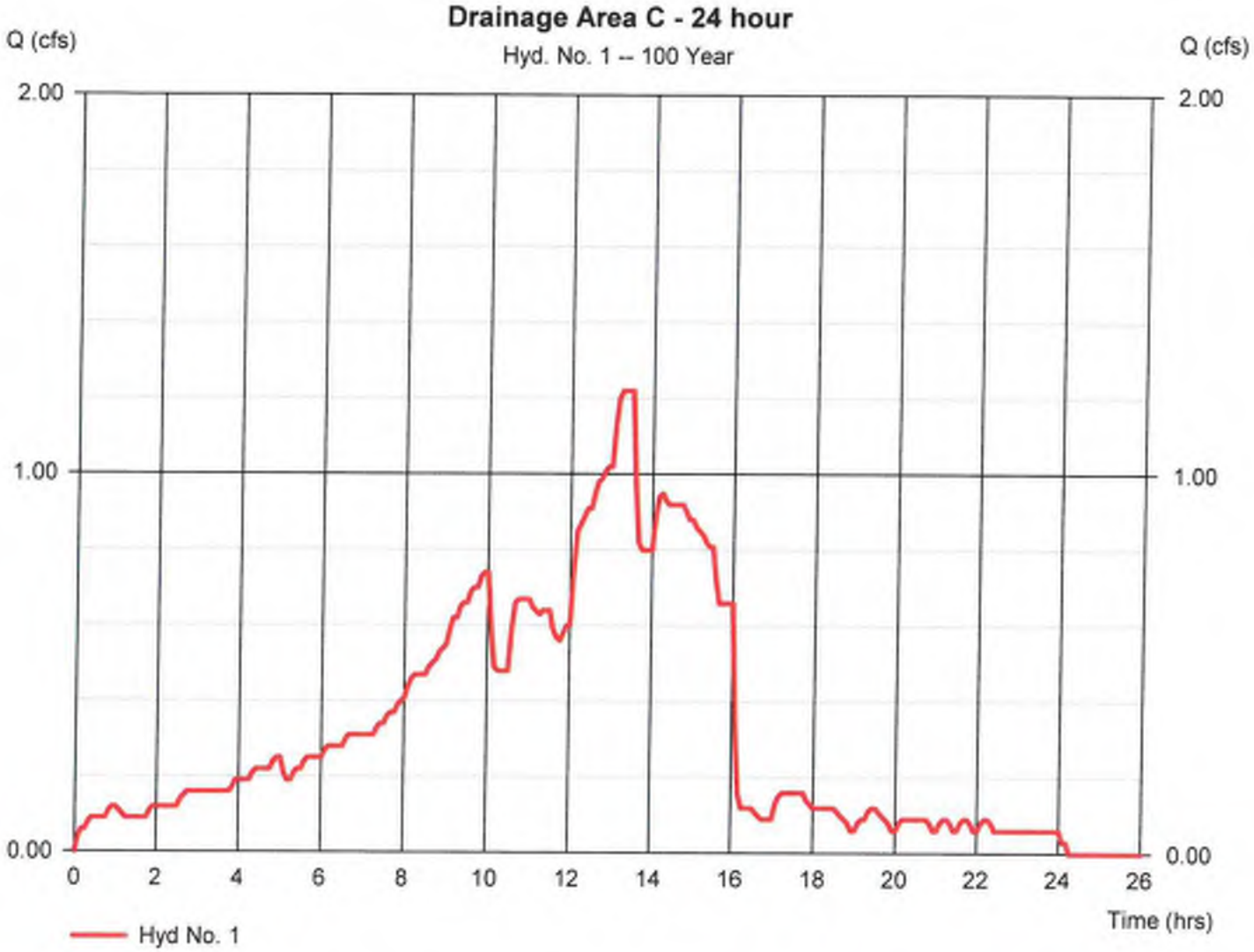
Hydrograph Report

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Hyd. No. 1

Drainage Area C - 24 hour

Hydrograph type	= Manual	Peak discharge	= 1.220 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.25 hrs
Time interval	= 5 min	Hyd. volume	= 29,937 cuft



Hydrograph Report

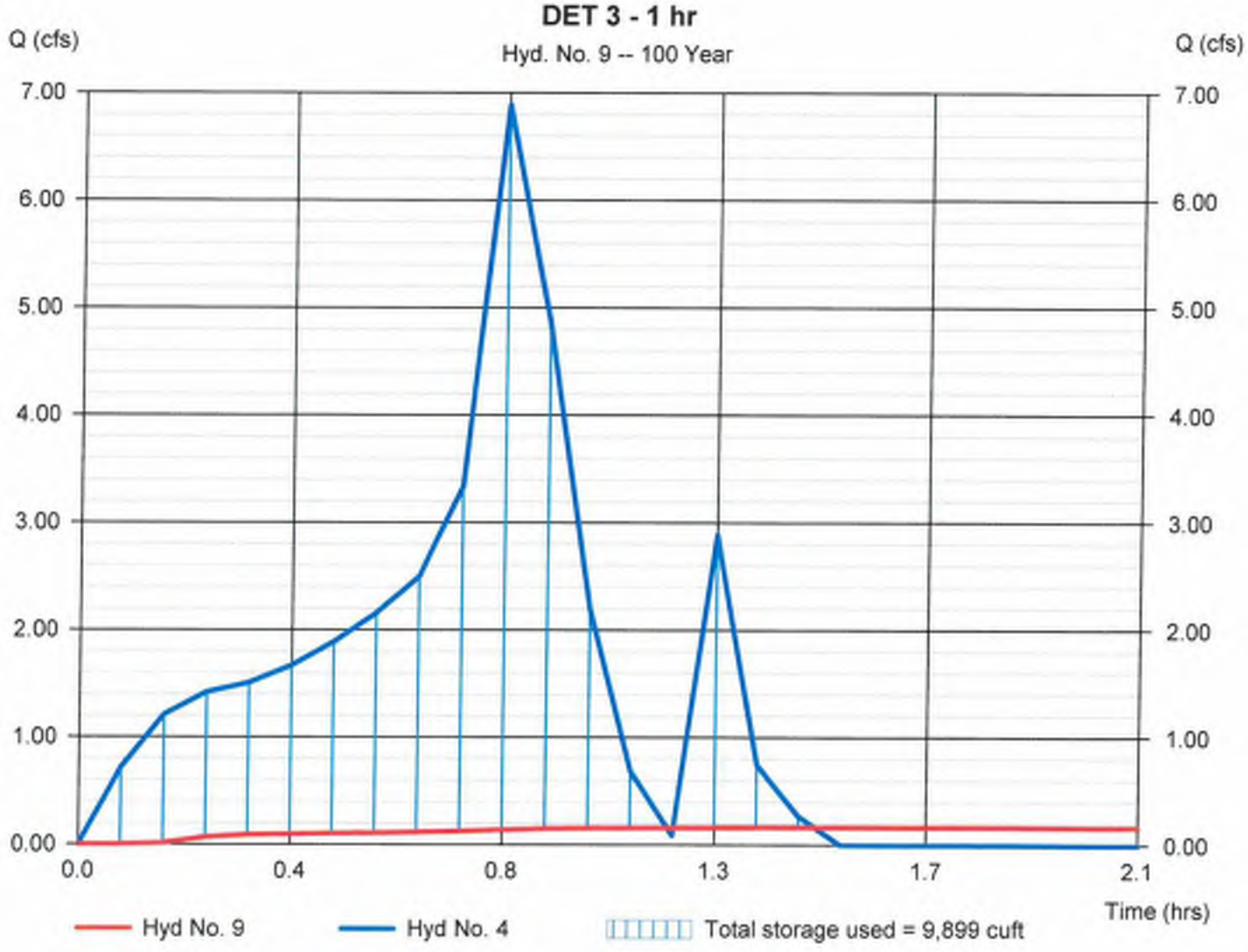
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Hyd. No. 9

DET 3 - 1 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.167 cfs
Storm frequency	= 100 yrs	Time to peak	= 1.42 hrs
Time interval	= 5 min	Hyd. volume	= 10,462 cuft
Inflow hyd. No.	= 4 - Drainage Area C - 1 hour	Max. Elevation	= 1549.64 ft
Reservoir name	= System 3	Max. Storage	= 9,899 cuft

Storage Indication method used.



Hydrograph Report

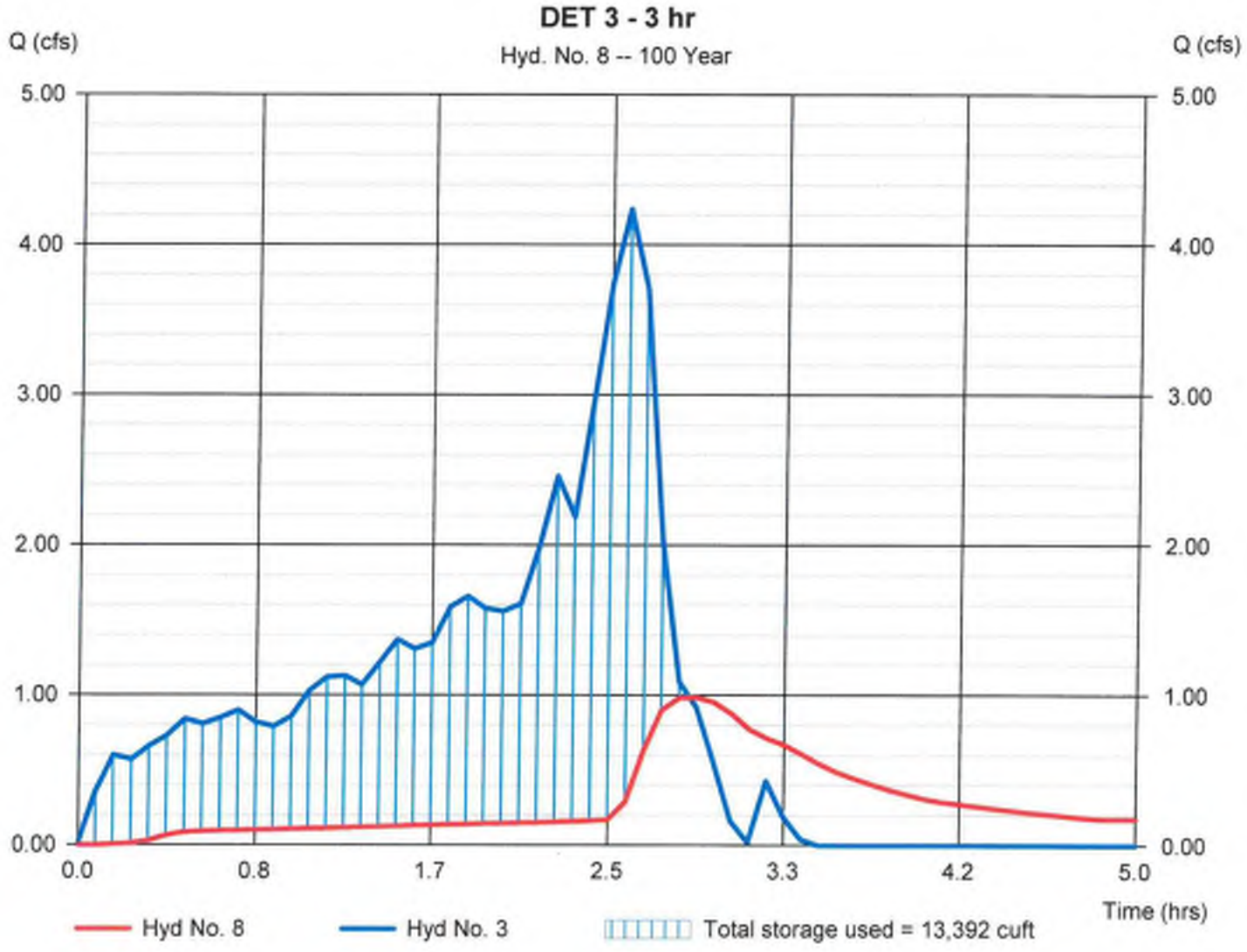
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Thursday, 07 / 12 / 2018

Hyd. No. 8

DET 3 - 3 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.987 cfs
Storm frequency	= 100 yrs	Time to peak	= 2.92 hrs
Time interval	= 5 min	Hyd. volume	= 15,871 cuft
Inflow hyd. No.	= 3 - Drinage Area C - 3 hour	Max. Elevation	= 1549.85 ft
Reservoir name	= System 3	Max. Storage	= 13,392 cuft

Storage Indication method used.



Hydrograph Report

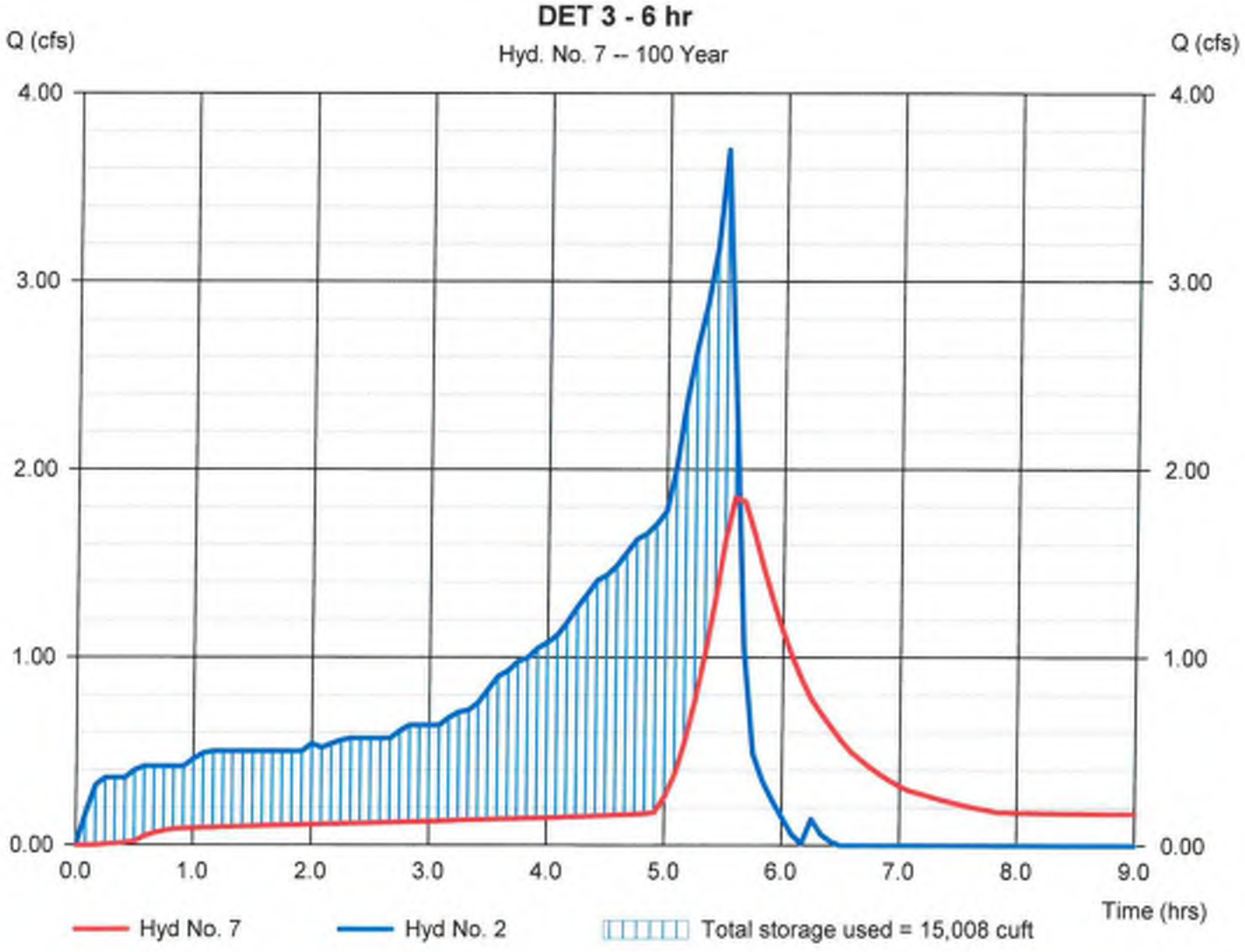
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 — Thursday, 07 / 12 / 2018

Hyd. No. 7

DET 3 - 6 hr

Hydrograph type	= Reservoir	Peak discharge	= 1.852 cfs
Storm frequency	= 100 yrs	Time to peak	= 5.58 hrs
Time interval	= 5 min	Hyd. volume	= 20,110 cuft
Inflow hyd. No.	= 2 - Drainage Area C - 6 hour	Max. Elevation	= 1549.95 ft
Reservoir name	= System 3	Max. Storage	= 15,008 cuft

Storage Indication method used.



Hydrograph Report

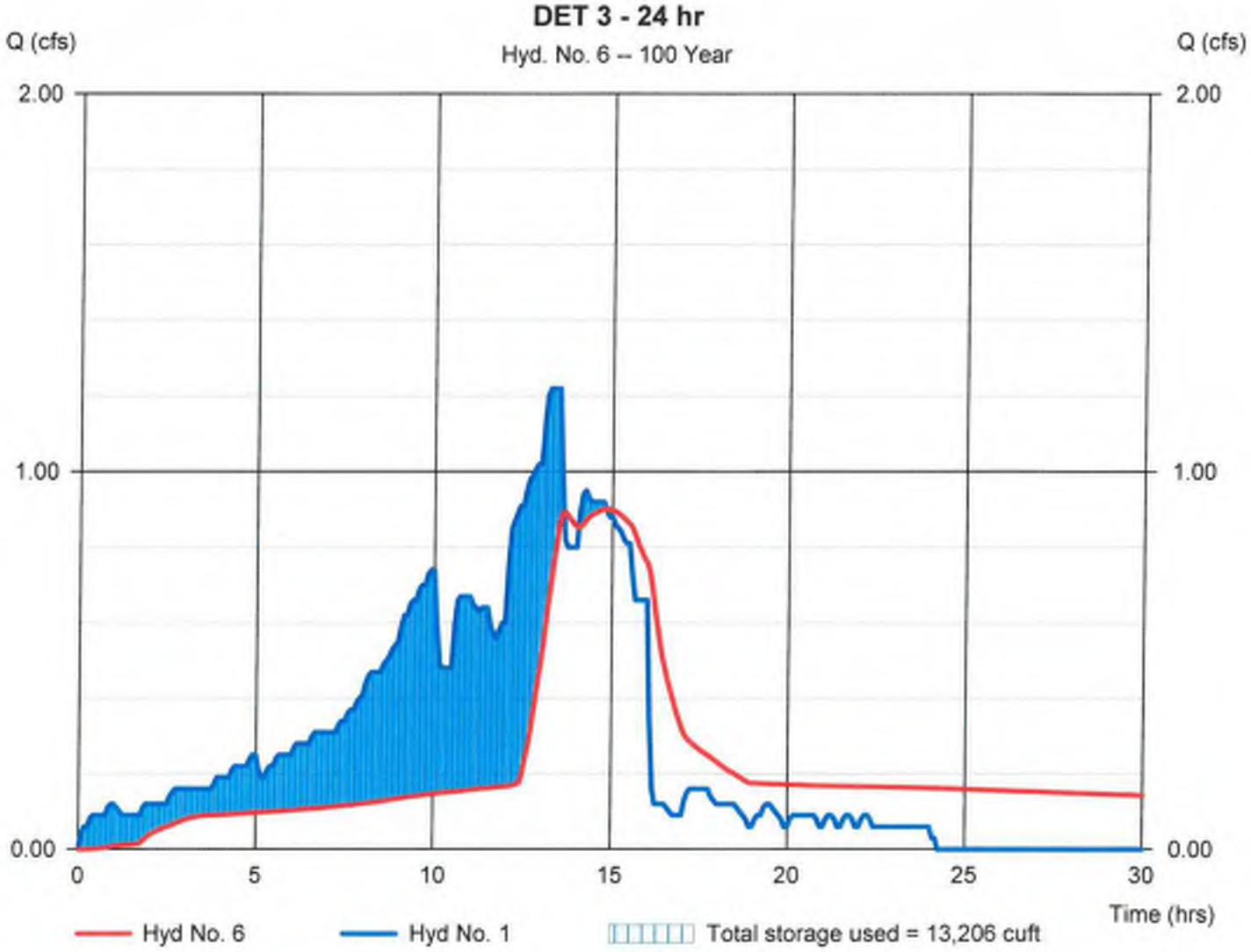
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Thursday, 07 / 12 / 2018

Hyd. No. 6

DET 3 - 24 hr

Hydrograph type	= Reservoir	Peak discharge	= 0.902 cfs
Storm frequency	= 100 yrs	Time to peak	= 14.83 hrs
Time interval	= 5 min	Hyd. volume	= 29,881 cuft
Inflow hyd. No.	= 1 - Drainage Area C - 24 hou	Max. Elevation	= 1549.84 ft
Reservoir name	= System 3	Max. Storage	= 13,206 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - System 3

Pond Data

UG Chambers -Invert elev. = 1548.50 ft, Rise x Span = 3.50 x 3.50 ft, Barrel Len = 515.00 ft, No. Barrels = 10, Slope = 0.10%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1548.50	n/a	0	0
0.40	1548.90	n/a	989	989
0.80	1549.30	n/a	4,053	5,042
1.20	1549.70	n/a	5,854	10,896
1.61	1550.11	n/a	6,741	17,637
2.01	1550.51	n/a	7,148	24,785
2.41	1550.91	n/a	7,147	31,932
2.81	1551.31	n/a	6,748	38,680
3.21	1551.71	n/a	5,848	44,528
3.61	1552.11	n/a	4,045	48,573
4.01	1552.52	n/a	986	49,559

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.50	0.00	0.00	0.00
Span (in)	= 2.50	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 1548.50	0.00	0.00	0.00
Length (ft)	= 1.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

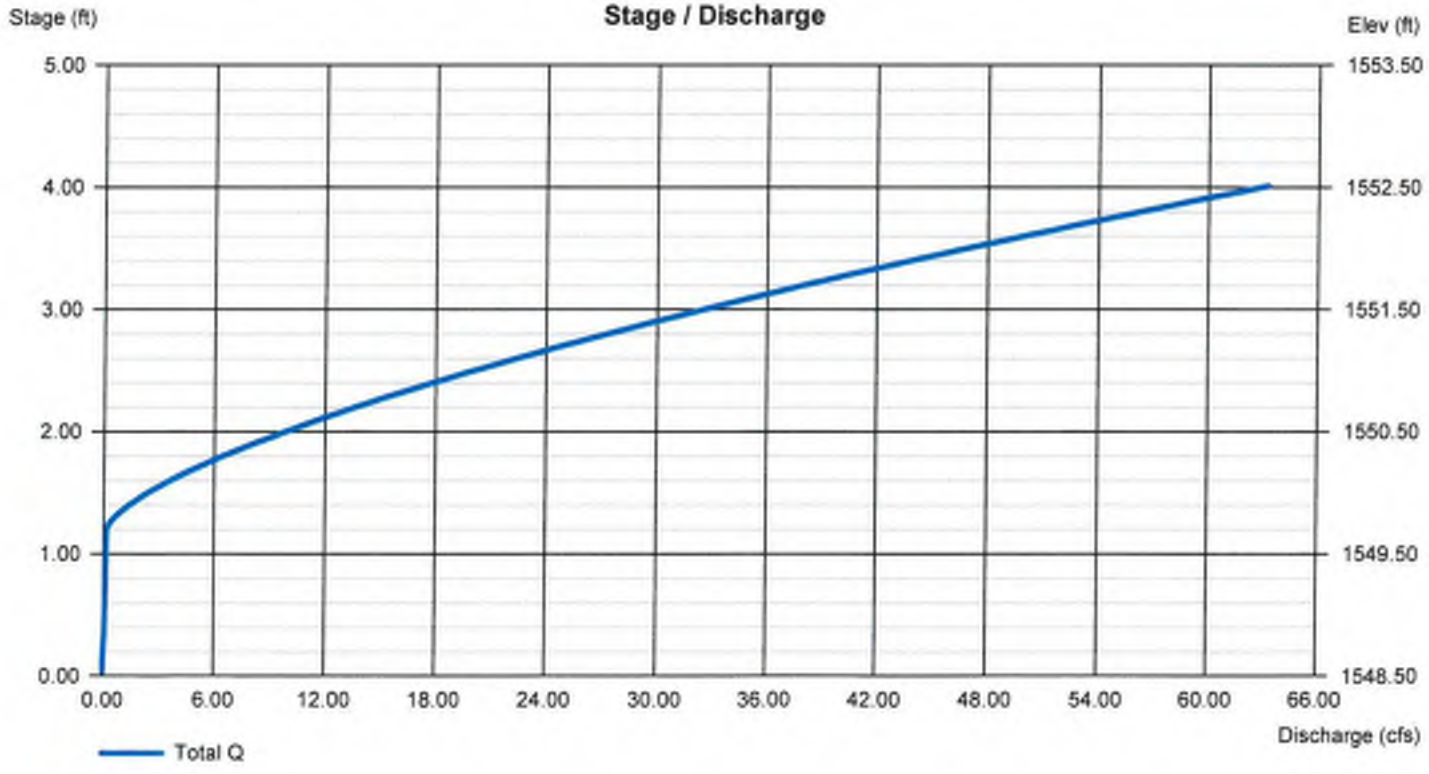
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 1549.70	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



HYDROLOGY STUDY

For:

Cactus Avenue Channel

Project Site Location/Address:
Cactus Avenue
Moreno Valley, CA

Prepared For:
Meridian Park LLC
1156 N. Mountain Avenue
Upland, CA 91786
Contact: Timothy Reeves

Lead Agency:
Riverside County Flood Control and Water Conservation District
1995 Market Street
Riverside, CA 92501

Prepared by:
DRC Engineering, Inc.
160 S. Old Springs Road, Suite 210
Anaheim, CA 92808
(714) 685-6860
Christopher McKee, P.E.

August 1, 2018

Project No. 17-380

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Appendix B	Land Use Exhibit Hydrology Map 100 year Hydrology Calculations (AES Rational Method)
Appendix C	Hydraulic Analysis (WSPG)
Appendix D	Cactus Channel Improvement Plans (For Reference)

Section I Introduction

The following presents the results of the existing condition hydrology study for existing flood control facilities along the south of Cactus Street, in the city of Moreno Valley, Riverside County, State of California as shown in the vicinity map in Appendix A. The report was prepared by DRC Engineering for Riverside County Flood Control and Water Conservation District.

The purpose of this study is to determine the peak flows along the Cactus Street Channel and use the data to design and upgrade the existing earthen open channel to be a box culvert channel. Cactus Channel collects a portion of the Sunnymead Watershed located within Western Riverside County. The channel is located on the northern edge of March Air Force Base and southern edge of Moreno Valley. Drainage is mostly from residential and commercial property in the city of Moreno Valley draining from the North. Cactus Channel flows west to east into Heacock Channel, which flows north to south, then outlets into the Perris Valley Storm Drain Lateral A, which flows west to east.

Section II Methodology

The peak storm discharge for the drainage sub-areas was calculated using the Riverside County Hydrology Manual. Rational Method Equation (1978 April), using AES Software (Ratscx), was used to calculate the 100-year storm event (see calculations in Appendix C). A soil type of C was assigned to the project site based on the Riverside County Flood Control and Water Conservation District Hydrology Manual Hydrologic Soils Group Map Plate C-1.16 (see portion of map in Appendix A). Small portions of the area are classified as Soil Group B, however, soil group C was chosen as a conservative choice. Soil group C is defined as soils having slow infiltration rates when thoroughly wetted and consisting chiefly of silty-loam soils with a layer that impedes downward movement of water, or soils with moderately fine to fine texture. These soils have a slow rate of water transmission. Impervious covers were estimated based on plate D-5.6 of the Riverside County Hydrology Manual. The Land Use Exhibit in Appendix B was used to identify land uses based on city of Moreno Valley zoning. 2 year – 1 hour, 100 year – 1 hour and intensity duration slope were found from Plate D-4.3, 4.4 & 4.6 respectively. These pages can be found in Appendix A.

Hydraulic calculations for Cactus Channel were performed using Civil Design Water Surface and Pressure Gradient Hydraulic Analysis System Program (WSPG). Manning's number (N) was estimated to be anywhere from 0.012-0.013 for the open channel. The maximum flow was divided up based on the peak flows in Lines A, T & C, therefore, creating three junctions into the channel. This simplified approach gives a higher flow at certain points along the channel and creates a more conservative design.

Section III Project Description

Existing site conditions

Cactus Channel is a vegetated earthen channel located south of Cactus Street and north of March Air Reserve Base. The earthen channel collects flows discharging from the storm drains along Elsworth, Frederick and Graham Streets. Cactus Channel also receives relatively small runoff from Cactus Avenue via public catch basins that discharge at various locations downstream along the channel.

Proposed Site Conditions

The existing/base watershed hydrology is considered the same as the future condition for Cactus Channel. This assumption is based on the fact that the watershed is almost fully developed and most flood control facilities upstream and downstream of Cactus Channel have been constructed. Since few areas are still in the process of being developed, all assumptions in the development of the hydrologic model assumed full development. A Hydrology Map can be found in Appendix B.

The proposed design for Cactus Channel features underground reinforced concrete boxes carrying flow to Heacock Channel at a slope of 0.18%. The channel was designed to take the place of the existing earthen channel and carry the cumulative maximum flow relative to the junctions upstream. The design also includes a proposed 30' easement for Riverside County Flood Control District. Cactus Channel Improvement Plans have been included in Appendix D for reference.

Section IV Conclusion

Watershed Hydrology

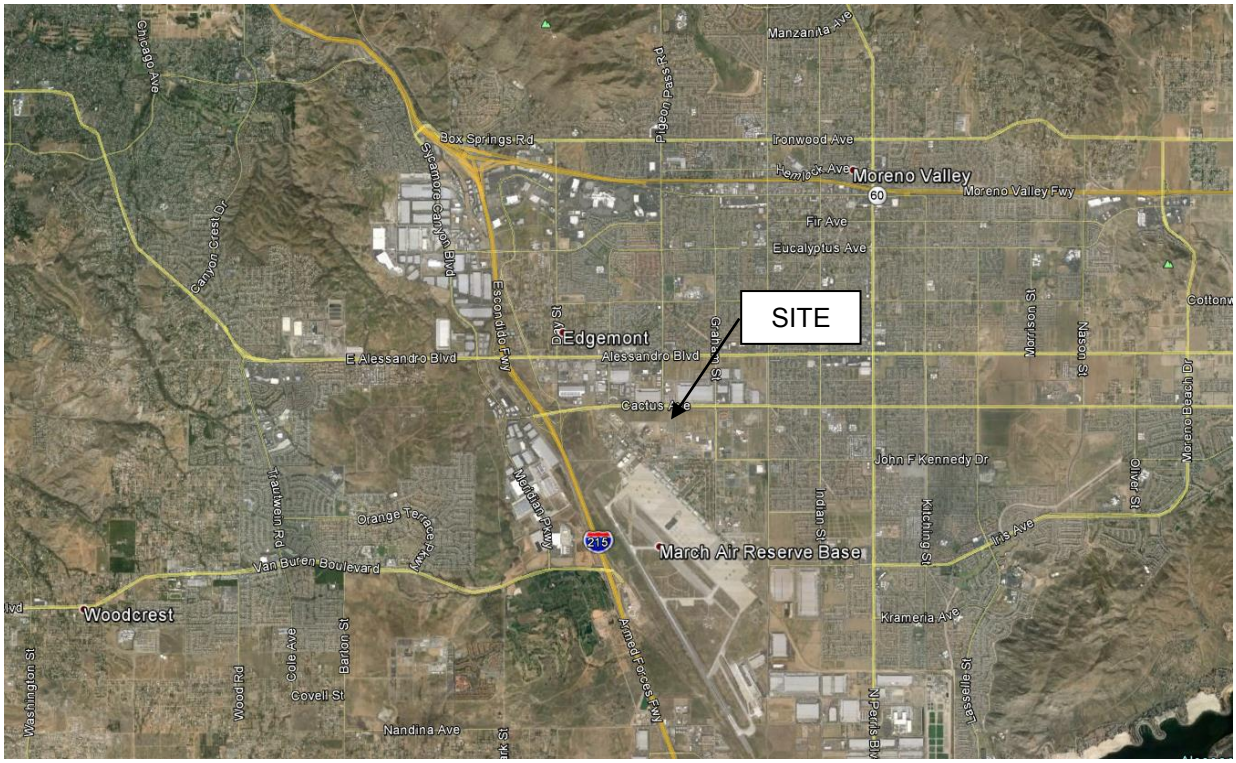
Based on the fully developed current condition, Cactus Channel will receive a peak flow rate of 1,144.83 cfs for the 100 year storm at the outlet to Heakcock Channel. The majority of this flow will be provided by Lines A, T and C towards the upstream end of the channel. Hydrology calculations can be found in Appendix B.

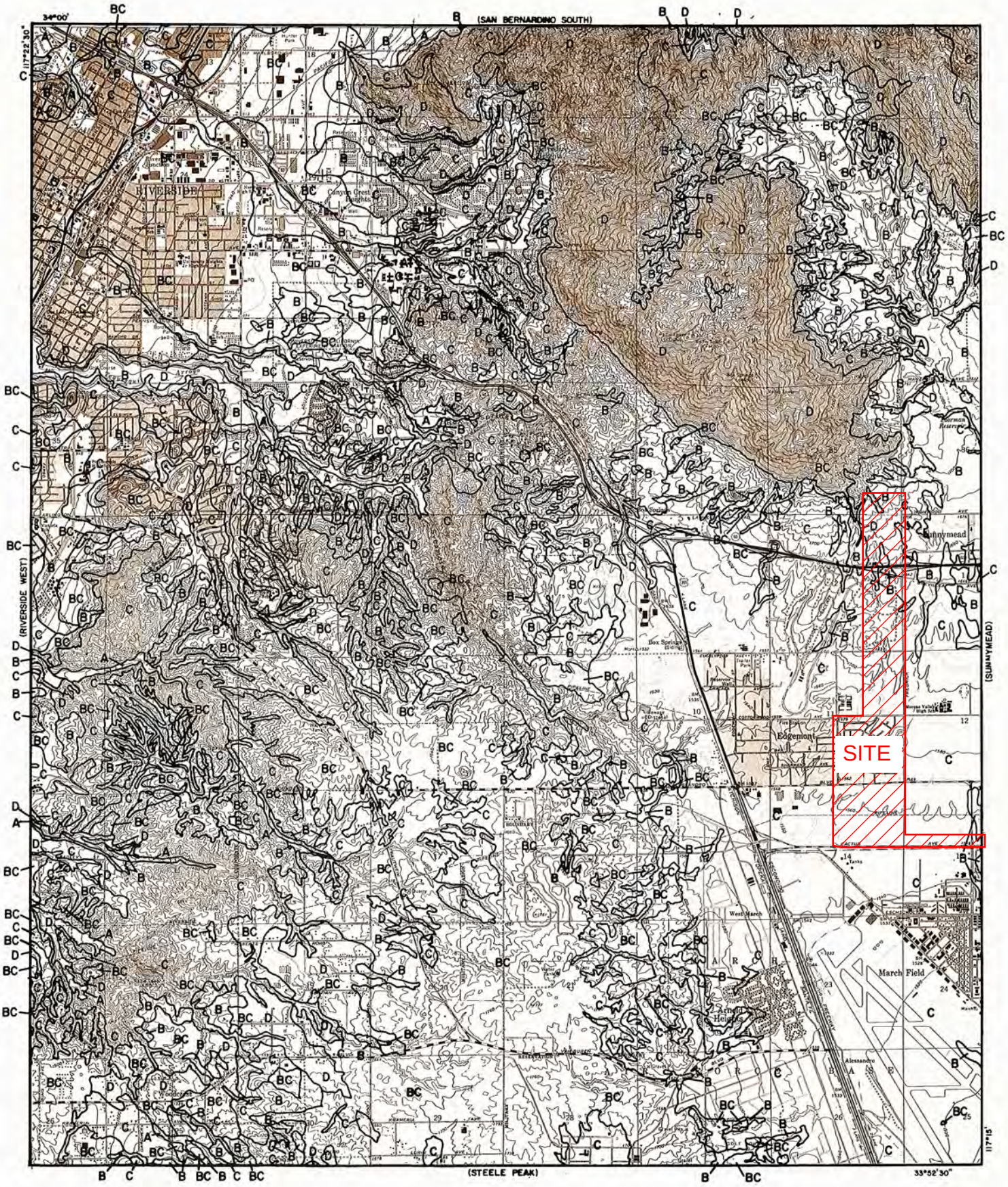
Cactus Channel Hydraulics

A total of 1,144.83 cfs was ran through the channel design using WSPG. HGL elevations for the 100 year flow can be seen reaching an elevation of 1552.87 and at no point does the HGL go above the existing surface elevation. The HGL at the outlet to Heacock Channel is 1539.0. Hydraulic analysis can be found in Appendix C.

APPENDIX A

VICINITY MAP
SOILS MAP
2 YEAR 1 HOUR PRECIPITATION MAP
100 YEAR 1 HOUR PRECIPITATION MAP
INTENSITY DURATION CURVE MAP





LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC&WCD

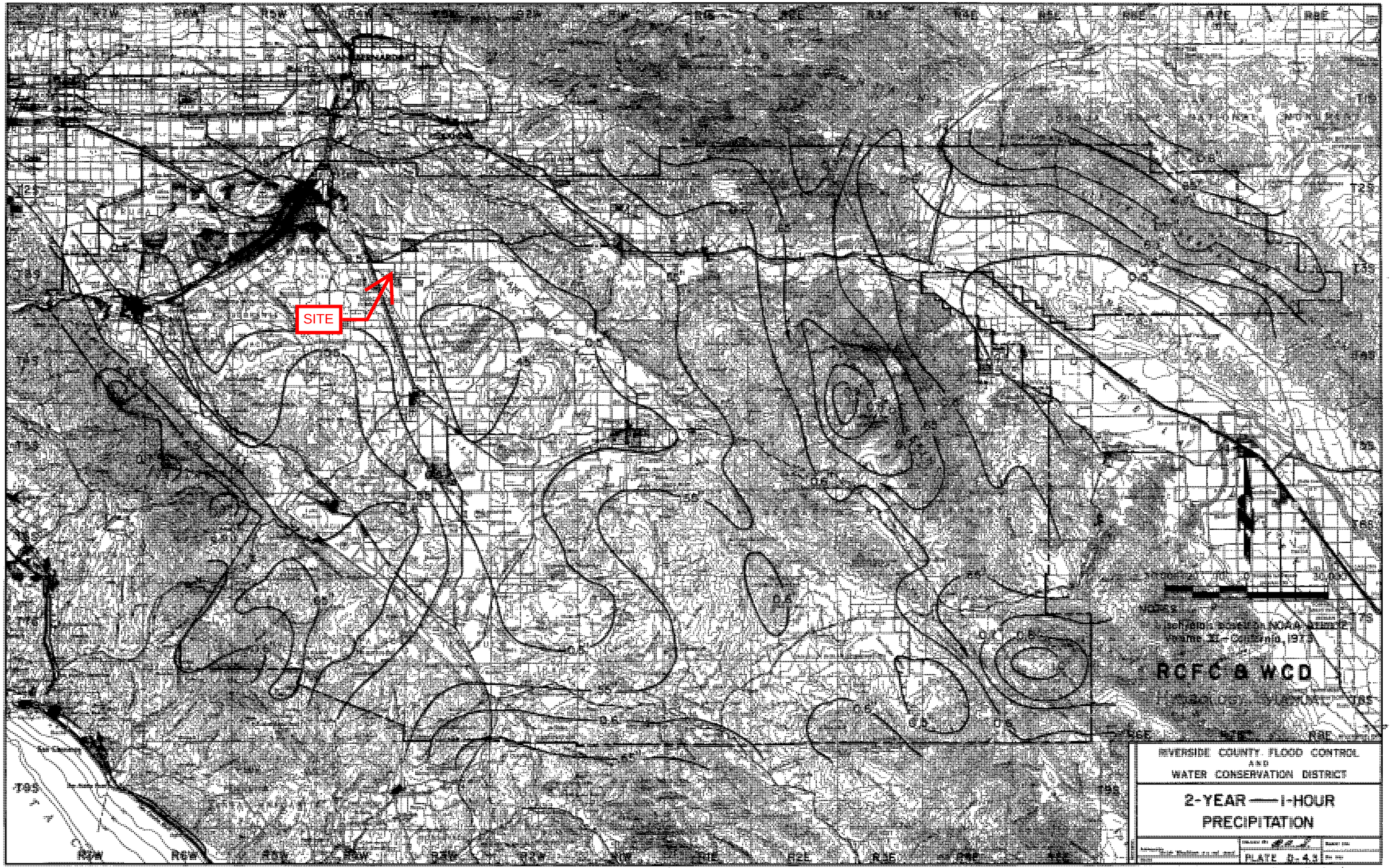
HYDROLOGY MANUAL

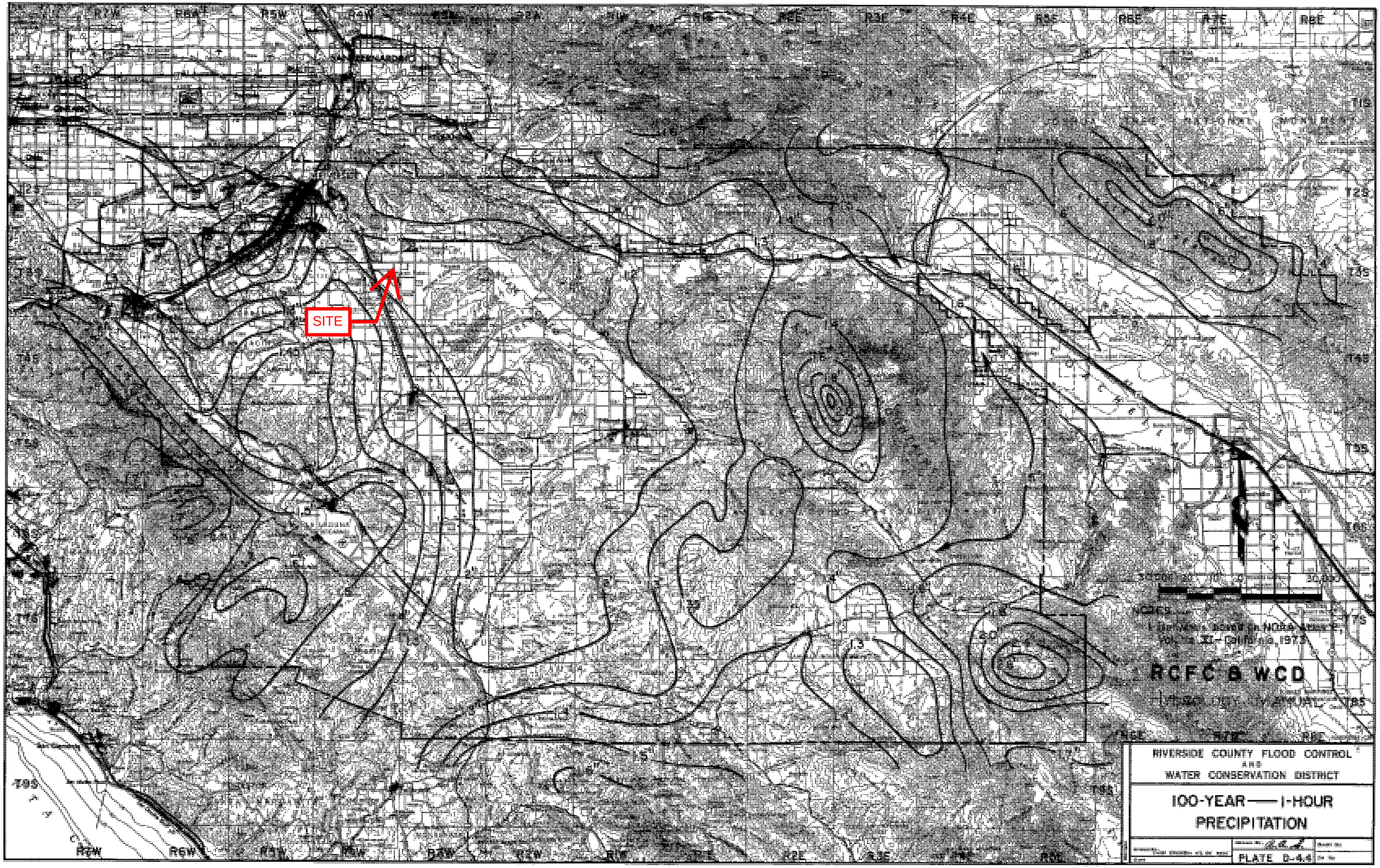
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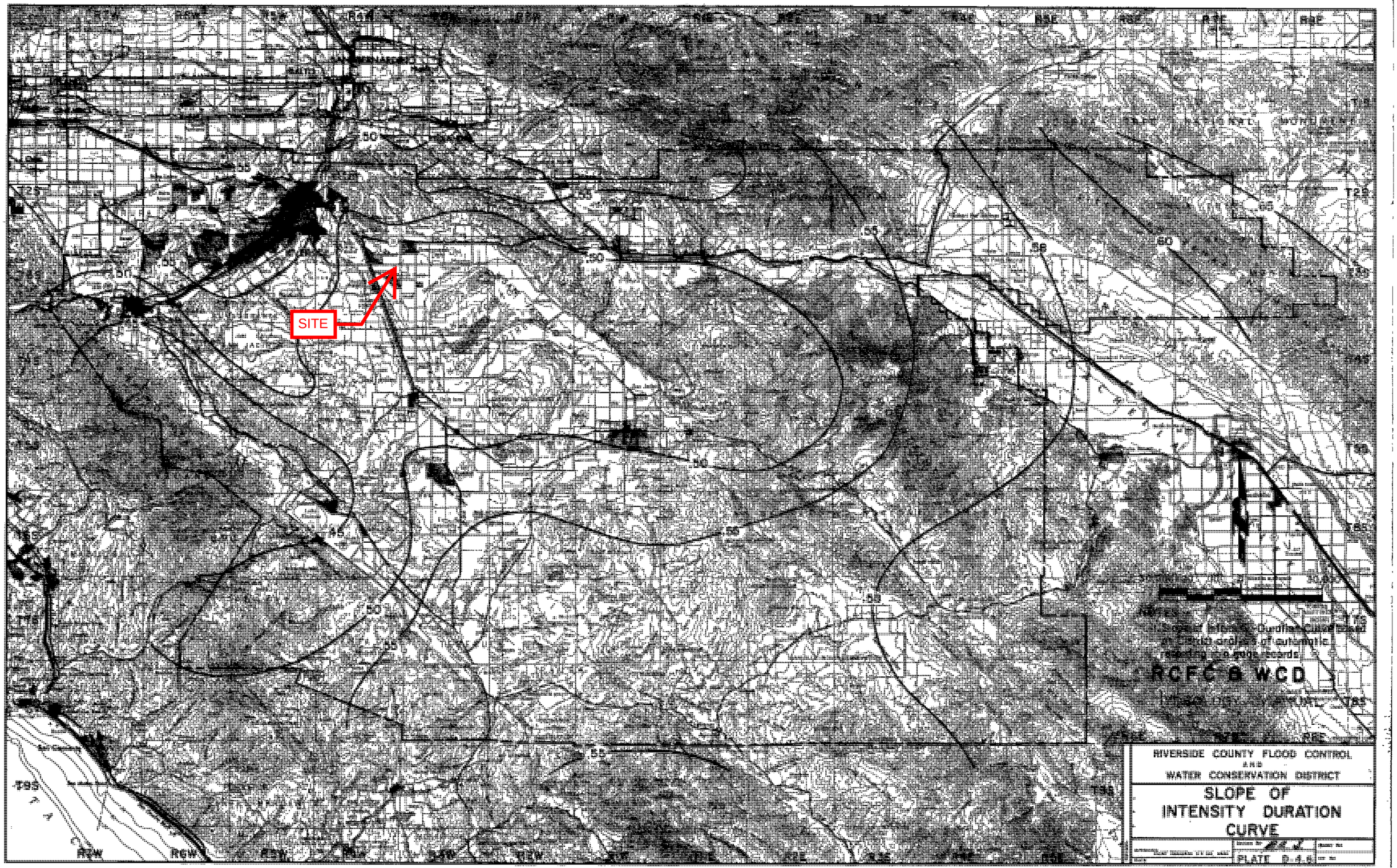
0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR RIVERSIDE–EAST

PLATE C–1.16

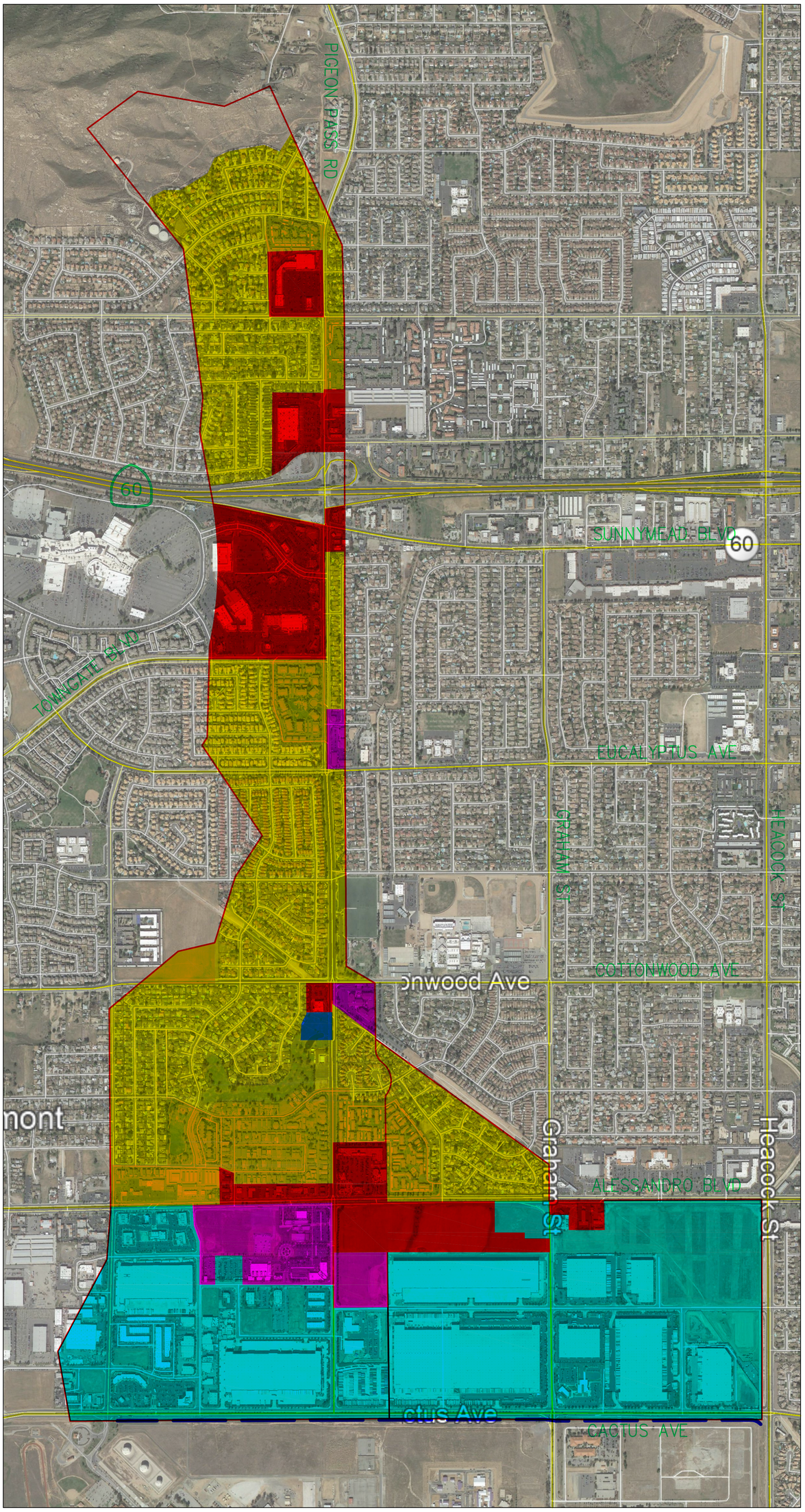

SITE
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR
PRECIPITATION
PLATE D-4.3
RCFC & WCD


SITE
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973.
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4


SITE
Isopluvial of 10 Year Rainfall Event
Based on analysis of automatic recording rain gage records
RCFC & WCD
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
SLOPE OF INTENSITY DURATION CURVE
PLATE D-4.6

APPENDIX B

LAND USE EXHIBIT
HYDROLOGY MAP
100 YEAR HYDROLOGY CALCULATIONS



N

0 0.25 0.5 Miles

LEGEND

- COMMERCIAL
- INDUSTRIAL/BUSINESS PARK
- PUBLIC FACILITIES
- OFFICE
- SUBURBAN RESIDENTIAL
- MULTIFAMILY
- OPEN SPACE/PARK

SCALE: 1" = 600'

OF 1 SHEETS

SHEET NUMBER: 1

PROJECT NO.: 17-380

DRAWING FILE: SITE EXHIBIT

DRAWN: NS

CHECKED: KH

DATE: 08/01/18

ISSUE: HM

PROJECT: LEWIS K4 SITE
RCFC CHANNEL
MORENO VALLEY CA

DRAWING NAME: LAND USE EXHIBIT

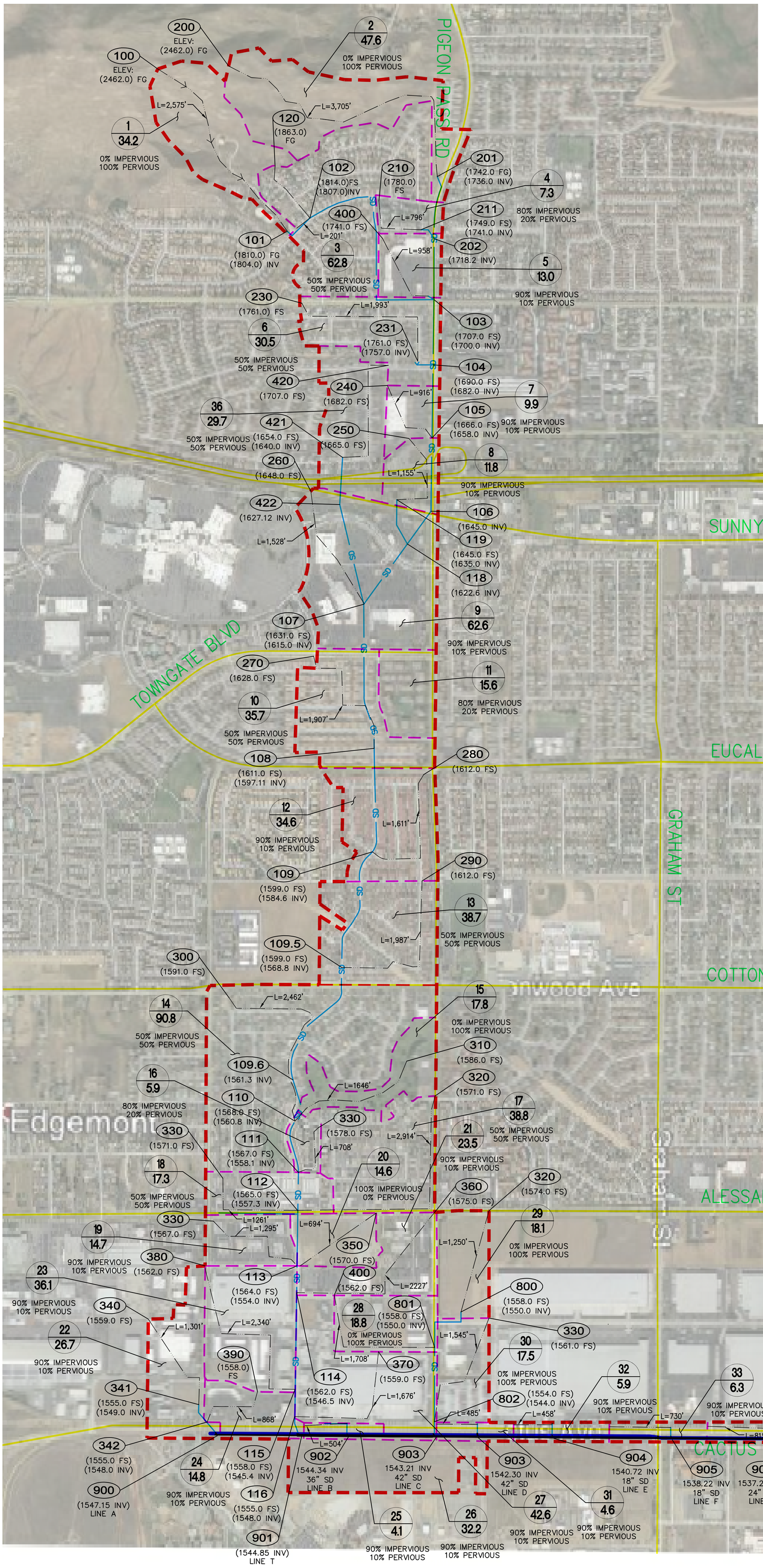
NO.:	REVISION:	DATE:

IDRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

GREGORY R. COOKE R.C.E. 39478 DATE

NOT FOR CONSTRUCTION

FILENAME: M:\2017\17-380 Lewis K4 Site Moreno Valley\Exhibit\EXH004 – Land Use Exhibit\Land Use Exhibit.dwg, LAST SAVED ON: Aug 01 2018 7:50am PLOTTED BY: KENNY, ON: Aug 01 2018 7:51am, CFG:



LEGEND

- STORM DRAIN FACILITY — SD
- TRIBUTARY AREA
- CACTUS CHANNEL WATERSHED
- FLOW PATH
- WATERSHED DESIGNATION / WATERSHED AREA (ACRES) — XX / XX.X

N

600' 300' 0' 600' 1,200'

GRAPHIC SCALE: 1 INCH = 600 FT

SCALE: 1" = 600'
SHEET NUMBER: 1 OF 1 SHEETS
PROJECT NO.: 17-380
DRAWING FILE: SITE EXHIBIT
CHECKED: KH DRAWN: NS
DATE: 08-01-2018
ISSUE: HM

PROJECT: **LEWIS K4 SITE**
RCFC CHANNEL
MORENO VALLEY CA
DRAWING NAME: **HYDROLOGY MAP**

NO.:	REVISION:	DATE:

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860
GREGORY R. COOKE R.C.E. 39478 DATE

NOT FOR CONSTRUCTION

FILENAME: M:\2017\17-380 Lewis K4 Site Moreno Valley\Hydrology\Cactus Avenue Channel\17380 HM Drainage Areas.dwg, LAST SAVED ON: Aug 01 2018 8:24am PLOTTED BY: KENNY, ON: Aug 01 2018 9:23am, CFG:

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
                    (Rational Tabling Version 22.0)
                Release Date: 07/01/2015  License ID 1510

                          Analysis prepared by:

                          DRC Engineering, Inc.
                    160 South Old Springs Road, Suite 210
                          Anaheim Hills, CA 92808
                               714-685-6860

 ************************** DESCRIPTION OF STUDY **************************
* CACTUS CHANNEL                                                          *
* 100-YEAR STORM                                                          *
* PROPOSED                                                                *
 *************************************************************************

  FILE NAME: 17380P.DAT
  TIME/DATE OF STUDY: 09:07 07/30/2018
------------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 1.00
  2-YEAR, 1-HOUR PRECIPITATION(INCH) =  0.500
  100-YEAR, 1-HOUR PRECIPITATION(INCH) =  1.200
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  SLOPE OF INTENSITY DURATION CURVE = 0.5000
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: COMPUTE CONFLUENCE VALUES ACCORDING TO RCFC&WCD HYDROLOGY MANUAL
        AND IGNORE OTHER CONFLUENCE COMBINATIONS FOR DOWNSTREAM ANALYSES
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+-----------------------------------------------------------------------------+
| LINE A                                                                      |
|                                                                             |
|                                                                             |
+-----------------------------------------------------------------------------+

******************************************************************************
  FLOW PROCESS FROM NODE    340.00 TO NODE    341.00 IS CODE =  21
```

```
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1301.00
  UPSTREAM ELEVATION(FEET) =   1559.00
  DOWNSTREAM ELEVATION(FEET) =   1555.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[( 1301.00**3)/(     4.00)]**.2 =   16.972
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.256
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8811
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     53.08
  TOTAL AREA(ACRES) =     26.70   TOTAL RUNOFF(CFS) =     53.08

************************************************************************
  FLOW PROCESS FROM NODE    341.00 TO NODE    342.00 IS CODE =  41
------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1549.00  DOWNSTREAM(FEET) =  1548.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.90
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   17.17
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    342.00 =    1501.00 FEET.

************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    342.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.17
  RAINFALL INTENSITY(INCH/HR) =   2.24
  TOTAL STREAM AREA(ACRES) =    26.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     53.08

************************************************************************
  FLOW PROCESS FROM NODE    390.00 TO NODE    342.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   868.00
  UPSTREAM ELEVATION(FEET) =   1558.00
  DOWNSTREAM ELEVATION(FEET) =   1555.00
  ELEVATION DIFFERENCE(FEET) =      3.00
  TC = 0.303*[(  868.00**3)/(     3.00)]**.2 =   14.102
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.475
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     32.33
  TOTAL AREA(ACRES) =     14.80   TOTAL RUNOFF(CFS) =     32.33

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    342.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.10
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =    14.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.33

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       53.08    17.17        2.243         26.70
      2       32.33    14.10        2.475         14.80

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       75.92    14.10       2.475
      2       82.38    17.17       2.243

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      82.38   Tc(MIN.) =   17.17
  TOTAL AREA(ACRES) =       41.5
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    342.00 =    1501.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    342.00 TO NODE    900.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1548.00  DOWNSTREAM(FEET) =   1547.15
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0028
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      82.38
  FLOW VELOCITY(FEET/SEC.) =   5.69   FLOW DEPTH(FEET) =   1.45
  TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =   18.05
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    900.00 =    1801.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  51
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1546.20  DOWNSTREAM(FEET) =   1544.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1027.35   CHANNEL SLOPE =  0.0017
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      82.38
  FLOW VELOCITY(FEET/SEC.) =   4.04   FLOW DEPTH(FEET) =   1.13
  TRAVEL TIME(MIN.) =   4.24   Tc(MIN.) =   22.28
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    901.00 =    2828.35 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    901.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| LINE T                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2575.00
  UPSTREAM ELEVATION(FEET) =   2462.00
  DOWNSTREAM ELEVATION(FEET) =   1810.00
  ELEVATION DIFFERENCE(FEET) =    652.00
  TC = 0.709*[( 2575.00**3)/(   652.00)]**.2 =   21.603
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.000
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6926
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     47.37
  TOTAL AREA(ACRES) =     34.20   TOTAL RUNOFF(CFS) =     47.37

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1807.00  DOWNSTREAM(FEET) =  1804.00
  FLOW LENGTH(FEET) =   201.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.08
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.37
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   21.82
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    2776.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.82
  RAINFALL INTENSITY(INCH/HR) =   1.99
  TOTAL STREAM AREA(ACRES) =    34.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     47.37

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   790.62
  UPSTREAM ELEVATION(FEET) =   1863.00
  DOWNSTREAM ELEVATION(FEET) =   1814.00
  ELEVATION DIFFERENCE(FEET) =     49.00
  TC = 0.393*[(  790.62**3)/(    49.00)]**.2 =    9.879
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.957
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8242
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =    153.08
  TOTAL AREA(ACRES) =     62.80   TOTAL RUNOFF(CFS) =    153.08

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   2.96
  TOTAL STREAM AREA(ACRES) =    62.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    153.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       47.37    21.82        1.990         34.20
      2      153.08     9.88        2.957         62.80

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      174.52     9.88       2.957
      2      150.35    21.82       1.990

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     174.52   Tc(MIN.) =    9.88
  TOTAL AREA(ACRES) =       97.0
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =    2776.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1804.00  DOWNSTREAM(FEET) =  1700.00
  FLOW LENGTH(FEET) =  2716.24   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  55.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     174.52
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    5492.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH FAIR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  3705.00
  UPSTREAM ELEVATION(FEET) =   2462.00
  DOWNSTREAM ELEVATION(FEET) =   1742.00
  ELEVATION DIFFERENCE(FEET) =    720.00
  TC = 0.709*[( 3705.00**3)/(   720.00)]**.2 =   26.345
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.811
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6763
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     58.30
  TOTAL AREA(ACRES) =     47.60   TOTAL RUNOFF(CFS) =     58.30

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1736.00  DOWNSTREAM(FEET) =  1700.00
  FLOW LENGTH(FEET) =  1500.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.99
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   27.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    5205.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.10
  RAINFALL INTENSITY(INCH/HR) =   1.79
  TOTAL STREAM AREA(ACRES) =    47.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.30

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   796.00
  UPSTREAM ELEVATION(FEET) =   1780.00
  DOWNSTREAM ELEVATION(FEET) =   1749.00
  ELEVATION DIFFERENCE(FEET) =     31.00
  TC = 0.323*[(  796.00**3)/(    31.00)]**.2 =    8.935
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.110
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8709
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     19.77
  TOTAL AREA(ACRES) =      7.30   TOTAL RUNOFF(CFS) =     19.77

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    202.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1741.00  DOWNSTREAM(FEET) =  1718.20
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.90
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.77
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.09
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    202.00 =     996.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.09
 RAINFALL INTENSITY(INCH/HR) =   3.08
 TOTAL STREAM AREA(ACRES) =     7.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.77

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       58.30    27.10        1.785         47.60
     2       19.77     9.09        3.084          7.30

 ***********************************WARNING************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       39.32     9.09       3.084
     2       69.75    27.10       1.785

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      69.75   Tc(MIN.) =   27.10
 TOTAL AREA(ACRES) =       54.9
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    5205.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1718.20  DOWNSTREAM(FEET) =  1700.00
 FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  39.47
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      69.75
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   27.42
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =    5955.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
     1       69.75    27.42       1.775       54.90
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =    5955.00 FEET.
```

```
 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1      174.52    10.69       2.842       97.00
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =    5492.24 FEET.

 ****************************************WARNING****************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1     201.72      10.69        2.842
     2     178.73      27.42        1.775

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     201.72   Tc(MIN.) =   10.69
 TOTAL AREA(ACRES) =      151.9

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.69
 RAINFALL INTENSITY(INCH/HR) =   2.84
 TOTAL STREAM AREA(ACRES) =   151.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    201.72

****************************************************************************
 FLOW PROCESS FROM NODE    400.00 TO NODE    103.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   958.00
 UPSTREAM ELEVATION(FEET) =   1741.00
 DOWNSTREAM ELEVATION(FEET) =   1707.00
 ELEVATION DIFFERENCE(FEET) =     34.00
 TC = 0.303*[(  958.00**3)/(    34.00)]**.2 =    9.207
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.063
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8853
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     35.26
 TOTAL AREA(ACRES) =     13.00   TOTAL RUNOFF(CFS) =     35.26

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.21
 RAINFALL INTENSITY(INCH/HR) =   3.06
 TOTAL STREAM AREA(ACRES) =    13.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     35.26

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      201.72    10.69        2.842        151.90
     2       35.26     9.21        3.063         13.00

**********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      208.93     9.21       3.063
     2      234.43    10.69       2.842

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     234.43   Tc(MIN.) =   10.69
 TOTAL AREA(ACRES) =      164.9
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =    5955.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1707.00  DOWNSTREAM(FEET) =  1690.00
 FLOW LENGTH(FEET) =   775.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  47.76
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     234.43
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.96
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =    6730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.81
  TOTAL STREAM AREA(ACRES) =   164.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    234.43

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    231.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1993.00
  UPSTREAM ELEVATION(FEET) =   1761.00
  DOWNSTREAM ELEVATION(FEET) =   1698.00
  ELEVATION DIFFERENCE(FEET) =     63.00
  TC = 0.393*[( 1993.00**3)/(    63.00)]**.2 =   16.360
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.298
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8070
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     56.56
  TOTAL AREA(ACRES) =     30.50   TOTAL RUNOFF(CFS) =     56.56

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    104.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1688.00  DOWNSTREAM(FEET) =  1682.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.01
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.56
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   16.46
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    104.00 =    2193.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.46
  RAINFALL INTENSITY(INCH/HR) =   2.29
  TOTAL STREAM AREA(ACRES) =    30.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     56.56

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      234.43    10.96        2.807        164.90
      2       56.56    16.46        2.291         30.50
```

```
 ************************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ********************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      272.09    10.96       2.807
      2      247.86    16.46       2.291

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     272.09   Tc(MIN.) =   10.96
  TOTAL AREA(ACRES) =      195.4
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    104.00 =    6730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1682.00  DOWNSTREAM(FEET) =  1666.00
  FLOW LENGTH(FEET) =   855.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  55.43
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     272.09
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    105.00 =    7585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   2.77
  TOTAL STREAM AREA(ACRES) =   195.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    272.09

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   916.00
  UPSTREAM ELEVATION(FEET) =   1682.00
  DOWNSTREAM ELEVATION(FEET) =   1666.00
  ELEVATION DIFFERENCE(FEET) =     16.00
```

```
 TC = 0.303*[(  916.00**3)/(    16.00)]**.2 =   10.421
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.879
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8845
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     25.21
 TOTAL AREA(ACRES) =      9.90   TOTAL RUNOFF(CFS) =     25.21

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.42
 RAINFALL INTENSITY(INCH/HR) =   2.88
 TOTAL STREAM AREA(ACRES) =     9.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.21

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      272.09    11.22        2.775        195.40
     2       25.21    10.42        2.879          9.90

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      277.90    10.42       2.879
     2      296.39    11.22       2.775

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     296.39   Tc(MIN.) =   11.22
 TOTAL AREA(ACRES) =      205.3
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    105.00 =    7585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1658.00  DOWNSTREAM(FEET) =  1645.00
 FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  60.38
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     296.39
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.47
```

```
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    106.00 =    8485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    118.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1645.00  DOWNSTREAM(FEET) =  1635.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  60.38
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     296.39
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.60
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    118.00 =    8965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.60
  RAINFALL INTENSITY(INCH/HR) =   2.73
  TOTAL STREAM AREA(ACRES) =   205.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    296.39

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    119.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1155.00
  UPSTREAM ELEVATION(FEET) =   1665.00
  DOWNSTREAM ELEVATION(FEET) =   1645.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  TC = 0.937*[( 1155.00**3)/(    20.00)]**.2 =   35.422
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.562
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6505
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     11.99
  TOTAL AREA(ACRES) =     11.80   TOTAL RUNOFF(CFS) =     11.99

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    118.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1635.00  DOWNSTREAM(FEET) =  1622.60
  FLOW LENGTH(FEET) =   560.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  48.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      11.99
 PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   36.38
 LONGEST FLOWPATH FROM NODE    250.00 TO NODE    118.00 =    1715.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   36.38
 RAINFALL INTENSITY(INCH/HR) =   1.54
 TOTAL STREAM AREA(ACRES) =    11.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.99

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      296.39    11.60        2.729        205.30
     2       11.99    36.38        1.541         11.80

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      300.21    11.60       2.729
     2      179.36    36.38       1.541

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     300.21   Tc(MIN.) =   11.60
 TOTAL AREA(ACRES) =      217.1
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    118.00 =    8965.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1622.60  DOWNSTREAM(FEET) =  1615.00
 FLOW LENGTH(FEET) =   880.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.20
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     300.21
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   12.07
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    107.00 =    9845.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.07
 RAINFALL INTENSITY(INCH/HR) =   2.68
 TOTAL STREAM AREA(ACRES) =   217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    300.21

****************************************************************************
 FLOW PROCESS FROM NODE    420.00 TO NODE    421.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =  1628.00
 UPSTREAM ELEVATION(FEET) =   1707.00
 DOWNSTREAM ELEVATION(FEET) =   1654.00
 ELEVATION DIFFERENCE(FEET) =     53.00
 TC = 0.393*[( 1628.00**3)/(    53.00)]**.2 =   15.000
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.400
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8101
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     57.75
 TOTAL AREA(ACRES) =     29.70   TOTAL RUNOFF(CFS) =     57.75

****************************************************************************
 FLOW PROCESS FROM NODE    421.00 TO NODE    422.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1640.00  DOWNSTREAM(FEET) =  1627.12
 FLOW LENGTH(FEET) =   561.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.93
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   3
 PIPE-FLOW(CFS) =      57.75
 PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   15.78
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    422.00 =    2189.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    422.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1627.12  DOWNSTREAM(FEET) =  1615.00
 FLOW LENGTH(FEET) =  1220.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  20.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.44
 GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      57.75
 PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   17.56
 LONGEST FLOWPATH FROM NODE    420.00 TO NODE    107.00 =    3409.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.56
  RAINFALL INTENSITY(INCH/HR) =   2.22
  TOTAL STREAM AREA(ACRES) =    29.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     57.75

****************************************************************************
  FLOW PROCESS FROM NODE    260.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1528.00
  UPSTREAM ELEVATION(FEET) =   1648.00
  DOWNSTREAM ELEVATION(FEET) =   1631.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  TC = 0.303*[( 1528.00**3)/(    17.00)]**.2 =   13.995
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.485
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8825
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =    137.27
  TOTAL AREA(ACRES) =     62.60   TOTAL RUNOFF(CFS) =    137.27

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.99
  RAINFALL INTENSITY(INCH/HR) =   2.48
  TOTAL STREAM AREA(ACRES) =    62.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    137.27

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      300.21    12.07        2.675        217.10
      2       57.75    17.56        2.218         29.70
      3      137.27    13.99        2.485         62.60

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      458.32    12.07       2.675
      2      462.11    13.99       2.485
      3      429.19    17.56       2.218

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     458.32   Tc(MIN.) =   12.07
  TOTAL AREA(ACRES) =      309.4
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    107.00 =    9845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1615.03  DOWNSTREAM(FEET) =  1606.70
  FLOW LENGTH(FEET) =   900.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.34
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     458.32
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   12.71
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    108.00 =   10745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1606.70  DOWNSTREAM(FEET) =  1596.64
  FLOW LENGTH(FEET) =   860.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.47
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     458.32
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   13.11
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    108.00 =   11605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  TOTAL STREAM AREA(ACRES) =   309.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    458.32

****************************************************************************
  FLOW PROCESS FROM NODE    270.00 TO NODE    108.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1907.00
  UPSTREAM ELEVATION(FEET) =   1628.00
  DOWNSTREAM ELEVATION(FEET) =   1611.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  TC = 0.393*[( 1907.00**3)/(    17.00)]**.2 =   20.705
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.043
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7980
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     58.19
  TOTAL AREA(ACRES) =     35.70   TOTAL RUNOFF(CFS) =     58.19

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.70
  RAINFALL INTENSITY(INCH/HR) =   2.04
  TOTAL STREAM AREA(ACRES) =    35.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     58.19

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      458.32    13.11        2.567        309.40
      2       58.19    20.70        2.043         35.70

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      495.16    13.11       2.567
      2      422.86    20.70       2.043

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     495.16   Tc(MIN.) =   13.11
  TOTAL AREA(ACRES) =      345.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    108.00 =   11605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  TOTAL STREAM AREA(ACRES) =   345.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    495.16

****************************************************************************
  FLOW PROCESS FROM NODE    410.00 TO NODE    411.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1180.00
  UPSTREAM ELEVATION(FEET) =   1626.00
  DOWNSTREAM ELEVATION(FEET) =   1618.00
  ELEVATION DIFFERENCE(FEET) =      8.00
  TC = 0.323*[( 1180.00**3)/(     8.00)]**.2 =   14.836
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.413
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8642
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     32.53
  TOTAL AREA(ACRES) =     15.60   TOTAL RUNOFF(CFS) =     32.53

****************************************************************************
  FLOW PROCESS FROM NODE    411.00 TO NODE    108.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1601.93  DOWNSTREAM(FEET) =  1597.11
  FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.93
  GIVEN PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   14.85
  LONGEST FLOWPATH FROM NODE    410.00 TO NODE    108.00 =    1207.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.85
  RAINFALL INTENSITY(INCH/HR) =   2.41
  TOTAL STREAM AREA(ACRES) =    15.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.53

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      495.16    13.11        2.567        345.10
      2       32.53    14.85        2.412         15.60

 **********************************WARNING*********************************
```

```
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      523.87    13.11       2.567
      2      497.71    14.85       2.412

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     523.87   Tc(MIN.) =   13.11
  TOTAL AREA(ACRES) =      360.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    108.00 =   11605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1596.64  DOWNSTREAM(FEET) =  1584.64
  FLOW LENGTH(FEET) =  1000.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.94
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     523.87
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.61
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    109.00 =   12605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.61
  RAINFALL INTENSITY(INCH/HR) =   2.52
  TOTAL STREAM AREA(ACRES) =   360.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    523.87

****************************************************************************
  FLOW PROCESS FROM NODE    280.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1611.00
  UPSTREAM ELEVATION(FEET) =   1612.00
  DOWNSTREAM ELEVATION(FEET) =   1599.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.393*[( 1611.00**3)/(    13.00)]**.2 =   19.743
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.092
 SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7998
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     57.89
 TOTAL AREA(ACRES) =     34.60   TOTAL RUNOFF(CFS) =     57.89

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   19.74
 RAINFALL INTENSITY(INCH/HR) =   2.09
 TOTAL STREAM AREA(ACRES) =    34.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     57.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      523.87    13.61        2.519        360.70
     2       57.89    19.74        2.092         34.60

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      563.79    13.61       2.519
     2      492.90    19.74       2.092

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     563.79   Tc(MIN.) =   13.61
 TOTAL AREA(ACRES) =      395.3
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    109.00 =   12605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    109.50 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1589.00  DOWNSTREAM(FEET) =  1568.80
 FLOW LENGTH(FEET) =  1430.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  35.45
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     563.79
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   14.29
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    109.50 =   14035.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    109.50 TO NODE    109.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.29
  RAINFALL INTENSITY(INCH/HR) =   2.46
  TOTAL STREAM AREA(ACRES) =   395.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    563.79

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    109.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1987.00
  UPSTREAM ELEVATION(FEET) =   1612.00
  DOWNSTREAM ELEVATION(FEET) =   1568.80
  ELEVATION DIFFERENCE(FEET) =     43.20
  TC = 0.393*[( 1987.00**3)/(    43.20)]**.2 =   17.611
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.215
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .8042
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     68.94
  TOTAL AREA(ACRES) =     38.70   TOTAL RUNOFF(CFS) =     68.94

****************************************************************************
  FLOW PROCESS FROM NODE    109.50 TO NODE    109.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.61
  RAINFALL INTENSITY(INCH/HR) =   2.21
  TOTAL STREAM AREA(ACRES) =    38.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      563.79    14.29        2.459        395.30
      2       68.94    17.61        2.215         38.70

 ***********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      619.71    14.29       2.459
      2      576.73    17.61       2.215

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     619.71   Tc(MIN.) =   14.29
  TOTAL AREA(ACRES) =      434.0
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    109.50 =   14035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.50 TO NODE    109.60 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1568.00  DOWNSTREAM(FEET) =  1561.33
  FLOW LENGTH(FEET) =  1292.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.96
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     619.71
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   14.84
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    109.60 =   15327.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.60 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1561.33  DOWNSTREAM(FEET) =   1560.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.00   CHANNEL SLOPE =  0.0016
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =     619.71
  FLOW VELOCITY(FEET/SEC.) =  25.82   FLOW DEPTH(FEET) =   4.00
  TRAVEL TIME(MIN.) =   0.21   Tc(MIN.) =   15.05
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    110.00 =   15652.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.05
  RAINFALL INTENSITY(INCH/HR) =   2.40
  TOTAL STREAM AREA(ACRES) =   434.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    619.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2462.00
  UPSTREAM ELEVATION(FEET) =   1591.00
  DOWNSTREAM ELEVATION(FEET) =   1560.80
  ELEVATION DIFFERENCE(FEET) =     30.20
  TC = 0.393*[( 2462.00**3)/(    30.20)]**.2 =   21.514
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.004
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7964
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =    144.92
  TOTAL AREA(ACRES) =     90.80   TOTAL RUNOFF(CFS) =    144.92

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.51
  RAINFALL INTENSITY(INCH/HR) =   2.00
  TOTAL STREAM AREA(ACRES) =    90.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    144.92

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH GOOD COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1646.00
  UPSTREAM ELEVATION(FEET) =   1586.00
  DOWNSTREAM ELEVATION(FEET) =   1560.80
  ELEVATION DIFFERENCE(FEET) =     25.20
  TC = 0.937*[( 1646.00**3)/(    25.20)]**.2 =   41.831
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.437
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6352
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     16.25
  TOTAL AREA(ACRES) =     17.80   TOTAL RUNOFF(CFS) =     16.25

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   41.83
```

```
 RAINFALL INTENSITY(INCH/HR) =   1.44
 TOTAL STREAM AREA(ACRES) =    17.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.25

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      619.71    15.05        2.396        434.00
     2      144.92    21.51        2.004         90.80
     3       16.25    41.83        1.437         17.80

 ***********************************WARNING************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      726.93    15.05       2.396
     2      671.57    21.51       2.004
     3      491.87    41.83       1.437

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     726.93   Tc(MIN.) =   15.05
 TOTAL AREA(ACRES) =      542.6
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    110.00 =   15652.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1560.80  DOWNSTREAM(FEET) =   1558.13
 CHANNEL LENGTH THRU SUBAREA(FEET) =   700.00   CHANNEL SLOPE =  0.0038
 CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =   1.500
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
 CHANNEL FLOW THRU SUBAREA(CFS) =     726.93
 FLOW VELOCITY(FEET/SEC.) =  11.39   FLOW DEPTH(FEET) =   3.65
 TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =   16.07
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    111.00 =   16352.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   16.07
 RAINFALL INTENSITY(INCH/HR) =   2.32
 TOTAL STREAM AREA(ACRES) =   542.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    726.93

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    330.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
 TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   708.00
 UPSTREAM ELEVATION(FEET) =   1578.00
 DOWNSTREAM ELEVATION(FEET) =   1567.00
 ELEVATION DIFFERENCE(FEET) =     11.00
 TC = 0.323*[(  708.00**3)/(    11.00)]**.2 =   10.246
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.904
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8692
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     14.89
 TOTAL AREA(ACRES) =      5.90   TOTAL RUNOFF(CFS) =     14.89

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.25
 RAINFALL INTENSITY(INCH/HR) =   2.90
 TOTAL STREAM AREA(ACRES) =     5.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.89

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      726.93    16.07        2.319        542.60
     2       14.89    10.25        2.904          5.90

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      478.28    10.25       2.904
     2      738.82    16.07       2.319

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     738.82   Tc(MIN.) =   16.07
 TOTAL AREA(ACRES) =      548.5
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    111.00 =   16352.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1558.13  DOWNSTREAM(FEET) =   1557.27
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0020
  CHANNEL BASE(FEET) =    8.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =     738.82
  FLOW VELOCITY(FEET/SEC.) =  23.09   FLOW DEPTH(FEET) =   4.00
  TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =   16.38
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    112.00 =   16772.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.38
  RAINFALL INTENSITY(INCH/HR) =   2.30
  TOTAL STREAM AREA(ACRES) =   548.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    738.82

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS SINGLE FAMILY (1/4 ACRE)
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2914.00
  UPSTREAM ELEVATION(FEET) =   1571.00
  DOWNSTREAM ELEVATION(FEET) =   1565.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  TC = 0.393*[( 2914.00**3)/(     6.00)]**.2 =   32.886
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.621
  SINGLE-FAMILY(1/4 ACRE LOT) RUNOFF COEFFICIENT = .7786
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     48.96
  TOTAL AREA(ACRES) =     38.80   TOTAL RUNOFF(CFS) =     48.96

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   32.89
  RAINFALL INTENSITY(INCH/HR) =   1.62
```

```
 TOTAL STREAM AREA(ACRES) =    38.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     48.96

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      738.82    16.38        2.297        548.50
     2       48.96    32.89        1.621         38.80

 ***********************************WARNING************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1      763.20    16.38       2.297
     2      570.32    32.89       1.621

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     763.20   Tc(MIN.) =   16.38
 TOTAL AREA(ACRES) =      587.3
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    112.00 =   16772.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1547.35  DOWNSTREAM(FEET) =  1546.80
 FLOW LENGTH(FEET) =  1039.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.18
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     763.20
 PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   17.52
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    113.00 =   17811.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   17.52
 RAINFALL INTENSITY(INCH/HR) =   2.22
 TOTAL STREAM AREA(ACRES) =   587.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    763.20

****************************************************************************
 FLOW PROCESS FROM NODE    350.00 TO NODE    113.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   694.00
  UPSTREAM ELEVATION(FEET) =   1570.00
  DOWNSTREAM ELEVATION(FEET) =   1564.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  TC = 0.533*[(  694.00**3)/(     6.00)]**.2 =   18.862
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.140
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .7032
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     21.97
  TOTAL AREA(ACRES) =     14.60   TOTAL RUNOFF(CFS) =     21.97

********************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.86
  RAINFALL INTENSITY(INCH/HR) =   2.14
  TOTAL STREAM AREA(ACRES) =    14.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.97

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      763.20    17.52        2.221        587.30
      2       21.97    18.86        2.140         14.60

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1      783.60    17.52       2.221
      2      757.44    18.86       2.140

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     783.60   Tc(MIN.) =   17.52
  TOTAL AREA(ACRES) =      601.9
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    113.00 =   17811.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1546.80  DOWNSTREAM(FEET) =  1546.50
  FLOW LENGTH(FEET) =   310.00   MANNING'S N =  0.012
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.59
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  96.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     783.60
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   17.85
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    114.00 =   18121.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.85
  RAINFALL INTENSITY(INCH/HR) =   2.20
  TOTAL STREAM AREA(ACRES) =   601.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    783.60

****************************************************************************
  FLOW PROCESS FROM NODE    360.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2227.00
  UPSTREAM ELEVATION(FEET) =   1575.00
  DOWNSTREAM ELEVATION(FEET) =   1562.00
  ELEVATION DIFFERENCE(FEET) =     13.00
  TC = 0.303*[( 2227.00**3)/(    13.00)]**.2 =   18.511
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.160
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8805
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     44.70
  TOTAL AREA(ACRES) =     23.50   TOTAL RUNOFF(CFS) =     44.70

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.51
  RAINFALL INTENSITY(INCH/HR) =   2.16
  TOTAL STREAM AREA(ACRES) =    23.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     44.70

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      783.60    17.85        2.200        601.90
      2       44.70    18.51        2.160         23.50
```

```
 ************************************WARNING*************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ********************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      826.70    17.85       2.200
      2      814.14    18.51       2.160

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     826.70   Tc(MIN.) =   17.85
  TOTAL AREA(ACRES) =      625.4
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    114.00 =   18121.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1546.50  DOWNSTREAM(FEET) =   1545.46
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1150.00   CHANNEL SLOPE =  0.0009
  CHANNEL BASE(FEET) =   14.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =     826.70
  FLOW VELOCITY(FEET/SEC.) =  14.76   FLOW DEPTH(FEET) =   4.00
  TRAVEL TIME(MIN.) =   1.30   Tc(MIN.) =   19.15
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    115.00 =   19271.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.15
  RAINFALL INTENSITY(INCH/HR) =   2.12
  TOTAL STREAM AREA(ACRES) =   625.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    826.70

****************************************************************************
  FLOW PROCESS FROM NODE    380.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  2340.00
  UPSTREAM ELEVATION(FEET) =   1562.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[( 2340.00**3)/(     4.00)]**.2 =   24.138
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.892
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8784
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     59.99
  TOTAL AREA(ACRES) =     36.10   TOTAL RUNOFF(CFS) =     59.99

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   24.14
  RAINFALL INTENSITY(INCH/HR) =   1.89
  TOTAL STREAM AREA(ACRES) =    36.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     59.99

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      826.70    19.15        2.124        625.40
      2       59.99    24.14        1.892         36.10

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      874.29    19.15       2.124
      2      796.26    24.14       1.892

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     874.29   Tc(MIN.) =   19.15
  TOTAL AREA(ACRES) =      661.5
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    115.00 =   19271.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1550.00  DOWNSTREAM(FEET) =   1548.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   872.50   CHANNEL SLOPE =  0.0023
  CHANNEL BASE(FEET) =   14.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =     874.29
  FLOW VELOCITY(FEET/SEC.) =  15.61   FLOW DEPTH(FEET) =   4.00
  TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =   20.08
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    116.00 =   20143.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.08
  RAINFALL INTENSITY(INCH/HR) =   2.07
  TOTAL STREAM AREA(ACRES) =   661.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    874.29

****************************************************************************
  FLOW PROCESS FROM NODE    370.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1676.00
  UPSTREAM ELEVATION(FEET) =   1559.00
  DOWNSTREAM ELEVATION(FEET) =   1555.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[( 1676.00**3)/(     4.00)]**.2 =   19.758
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.091
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8800
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     78.39
  TOTAL AREA(ACRES) =     42.60   TOTAL RUNOFF(CFS) =     78.39

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    116.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.76
  RAINFALL INTENSITY(INCH/HR) =   2.09
  TOTAL STREAM AREA(ACRES) =    42.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     78.39

  ** CONFLUENCE DATA **
```

```
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1      874.29    20.08        2.074        661.50
     2       78.39    19.76        2.091         42.60

 **********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
      1      938.75    19.76       2.091
      2      952.05    20.08       2.074

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     952.05   Tc(MIN.) =   20.08
  TOTAL AREA(ACRES) =      704.1
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    116.00 =   20143.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    901.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1548.00  DOWNSTREAM(FEET) =   1544.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =   200.00   CHANNEL SLOPE =  0.0158
  CHANNEL BASE(FEET) =   14.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   4.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     952.05
  FLOW VELOCITY(FEET/SEC.) =  21.09   FLOW DEPTH(FEET) =   3.22
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =   20.24
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    901.00 =   20343.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    901.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1      952.05    20.24       2.066      704.10
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    901.00 =   20343.50 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1       82.38    22.28       1.969       41.50
  LONGEST FLOWPATH FROM NODE    340.00 TO NODE    901.00 =    2828.35 FEET.

 **********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
```

```
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1    1026.86      20.24        2.066
      2     989.64      22.28        1.969

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1026.86   Tc(MIN.) =   20.24
  TOTAL AREA(ACRES) =      745.6

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1545.50  DOWNSTREAM(FEET) =   1543.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   581.22   CHANNEL SLOPE =  0.0036
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =    1026.86
  FLOW VELOCITY(FEET/SEC.) =  12.48   FLOW DEPTH(FEET) =   4.57
  TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =   21.01
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    902.00 =   20924.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.01
  RAINFALL INTENSITY(INCH/HR) =   2.03
  TOTAL STREAM AREA(ACRES) =   745.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1026.86

+--------------------------------------------------------------------------+
| LINE B                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    902.20 TO NODE    902.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1554.00
  DOWNSTREAM ELEVATION(FEET) =   1553.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  500.00**3)/(     1.00)]**.2 =   12.617
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.617
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      9.48
 TOTAL AREA(ACRES) =      4.10   TOTAL RUNOFF(CFS) =      9.48

****************************************************************************
 FLOW PROCESS FROM NODE    902.10 TO NODE    902.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1546.74  DOWNSTREAM(FEET) =  1544.34
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  36.0 INCH PIPE IS   7.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.48
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   12.84
 LONGEST FLOWPATH FROM NODE    902.20 TO NODE    902.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.84
 RAINFALL INTENSITY(INCH/HR) =   2.59
 TOTAL STREAM AREA(ACRES) =     4.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.48

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1     1026.86    21.01        2.028        745.60
     2        9.48    12.84        2.594          4.10

 ***********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 *****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1      636.89    12.84       2.594
     2     1034.27    21.01       2.028

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    1034.27   Tc(MIN.) =   21.01
 TOTAL AREA(ACRES) =      749.7
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    902.00 =   20924.72 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    903.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1543.25  DOWNSTREAM(FEET) =   1540.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1015.00   CHANNEL SLOPE =  0.0027
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1034.27
  FLOW VELOCITY(FEET/SEC.) =  11.49   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =   22.48
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    903.00 =   21939.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| LINE C                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    800.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1250.00
  UPSTREAM ELEVATION(FEET) =   1574.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  TC = 0.533*[( 1250.00**3)/(    16.00)]**.2 =   22.066
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.979
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6909
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     24.74
  TOTAL AREA(ACRES) =     18.10   TOTAL RUNOFF(CFS) =     24.74

****************************************************************************
  FLOW PROCESS FROM NODE    800.00 TO NODE    802.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1550.00  DOWNSTREAM(FEET) =  1544.00
```

```
  FLOW LENGTH(FEET) =  1500.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.74
  PIPE TRAVEL TIME(MIN.) =   3.79    Tc(MIN.) =   25.86
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    802.00 =    2750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    802.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   25.86
  RAINFALL INTENSITY(INCH/HR) =   1.83
  TOTAL STREAM AREA(ACRES) =    18.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.74

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1545.00
  UPSTREAM ELEVATION(FEET) =   1561.00
  DOWNSTREAM ELEVATION(FEET) =   1554.00
  ELEVATION DIFFERENCE(FEET) =      7.00
  TC = 0.303*[( 1545.00**3)/(     7.00)]**.2 =   16.824
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.266
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8812
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     34.95
  TOTAL AREA(ACRES) =     17.50   TOTAL RUNOFF(CFS) =     34.95

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    802.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.82
  RAINFALL INTENSITY(INCH/HR) =   2.27
  TOTAL STREAM AREA(ACRES) =    17.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.95

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.74    25.86        1.828         18.10
      2       34.95    16.82        2.266         17.50

 **********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
```

```
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.05    16.82       2.266
      2       52.93    25.86       1.828

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.05   Tc(MIN.) =   16.82
  TOTAL AREA(ACRES) =       35.6
  LONGEST FLOWPATH FROM NODE    320.00 TO NODE    802.00 =    2750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    802.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.82
  RAINFALL INTENSITY(INCH/HR) =   2.27
  TOTAL STREAM AREA(ACRES) =    35.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     51.05

****************************************************************************
  FLOW PROCESS FROM NODE    400.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =  1708.00
  UPSTREAM ELEVATION(FEET) =   1562.00
  DOWNSTREAM ELEVATION(FEET) =   1558.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  TC = 0.303*[( 1708.00**3)/(     4.00)]**.2 =   19.983
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.079
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8799
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     34.40
  TOTAL AREA(ACRES) =     18.80   TOTAL RUNOFF(CFS) =     34.40

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    801.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.98
  RAINFALL INTENSITY(INCH/HR) =   2.08
  TOTAL STREAM AREA(ACRES) =    18.80
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.40

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       51.05    16.82        2.266         35.60
     2       34.40    19.98        2.079         18.80

 ***********************************WARNING************************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ******************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       80.00    16.82       2.266
     2       81.23    19.98       2.079

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      80.00   Tc(MIN.) =   16.82
 TOTAL AREA(ACRES) =       54.4
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    801.00 =    2750.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    802.00 TO NODE    903.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1544.00  DOWNSTREAM(FEET) =  1543.21
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      80.00
 PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   17.22
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    903.00 =    2950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       80.00    17.22       2.240       54.40
 LONGEST FLOWPATH FROM NODE    320.00 TO NODE    903.00 =    2950.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1     1034.27    22.48       1.960      749.70
```

```
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    903.00 =   21939.72 FEET.

 ****************************************WARNING****************************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ***************************************************************************

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     872.33      17.22        2.240
      2    1104.29      22.48        1.960

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1104.29   Tc(MIN.) =   22.48
  TOTAL AREA(ACRES) =      804.1

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    904.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1541.50  DOWNSTREAM(FEET) =   1540.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.0018
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1104.29
  FLOW VELOCITY(FEET/SEC.) =  12.27   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =   23.16
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    904.00 =   22439.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   23.16
  RAINFALL INTENSITY(INCH/HR) =   1.93
  TOTAL STREAM AREA(ACRES) =   804.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1104.29

+--------------------------------------------------------------------------+
| LINE D                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    904.20 TO NODE    904.10 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
  UPSTREAM ELEVATION(FEET) =   1553.00
  DOWNSTREAM ELEVATION(FEET) =   1552.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  500.00**3)/(     1.00)]**.2 =   12.617
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.617
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.63
  TOTAL AREA(ACRES) =      4.60   TOTAL RUNOFF(CFS) =     10.63

****************************************************************************
  FLOW PROCESS FROM NODE    904.10 TO NODE    904.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1546.30  DOWNSTREAM(FEET) =  1542.30
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.19
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.63
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   12.98
  LONGEST FLOWPATH FROM NODE    904.20 TO NODE    904.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.98
  RAINFALL INTENSITY(INCH/HR) =   2.58
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1     1104.29    23.16        1.931        804.10
      2       10.63    12.98        2.580          4.60

 ***********************************WARNING**********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      629.45    12.98       2.580
      2     1112.25    23.16       1.931

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1112.25   Tc(MIN.) =   23.16
  TOTAL AREA(ACRES) =      808.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    904.00 =   22439.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1540.00  DOWNSTREAM(FEET) =   1539.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.0011
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1112.25
  FLOW VELOCITY(FEET/SEC.) =  12.36   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   24.38
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    905.00 =   23339.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   24.38
  RAINFALL INTENSITY(INCH/HR) =   1.88
  TOTAL STREAM AREA(ACRES) =   808.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1112.25

+--------------------------------------------------------------------------+
| LINE E                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    905.20 TO NODE    905.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   500.00
```

```
 UPSTREAM ELEVATION(FEET) =   1555.00
 DOWNSTREAM ELEVATION(FEET) =   1554.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 TC = 0.303*[(  500.00**3)/(     1.00)]**.2 =   12.617
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.617
 COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8832
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =     13.64
 TOTAL AREA(ACRES) =      5.90   TOTAL RUNOFF(CFS) =     13.64

****************************************************************************
 FLOW PROCESS FROM NODE    905.10 TO NODE    905.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1544.72  DOWNSTREAM(FEET) =  1540.72
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  10.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.37
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.64
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   12.94
 LONGEST FLOWPATH FROM NODE    905.20 TO NODE    905.00 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.94
 RAINFALL INTENSITY(INCH/HR) =   2.58
 TOTAL STREAM AREA(ACRES) =     5.90
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.64

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1     1112.25    24.38        1.883        808.70
     2       13.64    12.94        2.584          5.90

 ***********************************WARNING**********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1       603.99    12.94       2.584
     2      1122.18    24.38       1.883

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =    1122.18   Tc(MIN.) =   24.38
  TOTAL AREA(ACRES) =      814.6
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    905.00 =   23339.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    906.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1539.00  DOWNSTREAM(FEET) =   1536.48
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1400.00   CHANNEL SLOPE =  0.0018
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1122.18
  FLOW VELOCITY(FEET/SEC.) =  12.47   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   1.87   Tc(MIN.) =   26.25
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    906.00 =   24739.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   26.25
  RAINFALL INTENSITY(INCH/HR) =   1.81
  TOTAL STREAM AREA(ACRES) =   814.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1122.18

+--------------------------------------------------------------------------+
| LINE F                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    906.20 TO NODE    906.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   750.00
  UPSTREAM ELEVATION(FEET) =   1554.00
  DOWNSTREAM ELEVATION(FEET) =   1553.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  750.00**3)/(     1.00)]**.2 =   16.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.317
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8815
  SOIL CLASSIFICATION IS "C"
```

```
 SUBAREA RUNOFF(CFS) =     12.87
 TOTAL AREA(ACRES) =      6.30   TOTAL RUNOFF(CFS) =     12.87

****************************************************************************
 FLOW PROCESS FROM NODE    906.10 TO NODE    906.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =  1542.22  DOWNSTREAM(FEET) =  1538.22
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.11
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.87
 PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   16.42
 LONGEST FLOWPATH FROM NODE    906.20 TO NODE    906.00 =     950.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    906.00 TO NODE    906.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   16.42
 RAINFALL INTENSITY(INCH/HR) =   2.29
 TOTAL STREAM AREA(ACRES) =     6.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.87

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1     1122.18    26.25        1.814        814.60
     2       12.87    16.42        2.294          6.30

 **********************************WARNING***********************************
 IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
 ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
 WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
     1      714.95    16.42       2.294
     2     1132.36    26.25       1.814

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    1132.36   Tc(MIN.) =   26.25
 TOTAL AREA(ACRES) =      820.9
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    906.00 =   24739.72 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    906.00 TO NODE    907.00 IS CODE =  51
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1541.50  DOWNSTREAM(FEET) =   1539.25
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1250.00   CHANNEL SLOPE =  0.0018
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00

         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1132.36
  FLOW VELOCITY(FEET/SEC.) =  12.58   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   27.90
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    907.00 =   25989.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    907.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.90
  RAINFALL INTENSITY(INCH/HR) =   1.76
  TOTAL STREAM AREA(ACRES) =   820.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1132.36

+--------------------------------------------------------------------------+
| LINE G                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    907.20 TO NODE    907.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS COMMERCIAL
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   800.00
  UPSTREAM ELEVATION(FEET) =   1555.00
  DOWNSTREAM ELEVATION(FEET) =   1554.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.303*[(  800.00**3)/(     1.00)]**.2 =   16.728
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.273
  COMMERCIAL DEVELOPMENT RUNOFF COEFFICIENT = .8812
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =     10.81
  TOTAL AREA(ACRES) =      5.40   TOTAL RUNOFF(CFS) =     10.81

****************************************************************************
  FLOW PROCESS FROM NODE    907.10 TO NODE    907.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1541.24  DOWNSTREAM(FEET) =  1537.24
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.81
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   17.07
  LONGEST FLOWPATH FROM NODE    907.20 TO NODE    907.00 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    907.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.07
  RAINFALL INTENSITY(INCH/HR) =   2.25
  TOTAL STREAM AREA(ACRES) =     5.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.81

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1     1132.36    27.90        1.760        820.90
      2       10.81    17.07        2.250          5.40

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1      703.51    17.07       2.250
      2     1140.82    27.90       1.760

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1140.82   Tc(MIN.) =   27.90
  TOTAL AREA(ACRES) =      826.3
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    907.00 =   25989.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    907.00 TO NODE    908.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1539.25  DOWNSTREAM(FEET) =   1538.55
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0017
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
```

```
         ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
             CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
             ALLOWABLE DEPTH).
             AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
             ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

  CHANNEL FLOW THRU SUBAREA(CFS) =    1140.82
  FLOW VELOCITY(FEET/SEC.) =  12.68   FLOW DEPTH(FEET) =   5.00
  TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   28.43
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    908.00 =   26389.72 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   28.43
  RAINFALL INTENSITY(INCH/HR) =   1.74
  TOTAL STREAM AREA(ACRES) =   826.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =   1140.82

+--------------------------------------------------------------------------+
| LINE H                                                                   |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    908.20 TO NODE    908.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS: UNDEVELOPED WITH POOR COVER
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  UPSTREAM ELEVATION(FEET) =   1553.00
  DOWNSTREAM ELEVATION(FEET) =   1552.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  TC = 0.533*[(  700.00**3)/(     1.00)]**.2 =   27.131
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.785
  UNDEVELOPED WATERSHED RUNOFF COEFFICIENT = .6738
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      4.09
  TOTAL AREA(ACRES) =      3.40   TOTAL RUNOFF(CFS) =      4.09

****************************************************************************
  FLOW PROCESS FROM NODE    908.10 TO NODE    908.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  1536.64  DOWNSTREAM(FEET) =  1535.64
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  20.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  GIVEN PIPE DIAMETER(INCH) =  20.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.09
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   27.41
  LONGEST FLOWPATH FROM NODE    908.20 TO NODE    908.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    908.00 TO NODE    908.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   27.41
  RAINFALL INTENSITY(INCH/HR) =   1.78
  TOTAL STREAM AREA(ACRES) =     3.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.09

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER       (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1     1140.82    28.43        1.743        826.30
      2        4.09    27.41        1.775          3.40

 **********************************WARNING***********************************
  IN THIS COMPUTER PROGRAM, THE CONFLUENCE VALUE USED IS BASED
  ON THE RCFC&WCD FORMULA OF PLATE D-1 AS DEFAULT VALUE. THIS FORMULA
  WILL NOT NECESSARILY RESULT IN THE MAXIMUM VALUE OF PEAK FLOW.
 ****************************************************************************

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER       (CFS)    (MIN.)   (INCH/HOUR)
      1     1104.14    27.41       1.775
      2     1144.83    28.43       1.743

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1144.83   Tc(MIN.) =   28.43
  TOTAL AREA(ACRES) =      829.7
  LONGEST FLOWPATH FROM NODE    200.00 TO NODE    908.00 =   26389.72 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      829.7  TC(MIN.) =     28.43
  PEAK FLOW RATE(CFS)   =    1144.83
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX C

HYDRAULIC ANALYSIS

Program Package License Serial Number: 1232

WATER SURFACE PROFILE LISTING Date: 7-31-2018 Time:10:32:47

17380 K4 MORENO VALLEY
RCB CHANNEL
100 YEAR

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1000.000	1532.000	7.006	1539.006	1144.83	14.96	3.48	1542.48	1.09	7.01	11.00	10.000	11.000	.00	0 .0
13.267	.0018					.0036	.05	8.10	1.00	9.35	.013	-1.20	.00	RECTANG
1013.267	1532.024	7.345	1539.370	1144.83	14.27	3.16	1542.53	.99	7.01	11.00	10.000	11.000	.00	0 .0
24.993	.0018					.0033	.08	8.34	.93	9.35	.013	-1.20	.00	RECTANG
1038.260	1532.070	7.556	1539.626	1144.83	13.87	2.99	1542.61	.00	7.01	11.00	10.000	11.000	.00	0 .0
24.530	.0016					.0031	.08	7.56	.89	9.78	.013	-1.20	.00	RECTANG
1062.790	1532.110	7.709	1539.819	1144.83	13.59	2.87	1542.69	.19	7.01	11.00	10.000	11.000	.00	0 .0
TRANS STR	.0018					.0023	.35	7.89	.87		.013	-1.44	.00	RECTANG
1214.260	1532.390	8.972	1541.362	1144.83	10.70	1.78	1543.14	.00	6.62	12.00	8.000	12.000	.00	0 .0
2180.337	.0018					.0017	3.69	8.97	.63	8.55	.013	-1.44	.00	RECTANG
3394.597	1536.315	8.557	1544.873	1144.83	11.23	1.96	1546.83	.00	6.62	12.00	8.000	12.000	.00	0 .0
208.023	.0018					.0018	.37	8.56	.68	8.55	.013	-1.44	.00	RECTANG
3602.620	1536.690	8.555	1545.245	1144.83	11.23	1.96	1547.20	.00	6.62	12.00	8.000	12.000	.00	0 .0
TRANS STR	.0020					.0013	.01	8.56	.68		.013	-1.68	.00	RECTANG
3607.620	1536.700	9.554	1546.254	1144.83	8.62	1.15	1547.41	.00	5.99	14.00	7.000	14.000	.00	0 .0
379.704	.0018					.0009	.36	9.55	.49	7.29	.013	-1.68	.00	RECTANG
3987.324	1537.383	9.112	1546.495	1144.83	9.04	1.27	1547.77	.00	5.99	14.00	7.000	14.000	.00	0 .0
399.593	.0018					.0011	.43	9.11	.53	7.29	.013	-1.68	.00	RECTANG

17380 K4 MORENO VALLEY
RCB CHANNEL
100 YEAR

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/Dia.-FT or I.D. / X-Fall	Base Wt / ZR	ZL	No Wth Prs/Pip / Type Ch
4386.917	1538.102	8.692	1546.793	1144.83	9.48	1.40	1548.19	.00	5.99	14.00	7.000	14.000	.00	0 .0
439.340	.0018					.0012	.53	8.69	.57	7.29	.013	-1.68	.00	RECTANG
4826.257	1538.892	8.290	1547.183	1144.83	9.95	1.54	1548.72	.00	5.99	14.00	7.000	14.000	.00	0 .0
525.178	.0018					.0014	.72	8.29	.61	7.29	.013	-1.68	.00	RECTANG
5351.435	1539.837	7.908	1547.745	1144.83	10.43	1.69	1549.44	.00	5.99	14.00	7.000	14.000	.00	0 .0
770.250	.0018					.0015	1.19	7.91	.66	7.29	.013	-1.68	.00	RECTANG
6121.685	1541.223	7.543	1548.766	1144.83	10.94	1.86	1550.63	.00	5.99	14.00	7.000	14.000	.00	0 .0
126.365	.0018					.0017	.21	7.54	.71	7.29	.013	-1.68	.00	RECTANG
6248.050	1541.450	7.506	1548.956	1144.83	11.00	1.88	1550.83	.00	5.99	14.00	7.000	14.000	.00	0 .0
JUNCT STR	.0043					.0015	.01	7.51	.71		.014	-1.68	.00	RECTANG
6252.050	1541.467	8.446	1549.913	1034.88	8.82	1.21	1551.12	.00	5.61	14.00	7.000	14.000	.00	0 .0
4.730	-.0015					.0010	.00	8.45	.54	.00	.013	-1.68	.00	RECTANG
6256.780	1541.460	8.464	1549.924	1034.88	8.81	1.20	1551.13	.00	5.61	14.00	7.000	14.000	.00	0 .0
TRANS STR	.0020					.0009	.00	8.46	.54		.013	-2.00	.00	RECTANG
6261.780	1541.470	9.189	1550.659	1034.88	6.32	.62	1551.28	.00	4.77	18.79	5.000	18.790	.00	1 .8
347.714	.0018					.0008	.26	9.19	.38	6.39	.013	-2.00	.00	RECTANG
6609.494	1542.096	8.765	1550.861	1034.88	6.62	.68	1551.54	.00	4.77	18.79	5.000	18.790	.00	1 .8
355.246	.0018					.0009	.30	8.77	.40	6.39	.013	-2.00	.00	RECTANG

17380 K4 MORENO VALLEY
RCB CHANNEL
100 YEAR

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
6964.740	1542.736	8.362	1551.097	1034.88	6.95	.75	1551.85	.00	4.77	18.79	5.000	18.790	.00	1 .8
370.272	.0018					.0010	.36	8.36	.43	6.39	.013	-2.00	.00	RECTANG
7335.012	1543.402	7.976	1551.379	1034.88	7.29	.82	1552.20	.00	4.77	18.79	5.000	18.790	.00	1 .8
397.766	.0018					.0011	.43	7.98	.47	6.39	.013	-2.00	.00	RECTANG
7732.778	1544.119	7.609	1551.728	1034.88	7.64	.91	1552.64	.00	4.77	18.79	5.000	18.790	.00	1 .8
117.221	.0018					.0012	.14	7.61	.50	6.39	.013	-2.00	.00	RECTANG
7850.000	1544.330	7.511	1551.841	1034.88	7.74	.93	1552.77	.00	4.77	18.79	5.000	18.790	.00	1 .8
JUNCT STR	.0020					.0006	.01	7.51	.51		.013	-2.00	.00	RECTANG
7860.000	1544.350	8.424	1552.774	82.83	.55	.00	1552.78	.00	.96	18.79	5.000	18.790	.00	1 .8
8.390	.0012					.0000	.00	8.42	.03	1.31	.013	-2.00	.00	RECTANG
7868.390	1544.360	8.414	1552.774	82.83	.55	.00	1552.78	.00	.96	18.79	5.000	18.790	.00	1 .8
TRANS STR	.0020					.0001	.00	8.41	.03		.013	-.60	.00	RECTANG
7873.390	1544.370	8.376	1552.746	82.83	1.98	.06	1552.81	.00	2.07	5.00	5.000	5.000	.00	0 .0
229.217	.0018					.0001	.03	8.38	.12	2.85	.013	-.60	.00	RECTANG
8102.607	1544.783	7.988	1552.771	82.83	2.08	.07	1552.84	.00	2.07	5.00	5.000	5.000	.00	0 .0
220.057	.0018					.0001	.03	7.99	.13	2.85	.013	-.60	.00	RECTANG
8322.664	1545.179	7.617	1552.797	82.83	2.18	.07	1552.87	.00	2.07	5.00	5.000	5.000	.00	0 .0
211.445	.0018					.0002	.04	7.62	.14	2.85	.013	-.60	.00	RECTANG

Program Package License Serial Number: 1232

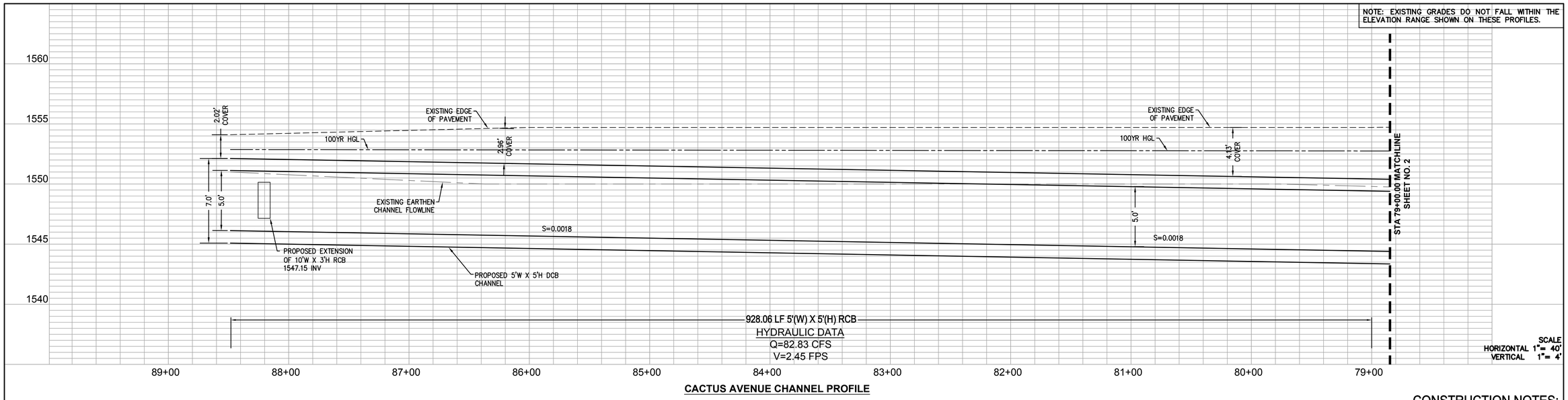
WATER SURFACE PROFILE LISTING Date: 7-31-2018 Time:10:32:47

17380 K4 MORENO VALLEY
RCB CHANNEL
100 YEAR

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/Dia.-FT or I.D. / X-Fall	Base Wt / ZL / ZR	No Wth Prs/Pip / Type Ch
8534.109	1545.560	7.264	1552.824	82.83	2.29	.08	1552.91	.00	2.07	5.00	5.000	5.000	.00	0	.0
203.372	.0018				.0002	.04	7.26	.15	2.85	.013	-.60	.00		RECTANG	
8737.481	1545.927	6.927	1552.854	82.83	2.40	.09	1552.94	.00	2.07	5.00	5.000	5.000	.00	0	.0
90.578	.0018				.0002	.02	6.93	.16	2.85	.013	-.60	.00		RECTANG	
8828.060	1546.090	6.778	1552.868	82.83	2.45	.09	1552.96	.00	2.07	5.00	5.000	5.000	.00	0	.0

APPENDIX D

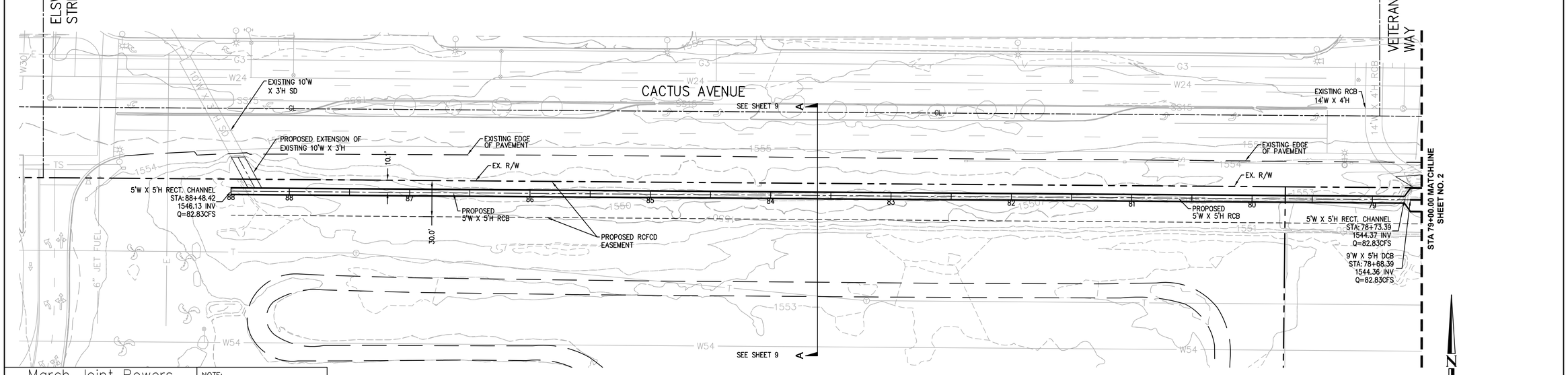
CACTUS CHANNEL IMPROVEMENT PLANS (FOR REFERENCE)



CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

① CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

March Joint Powers Authority
APPROVED BY:

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

CAUTION!!
LOCATION OF EXISTING UTILITIES ON THESE PLANS ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

PREPARED BY:
RBF Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

Don't Dig...Until You Call U.S.A. Toll Free
811
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

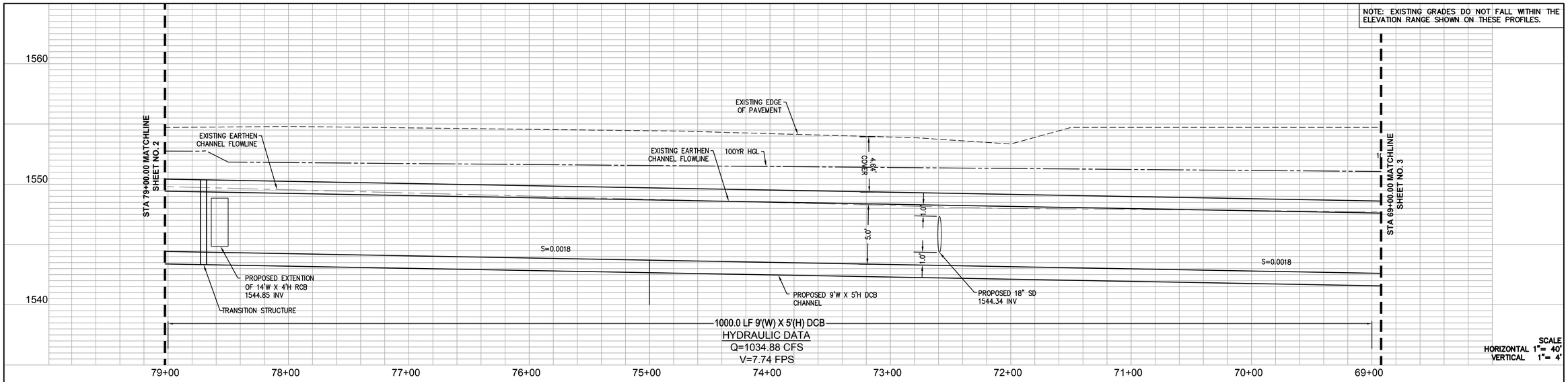
APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 88+48.48 TO STA 79+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 1 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

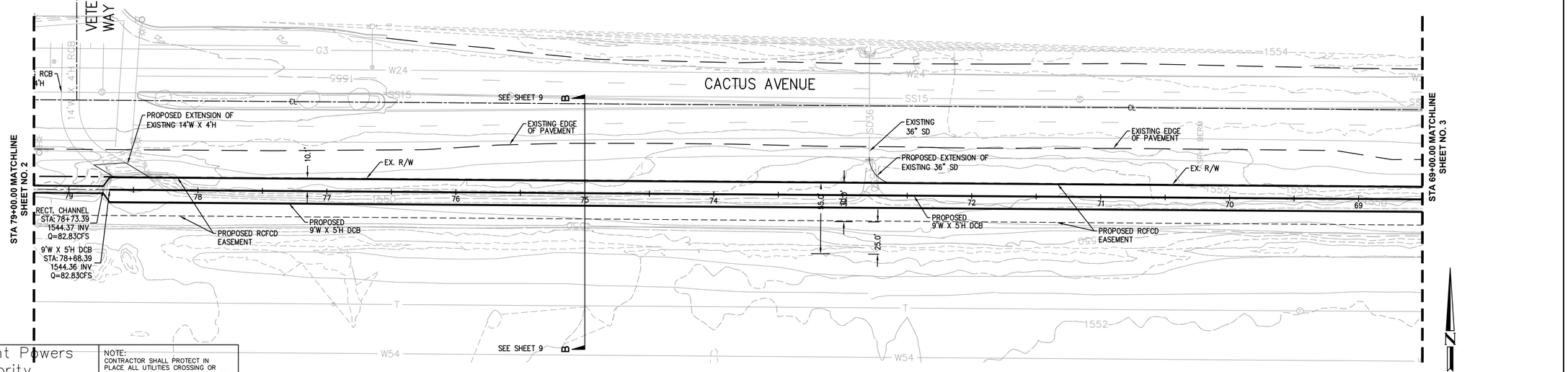


SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

(1) CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

CAUTION!!
LOCATION OF EXISTING UTILITIES ON THESE PLANS ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Don't Dig...Until You Call U.S.A. Toll Free
811
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

CHRISTOPHER MCKEE R.C.E. 74414 DATE

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL, IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

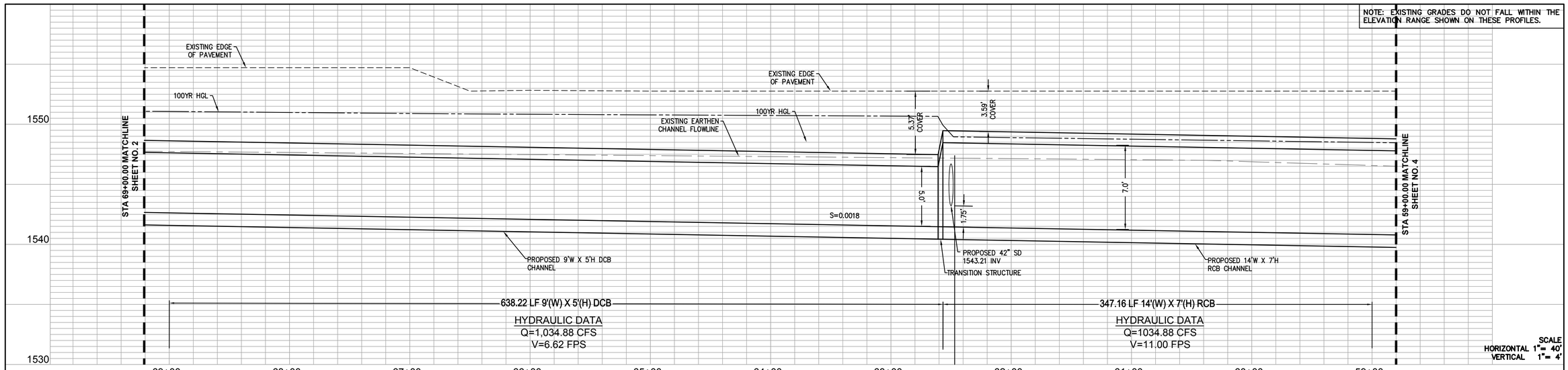
APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 79+00.00 TO STA 69+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 2 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

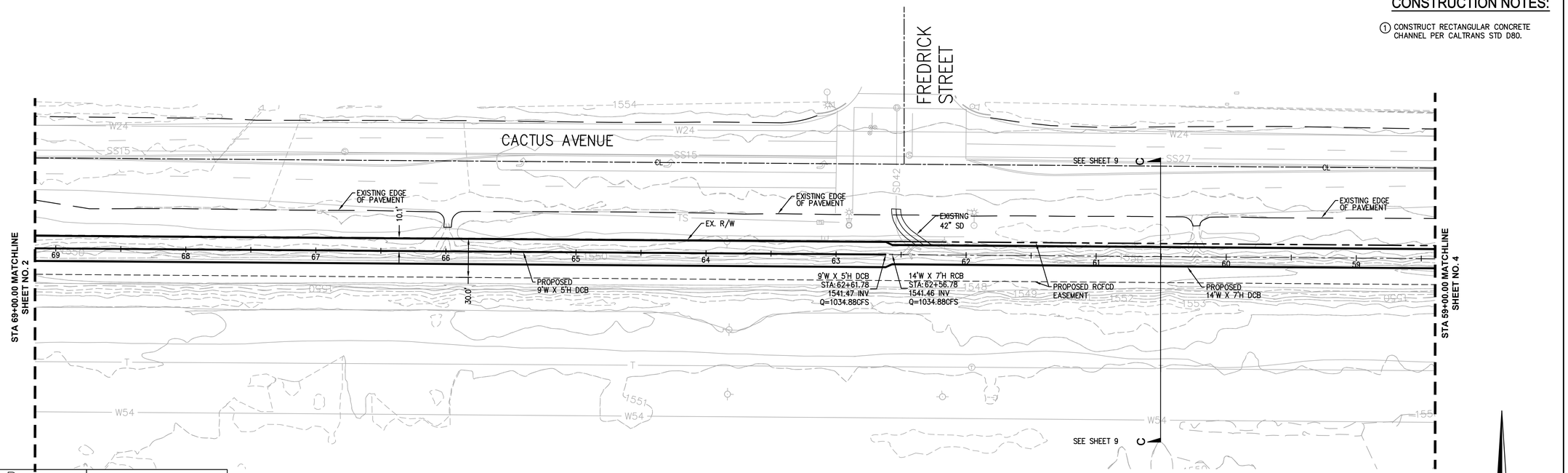


SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

① CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

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TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

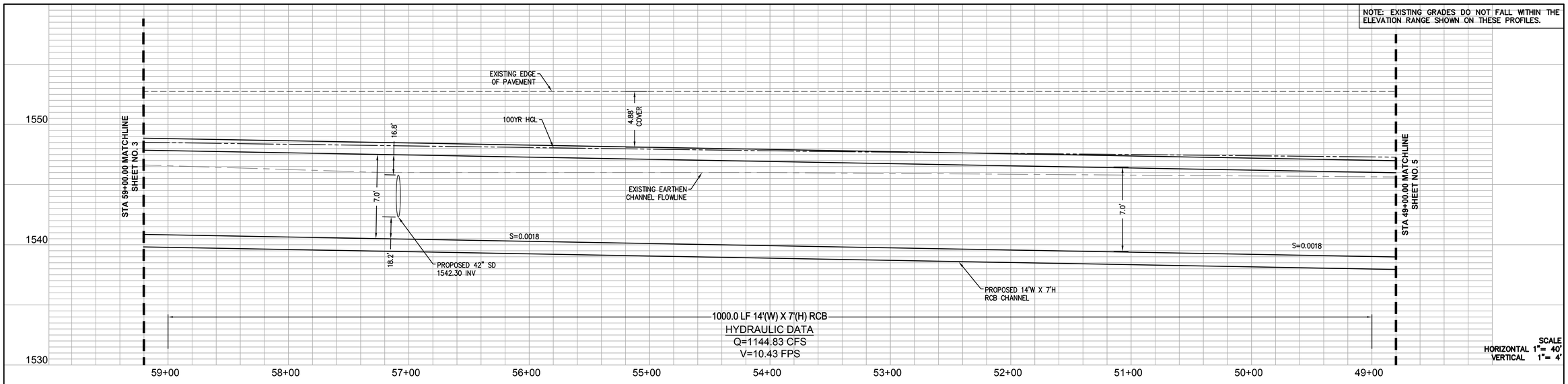
REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 STATE OF CALIFORNIA CIVIL

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 69+00.00 TO STA 59+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 3 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

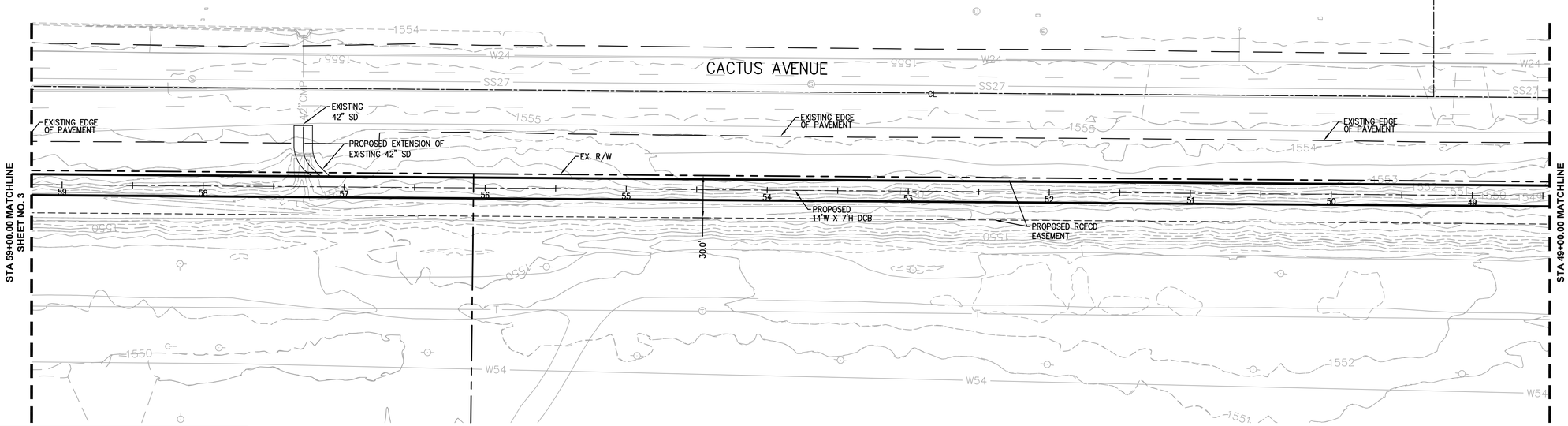


SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

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TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

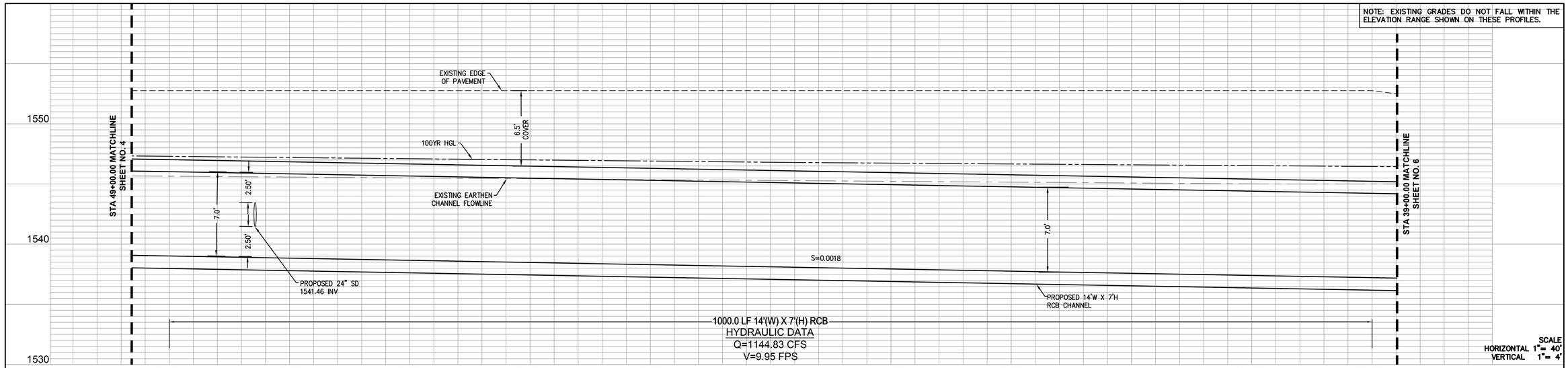
APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 59+00.00 TO STA 49+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 4 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

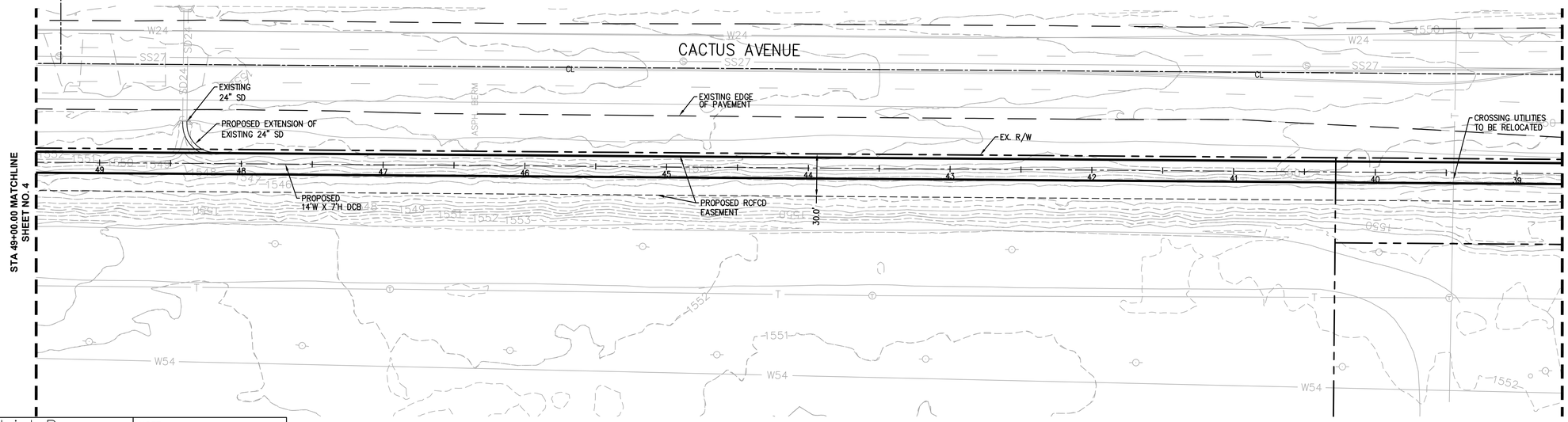


CACTUS AVENUE CHANNEL PROFILE

SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CONSTRUCTION NOTES:

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

N

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

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811
for the location of buried utility lines.
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TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

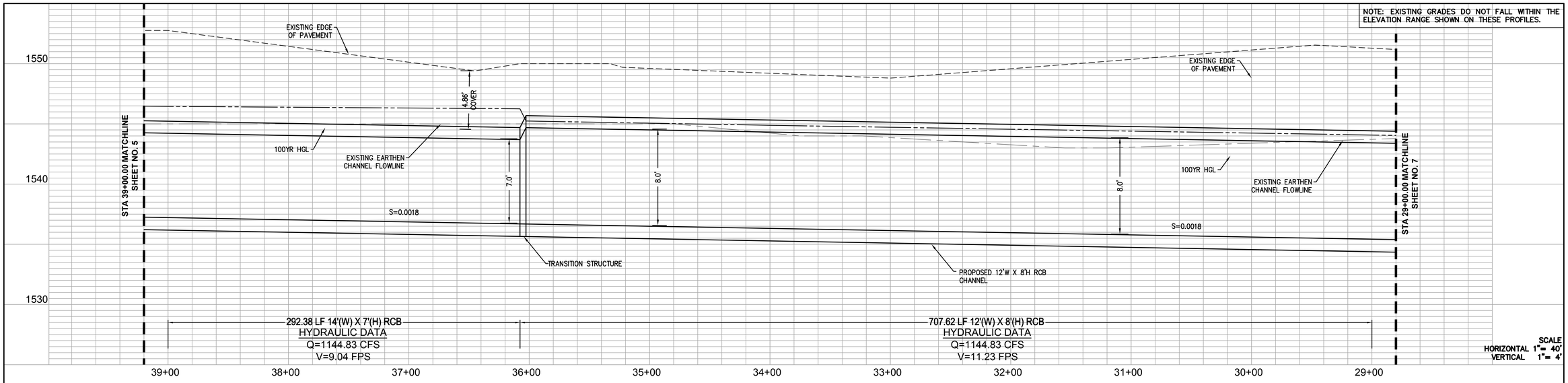
REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER M. KEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 49+00.00 TO STA 39+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 5 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

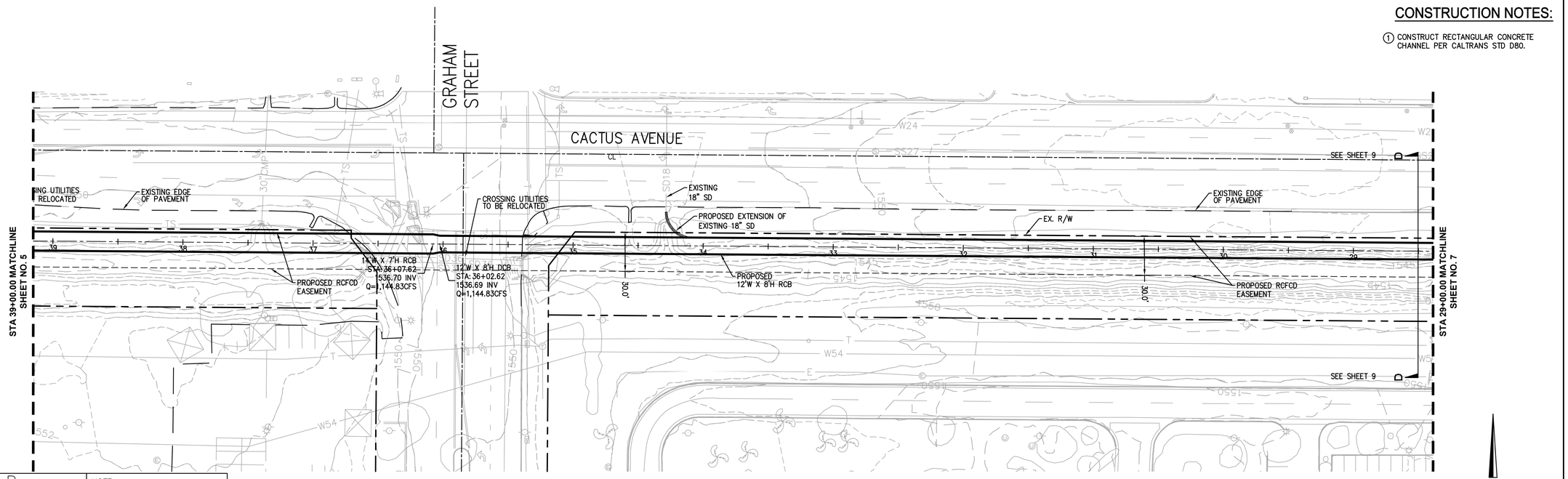


SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

① CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

40' 0' 40' 80' 120'
GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
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PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER MCKEE
No. C74414
Exp. 9-30-19
CIVIL
STATE OF CALIFORNIA

Don't Dig...Until You Call U.S.A. Toll Free
811
for the location of buried utility lines.
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TWO WORKING DAYS BEFORE YOU DIG

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

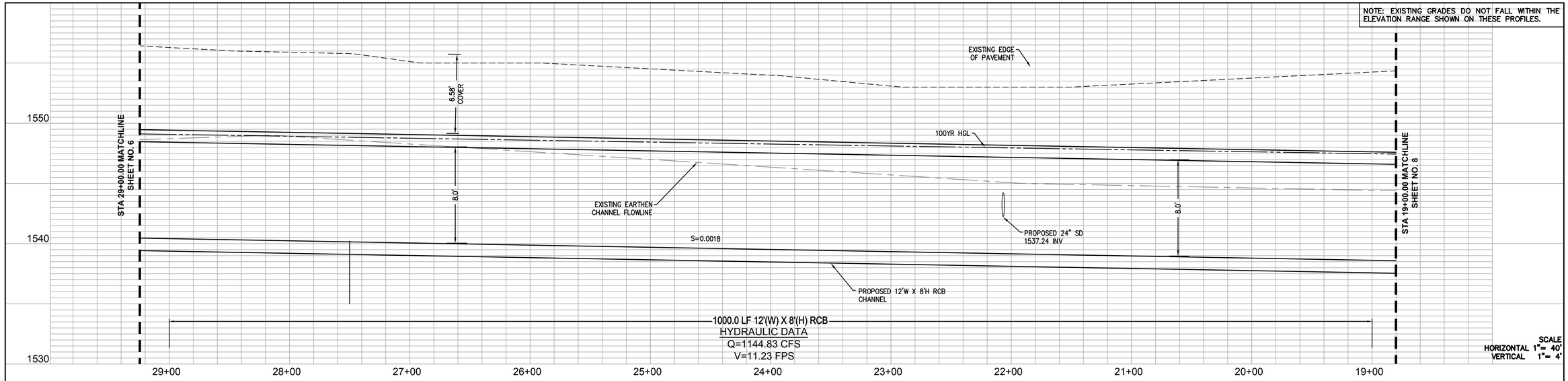
APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 39+00.00 TO STA 29+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 6 OF 9

NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.

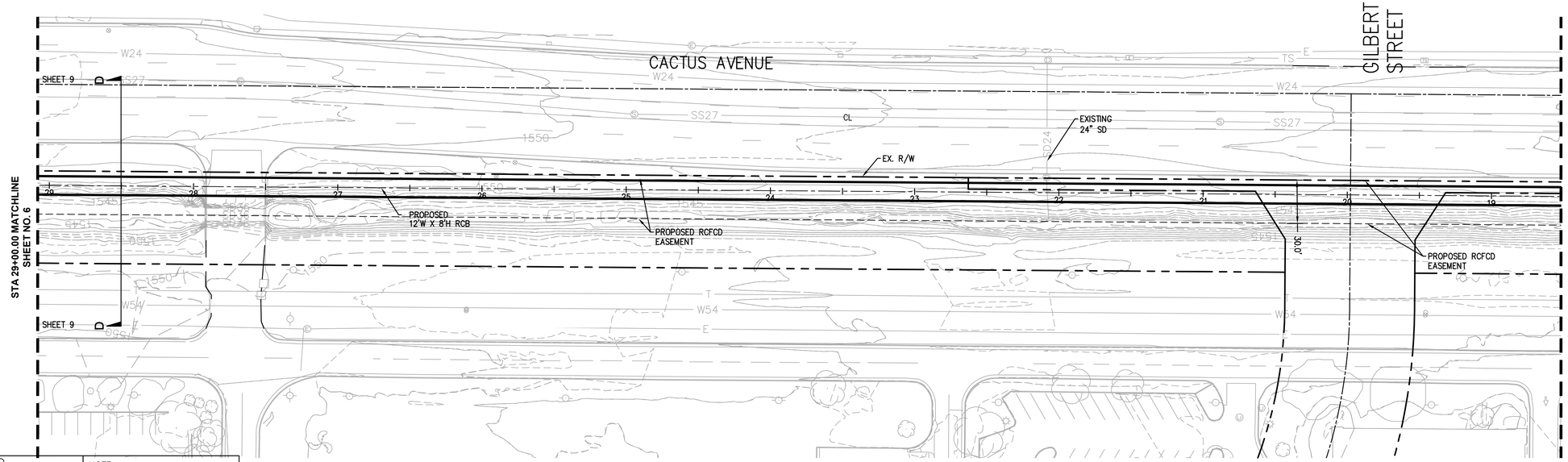


SCALE
HORIZONTAL 1"= 40'
VERTICAL 1"= 4'

CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

① CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB

N

40' 0' 40' 80' 120'

GRAPHIC SCALE: 1"=40'

March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
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for the location of buried utility lines.
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TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860
CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL, IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

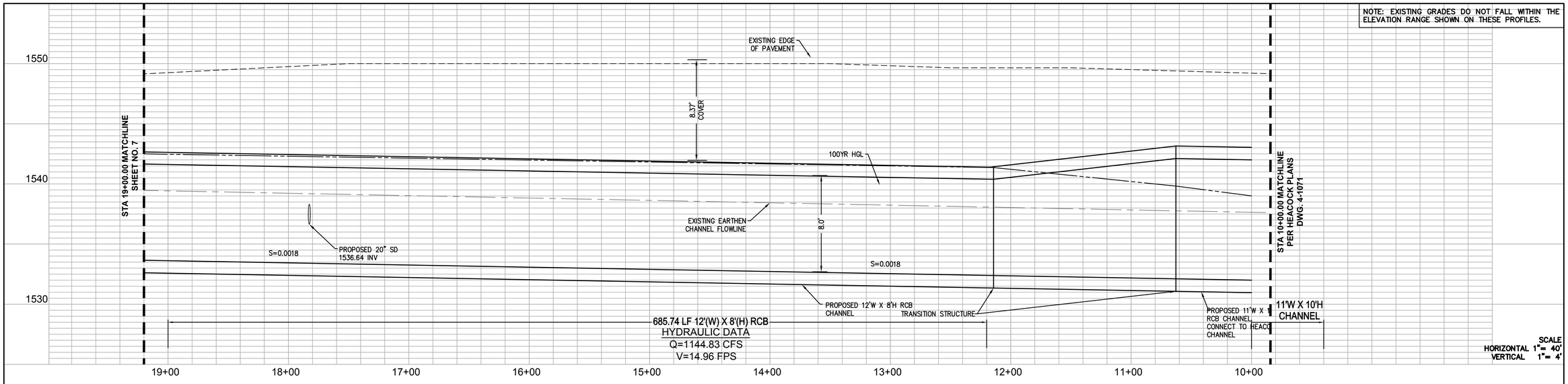
APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 29+00.00 TO STA 19+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 7 OF 9

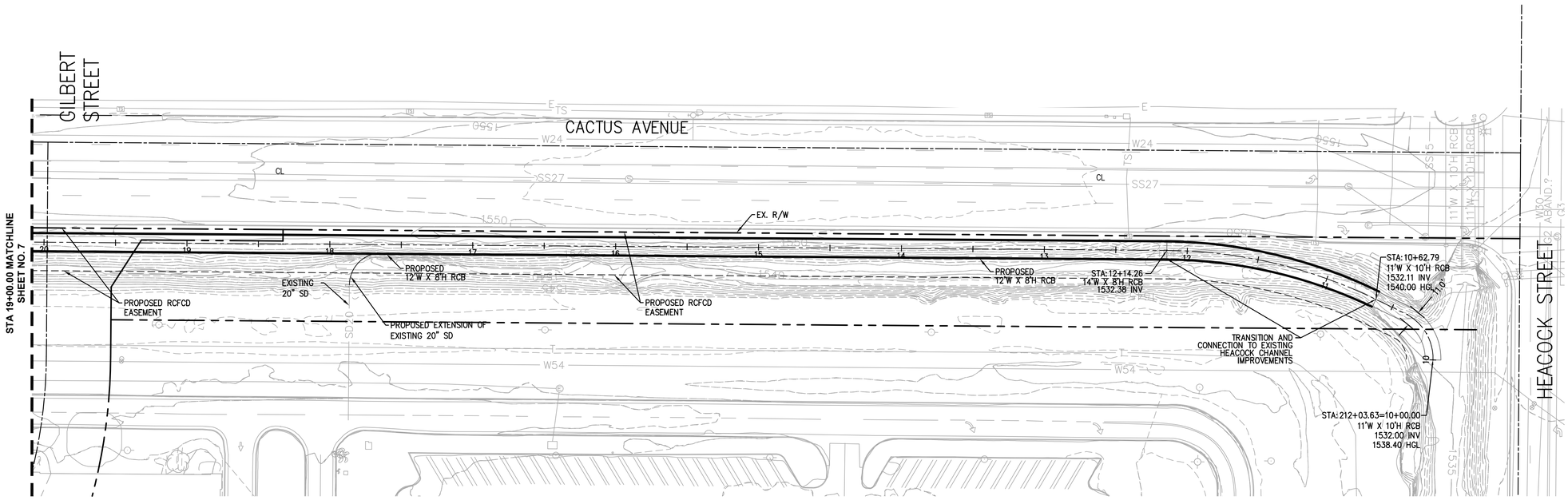
NOTE: EXISTING GRADES DO NOT FALL WITHIN THE ELEVATION RANGE SHOWN ON THESE PROFILES.



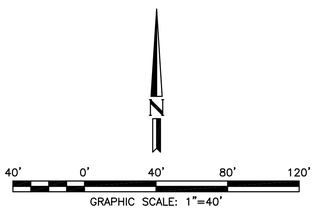
CACTUS AVENUE CHANNEL PROFILE

CONSTRUCTION NOTES:

1. CONSTRUCT RECTANGULAR CONCRETE CHANNEL PER CALTRANS STD D80.



CACTUS AVENUE-RCB



March Joint Powers
APPROVED BY: Authority

MARCH J.P.A. — DATE
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

NOTE:
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BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL, IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE — R.C.E. 74414 — DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

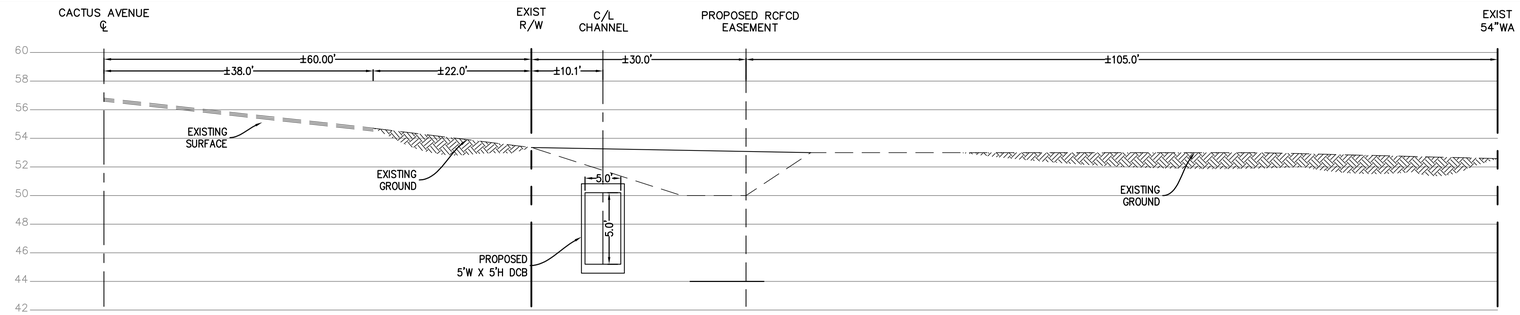
K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE
STA 19+00.00 TO STA 10+00.00

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 8 OF 9

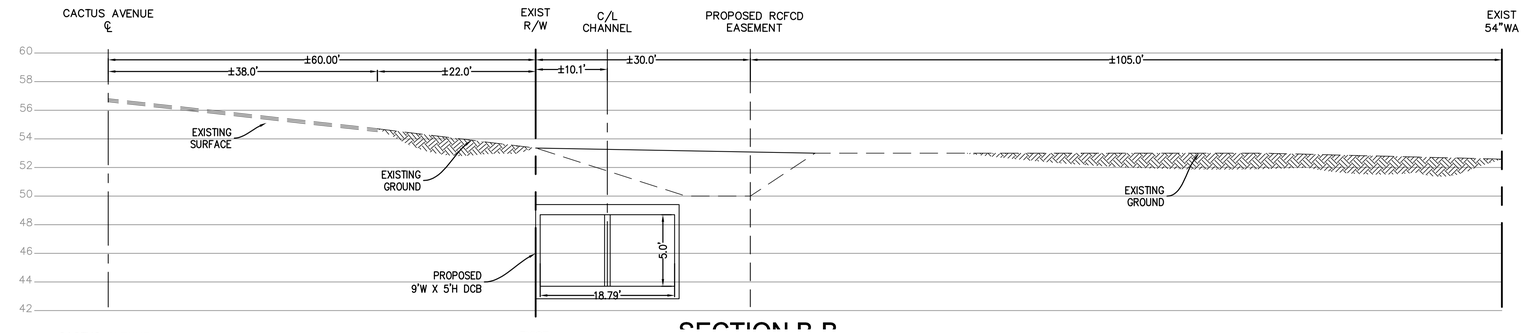
SECTION A-A

STA: 83+39.00
SCALE: HORIZ. 1"=10'
VERT. 1"=5'



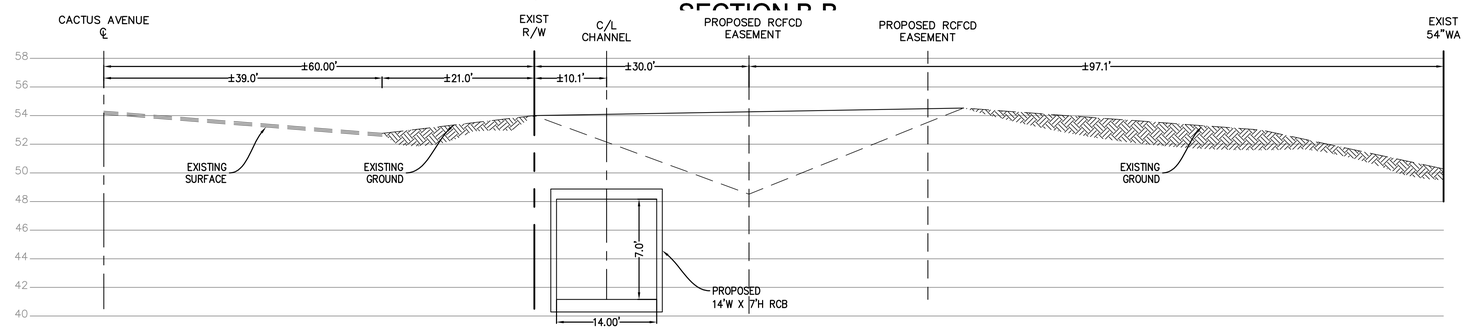
SECTION B-B

STA: 75+00.00
SCALE: HORIZ. 1"=10'
VERT. 1"=5'



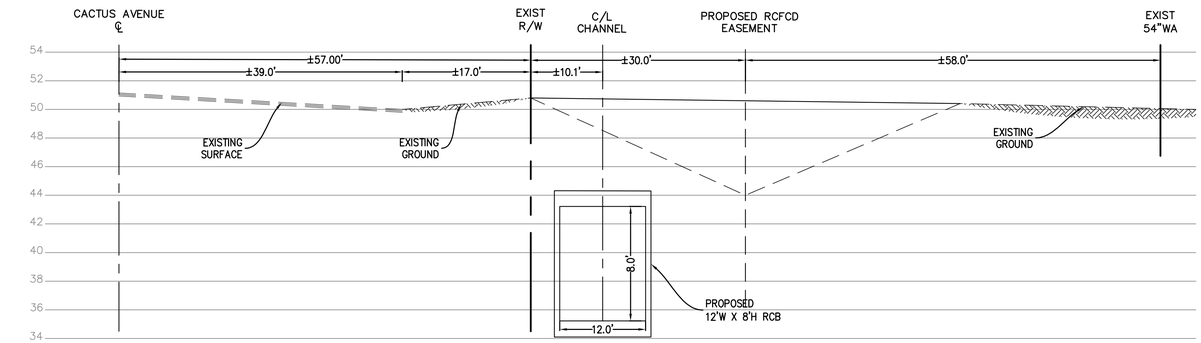
SECTION C-C

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SCALE: HORIZ. 1"=10'
VERT. 1"=5'



SECTION D-D

STA: 28+50.00
SCALE: HORIZ. 1"=10'
VERT. 1"=5'



March Joint Powers
APPROVED BY: Authority

MARCH J.P.A.
HABIB MOTLAGH
DIRECTOR OF PUBLIC WORKS

DATE

NOTE:
CONTRACTOR SHALL PROTECT IN PLACE ALL UTILITIES CROSSING OR PARALLELING THE STORM DRAIN LINES UNLESS OTHERWISE NOTED.

CAUTION!!
LOCATION OF EXISTING UTILITIES ON THESE PLANS ARE APPROXIMATE AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Don't Dig...Until You Call U.S.A. Toll Free
811
for the location of buried utility lines.
Don't disrupt vital services.
TWO WORKING DAYS BEFORE YOU DIG

PREPARED BY:
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. C74414 Exp. 9-30-19 CIVIL STATE OF CALIFORNIA

BENCHMARK:
A STANDARD U.S. C.&G.S. BRASS DISC STAMPED "Z 1143 1961" LOCATED S.E. ALONG THE A.T.S.F. RAILROAD FROM VAN BUREN BLVD., WEST OF THE I-215, AND 23 FEET N.E. OF THE N.E. RAIL. IDENTIFIED AS COUNTY OF RIVERSIDE BENCHMARK ID 600-43-68
ELEVATION 1532.70 FEET
DATUM: NGVD29

REF.	REVISIONS	APPR.	DATE

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DESIGNED BY: CHRIS MCKEE
DRAWN BY: DRC
DATE DRAWN: 04/26/2018
CHECKED BY: CHRIS MCKEE

RECOMMENDED FOR APPROVAL BY:
DESIGN ENGINEER R.E. No. 30539
DATE:

APPROVED BY:
CHIEF ENGINEER R.E. NO. 22035
DATE:

K4 MORENO VALLEY STORM DRAIN PLANS TRACT XXXXX

K4 BOX CULVERT CACTUS PROFILE CROSS-SECTIONS

PROJECT NO. 0-0-0000
DRAWING NO. W-XYZ
SHEET NO. 9 OF 9

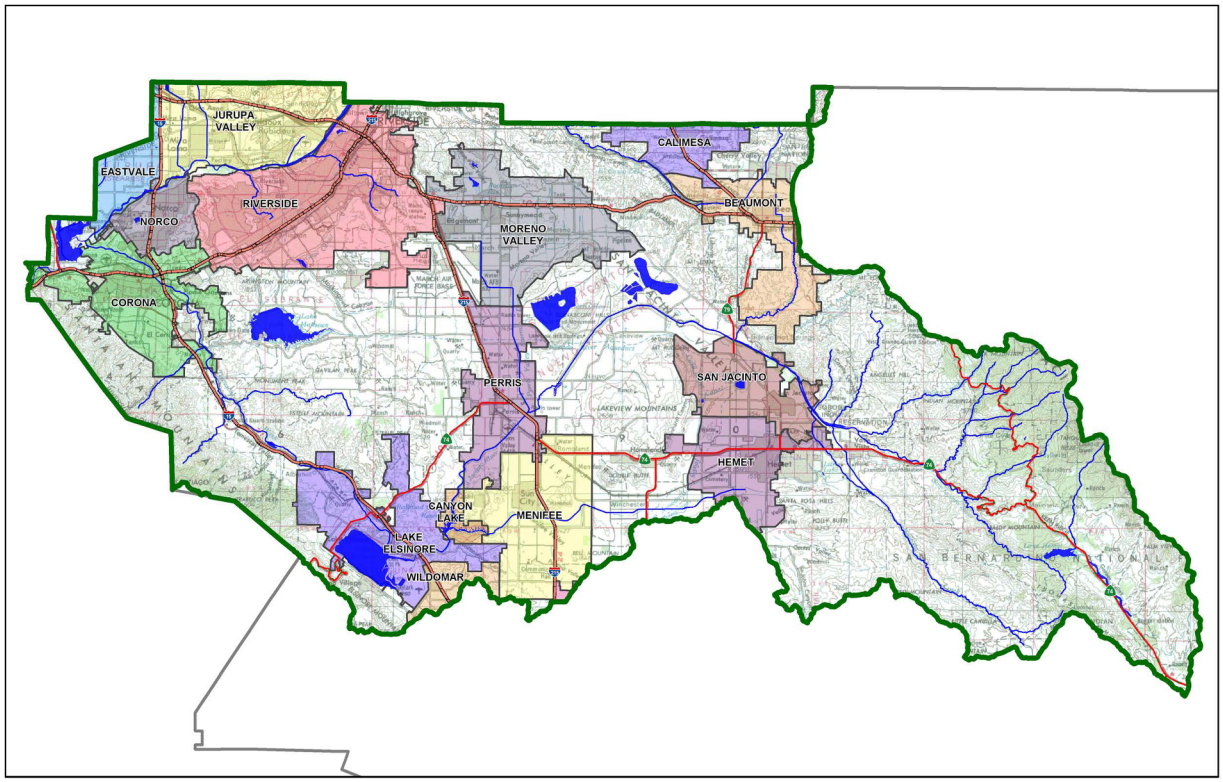
Project Specific Water Quality Management Plan

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: Cactus Avenue K-4 Parcel Industrial

Development No: TBD

Design Review/Case No: TBD



☒ **Preliminary**
☐ **Final**

Original Date Prepared: March 16, 2018

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**

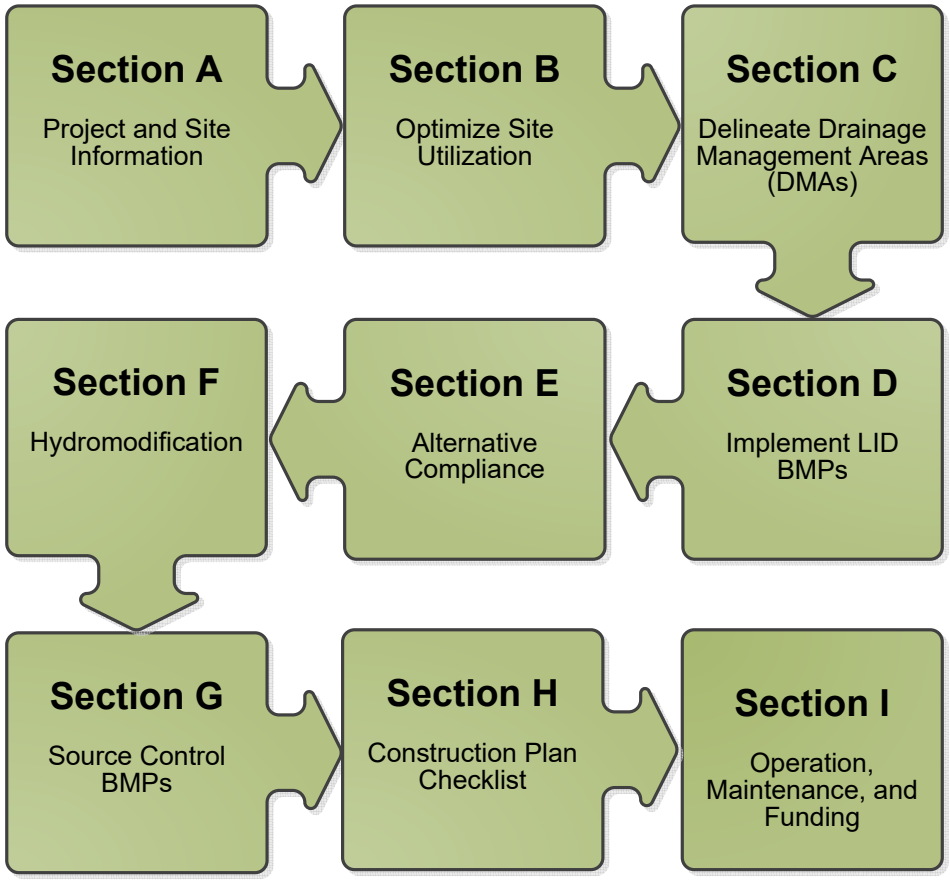
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A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for Meridian Park LLC by DRC Engineering, Inc. for the Cactus Avenue K-4 Parcel Industrial project.

This WQMP is intended to comply with the requirements of County of Riverside for NPDES Permit No. CAS618033 which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity. The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under County of Riverside Water Quality Ordinance (Municipal Code Section754).

"I, the undersigned, certify under penalty of law that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

Owner's Signature	Date
Owner's Printed Name	Owner's Title/Position

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	Date
Christopher McKee Preparer's Printed Name	Project Manager Preparer's Title/Position

Preparer's Licensure:



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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Industrial
Planning Area:	March Joint Powers Authority
Community Name:	March Air Reserve and March JPA
Development Name:	Industrial Warehouse Site K4
PROJECT LOCATION	
Latitude & Longitude (DMS): Lat: 33.906842 Deg, Long: -117.264695 Deg	
Project Watershed and Sub-Watershed: 297-150-006-8, 297-150-007-9, 297-150-038-7, 297160-005-8, 297-200-004-0	
APN(s): Lat: 33.90684°, Long: -117.26469°	
Map Book and Page No.: Map Book 110 Pages 30 and 40	
PROJECT CHARACTERISTICS	
Proposed or Potential Land Use(s)	Industrial
Proposed or Potential SIC Code(s)	4225
Area of Impervious Project Footprint (SF)	1,389,000
Total Area of proposed Impervious Surfaces within the Project Limits (SF)/or Replacement	1,389,000
Does the project consist of offsite road improvements?	☐ Y ☒ N
Does the project propose to construct unpaved roads?	☐ Y ☒ N
Is the project part of a larger common plan of development (phased project)?	☐ Y ☒ N
EXISTING SITE CHARACTERISTICS	
Total area of existing Impervious Surfaces within the project limits (SF)	0
Is the project located within any MSHCP Criteria Cell?	☐ Y ☒ N
If so, identify the Cell number:	N/A
Are there any natural hydrologic features on the project site?	☐ Y ☒ N
Is a Geotechnical Report attached?	☒ Y ☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	C
What is the Water Quality Design Storm Depth for the project?	0.625"

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Headcock Channel-Sunnymead Line B	N/A	N/A	N/A
perris valley channel	N/A	N/A	N/A
San Jacinto River Reach 1	None	MUN – AGR – GWR – REC1-REC2-WARM-WILD	Not designated as RARE
Lake Elsinore	Nutrients – Organic Enrichment / Low Dissolved Oxygen – Sedimentation / Siltation – Unknown Toxicity	REC1 - REC2 – WARM – WILD	Not designated as RARE

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☐ Y	☒ N
US Army Corps of Engineers, CWA Section 404 Permit	☐ Y	☒ N
US Fish and Wildlife, Endangered Species Act Section 7 Biological Opinion	☐ Y	☒ N
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* Grading and Building Permits	☐ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

The proposed drainage patter is consistent with existing drainage pattern. The existing site is approximately 48.02 acres of mass graded land (Mass Grading Plans prepared by Kimley Horn). The project site currently covers portions of two mass graded dirt pads. Each existing dirt pad is between approximately 20 to 30 acres in size and generally surface flows in the northeast direction into an existing storm water collection basin. The basins are approximately 4 feet deep and fitted with a CMP riser inlet that connects to an existing storm drain pipe located in Krameria Avenue. The area west of the mass graded dirt pads surface flows to a swale that was created in the Mass Grading Plan that routes the watershed located west of Coyote Bush Road to the south towards the Ben Clark Training Center. Out of the 48.02 acres of land, approximately 42.20 acres are shown to flow north to the Krameria storm drain system, while the remaining 5.82 acres are shown to drain south into the Ben Clark Training.

Did you identify and protect existing vegetation? If so, how? If not, why?

The site is undeveloped with minimal vegetation.

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

Based on soil's report, the project site has poor percolation test results (< 0.01 in/hr) and therefore this site is not suitable for onsite infiltration.

Did you identify and minimize impervious area? If so, how? If not, why?

Proposed pervious area is shown to the maximum extent practiable while still allowing for other impervious site design requirements (ie. amount of parking stalls).

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

All stormwater will be treated by two proposed Modular Wetland Biofiltration Systems (MWS) to prior leaving the site. There are not enough adjacent pervious areas to disperse runoff from rest of the proposed development area.

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1]	Area (Sq. Ft.)	DMA Type
DMA-A	Mixed	644,690	D
DMA-B	Mixed	669,510	D
DMA-C	Mixed	108,590	D

[1]*Reference Table 2-1 in the WQMP Guidance Document to populate this column*

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
N/A			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
N/A						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Runoff factor	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
N/A							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
DMA-A	BMP A
DMA-B	BMP B
DMA-C	BMP C

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site. If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?	X	
If Yes, list affected DMAs: All DMAs		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: All DMAs		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		
Describe here:		X

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☐The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If neither of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 1.0 Acre

Type of Landscaping (Conservation Design or Active Turf): Conservation Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 34.4 Acres

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.92

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 31.6 Acres

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
31.6 Acres	1.0 Acre

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 250

Project Type: Industrial

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 34.4 Acres

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-1 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 165

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 5,676

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	Projected number of toilet users (Step 1)
5,676	250

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

N/A

Step 1: Identify the projected average daily non-potable demand, in gallons per day, during the wet season and accounting for any periodic shut downs or other lapses in occupancy or operation.

Average Daily Demand: N/A

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for the identified non-potable use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: N/A

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-3 in Chapter 2 to determine the minimum demand for non-potable uses per tributary impervious acre.

Enter the factor from Table 2-3: N/A

Step 4: Multiply the unit value obtained from Step 4 by the total of impervious areas from Step 3 to develop the minimum number of gallons per day of non-potable use that would be required.

Minimum required use: N/A

Step 5: Determine if harvesting stormwater runoff for other non-potable use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required non-potable use (Step 4)	**Projected average daily use (Step 1)**
N/A	N/A

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment, unless a site-specific analysis has been completed that demonstrates technical infeasibility as noted in D.3 below.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document).

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
DMA-A	☐	☐	☐	☒	☐
DMA-B	☐	☐	☐	☒	☐
DMA-C	☐	☐	☐	☒	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First, calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second, design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP -A*		
	[A]		[B]	[C]	[A] x [C]			
DMA-A	*346,690*	*Roofs*	*1.00*	*0.89*	*309,248*			
DMA-A	*267,000*	*Concrete / Asphalt*	*1.00*	*0.892*	*238,164*			
DMA-A	*31,000*	*Ornamental Landscaping*	*0.10*	*0.11*	*3,424*			
						Rainfall Intensity (in/hr)	*Minimum Design Capture Volume* **DCV** *(cf))*	*Proposed Volume on Plan* **DCV** *(cf))*
	644,690				**550,836**	**0.625**	**28,689**	**29,000**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.4 DCV Calculations for LID BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP - B*		
	[A]		[B]	[C]	[A] x [C]			
DMA-B	*353,800*	*Roofs*	*1.00*	*0.89*	*315,590*			
DMA-B	*296,710*	*Concrete / Asphalt*	*1.00*	*0.892*	*264,665*			
DMA-B	*19,000*	*Ornamental Landscaping*	*0.10*	*0.11*	*2,099*			
						Rainfall Intensity (in/hr)	*Minimum Design Capture Volume* **DCV** *(cf))*	*Proposed Volume on Plan* **DCV** *(cf))*
	669,510				**582,354**	**0.625**	**30,331**	**30,500**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Table D.4 DCV Calculations for LID BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*BMP -C*		
	[A]		[B]	[C]	[A] x [C]			
DMA-C	*95,430*	*Roofs*	*1.00*	*0.89*	*85,124*			
DMA-C	*13,160*	*Ornamental Landscaping*	*0.10*	*0.11*	*1,454*			
						Rainfall Intensity (in/hr)	*Minimum Design Capture Volume* **DCV** *(cf))*	*Proposed Volume on Plan* **DCV** *(cf))*
	644,690				**86,577**	**0.625**	**4,509**	**5,000**

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- Or -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

E.1 Identify Pollutants of Concern

Utilizing Table A.1 from Section A above which noted your project's receiving waters and their associated EPA approved 303(d) listed impairments, cross reference this information with that of your selected Priority Development Project Category in Table E.1 below. If the identified General Pollutant Categories are the same as those listed for your receiving waters, then these will be your Pollutants of Concern and the appropriate box or boxes will be checked on the last row. The purpose of this is to document compliance and to help you appropriately plan for mitigating your Pollutants of Concern in lieu of implementing LID BMPs.

Table E.1 Potential Pollutants by Land Use Type

Priority Development Project Categories and/or Project Features (check those that apply)	General Pollutant Categories							
	Bacterial Indicators	Metals	Nutrients	Pesticides	Toxic Organic Compounds	Sediments	Trash & Debris	Oil & Grease
☐ Detached Residential Development	P	N	P	P	N	P	P	P
☐ Attached Residential Development	P	N	P	P	N	P	P	P(2)
☒ Commercial/Industrial Development	P(3)	P	P(1)	P(1)	P(5)	P(1)	P	P
☐ Automotive Repair Shops	N	P	N	N	P(4, 5)	N	P	P
☐ Restaurants (>5,000 ft^2)	P	N	N	N	N	N	P	P
☐ Hillside Development (>5,000 ft^2)	P	N	P	P	N	P	P	P
☐ Parking Lots (>5,000 ft^2)	P(6)	P	P(1)	P(1)	P(4)	P(1)	P	P
☐ Retail Gasoline Outlets	N	P	N	N	P	N	P	P
Project Priority Pollutant(s) of Concern	☐	☒	☒	☐	☐	☐	☒	☒

P = Potential

N = Not Potential

(1) A potential Pollutant if non-native landscaping exists or is proposed onsite; otherwise not expected

(2) A potential Pollutant if the project includes uncovered parking areas; otherwise not expected

(3) A potential Pollutant is land use involving animal waste

(4) Specifically petroleum hydrocarbons

(5) Specifically solvents

(6) Bacterial indicators are routinely detected in pavement runoff

E.2 Stormwater Credits

Projects that cannot implement LID BMPs but nevertheless implement smart growth principles are potentially eligible for Stormwater Credits. Utilize Table 3-8 within the WQMP Guidance Document to identify your Project Category and its associated Water Quality Credit. If not applicable, write N/A.

Table E.2 Water Quality Credits

Qualifying Project Categories	Credit Percentage[2]
Total Credit Percentage[1]	

[1]*Cannot Exceed 50%*
[2]*Obtain corresponding data from Table 3-8 in the WQMP Guidance Document*

E.3 Sizing Criteria

After you appropriately considered Stormwater Credits for your project, utilize Table E.3 below to appropriately size them to the DCV, or Design Flow Rate, as applicable. Please reference Chapter 3.5.2 of the WQMP Guidance Document for further information.

Table E.3 Treatment Control BMP Sizing

DMA Type/ID	DMA Area (square feet) [A]	Post-Project Surface Type	Effective Impervious Fraction, I_f [B]	DMA Runoff Factor [C]	DMA Area x Runoff Factor [A] x [C]		*Enter BMP Name / Identifier Here*		
						Design Storm Depth (in)	*Minimum Design Capture Volume or Design Flow Rate (cubic feet or cfs)*	*Total Storm Water Credit % Reduction*	*Proposed Volume or Flow on Plans (cubic feet or cfs)*
	A_T = Σ[A]				Σ= [D]	[E]	$[F] = \frac{[D] \times [E]}{[G]}$	[F] X (1-[H])	[I]

[B], [C] is obtained as described in Section 2.3.1 from the WQMP Guidance Document
[E] is obtained from Exhibit A in the WQMP Guidance Document
[G] is for Flow-Based Treatment Control BMPs [G] = 43,560, for Volume-Based Control Treatment BMPs, [G] = 12
[H] is from the Total Credit Percentage as Calculated from Table E.2 above
[I] as obtained from a design procedure sheet from the BMP manufacturer and should be included in Appendix 6

E.4 Treatment Control BMP Selection

Treatment Control BMPs typically provide proprietary treatment mechanisms to treat potential pollutants in runoff, but do not sustain significant biological processes. Treatment Control BMPs must have a removal efficiency of a medium or high effectiveness as quantified below:

- **High**: equal to or greater than 80% removal efficiency
- **Medium**: between 40% and 80% removal efficiency

Such removal efficiency documentation (e.g., studies, reports, etc.) as further discussed in Chapter 3.5.2 of the WQMP Guidance Document, must be included in Appendix 6. In addition, ensure that proposed Treatment Control BMPs are properly identified on the WQMP Site Plan in Appendix 1.

Table E.4 Treatment Control BMP Selection

Selected Treatment Control BMP Name or ID[1]	Priority Pollutant(s) of Concern to Mitigate[2]	Removal Efficiency Percentage[3]
Proprietary Biotreatment System (Modular Wetlands Units BMP A, BMP B and BMP C)	Oil & Grease, Metals, Trash & Debris	Oil & Grease - 95% (High) Metals - 38%-69% (Med.) TSS - 85% (High)

[1] Treatment Control BMPs must not be constructed within Receiving Waters. In addition, a proposed Treatment Control BMP may be listed more than once if they possess more than one qualifying pollutant removal efficiency.
[2] Cross Reference Table E.1 above to populate this column.
[3] As documented in a Co-Permittee Approved Study and provided in Appendix 6.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Copermittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	INSERT VALUE	INSERT VALUE	INSERT VALUE
Volume (Cubic Feet)	INSERT VALUE	INSERT VALUE	INSERT VALUE

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Sensitivity Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

The proposed project meets condition 'C' above with proposing two detention basins to mitigate the post-condition runoff to a level that is 10% or less than the pre-developed condition for the 2-year, 24-hour event (these basins are also sized to mitigate other appropriate storm events, i.e. the 10-year event). Refer Appendix 7 for supporting calculations.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff pollutants	Permanent Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar.	Maintain and periodically repaint or replace markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to

		storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Landscape/Outdoor Pesticide Use	State that final landscape plans will accomplish all of the following. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at http://rcflood.org/stormwater/Error! Hyperlink reference not valid. Provide IPM information to new owners, lessees and operators
Loading Docks	Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.	Move loaded and unloaded items indoors as soon as possible. See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Miscellaneous drain or Wash Water or Other Sources	Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.	

	Roof top equipment with potential to produce pollutants shall be roofed and/or have secondary containment. Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.	
Plazas, sidewalks, and parking lots		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)
BMP A	Modular Wetland System (MWS)	Conceptual Grading Plan
BMP B	Modular Wetland System (MWS)	Conceptual Grading Plan
BMP C	Modular Wetland System (MWS)	Conceptual Grading Plan

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: The property owner will be responsible to maintain the BMPs outlined in this report.

Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☐ Y ☒ N

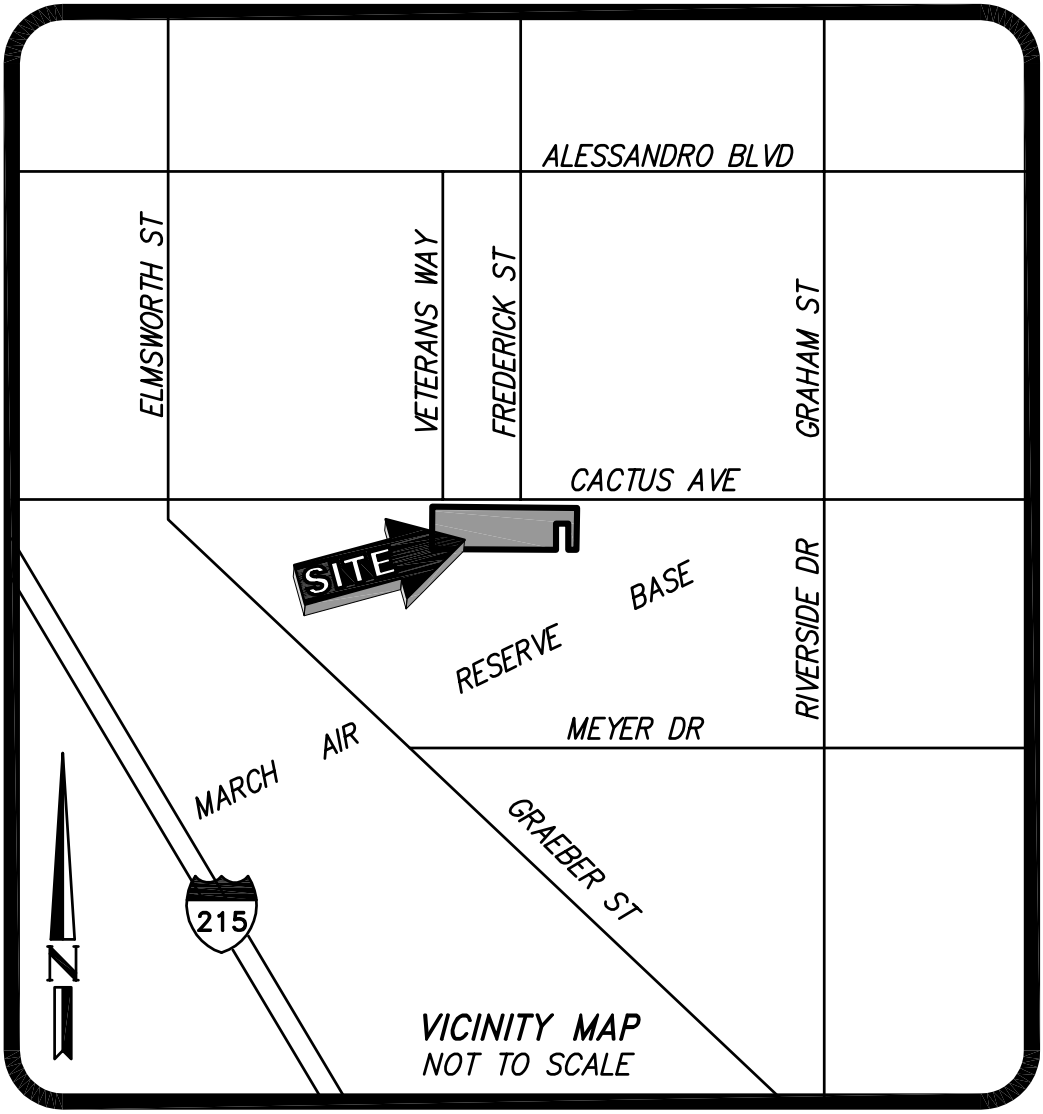
The maintenance of the proposed structure BMPs will be done by the property owner through site maintenance workers. The property owner will be responsible for funding of all onsite BMPs through its operating budget. The following party is responsible for the operation and maintenance of all Structural Source Control and Treatment Control BMPs until such time that the permanent sale of the parcel and transfer of ownership occurs:

Meridian Park, LLC
1156 North Mountain Avenue
Upland, CA 91785

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

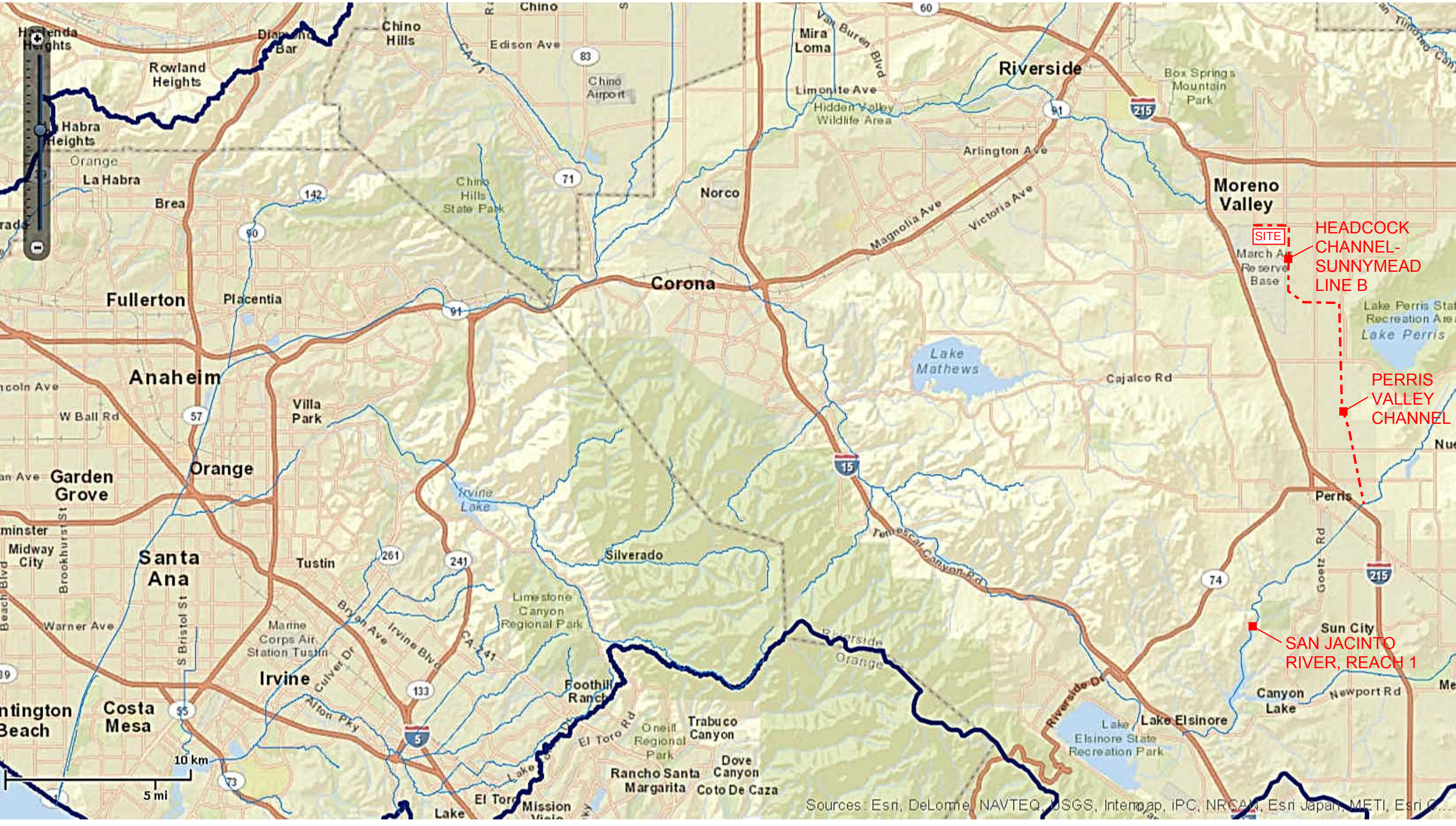
Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



VICINITY MAP
NOT TO SCALE

Receiving Water Map



R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 RiversideNorth
0.54 RiversideSouth
0.68 PigeonPass
SITE D=0.625"
0.65
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.70 SanJacintoNWS
0.87 VistaGrandeGS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
0.77 WildomarLaCresta
0.52 SkinnerLake
0.90 HurkeyCreek
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | HEMET | MURRIETA | TEMECULA

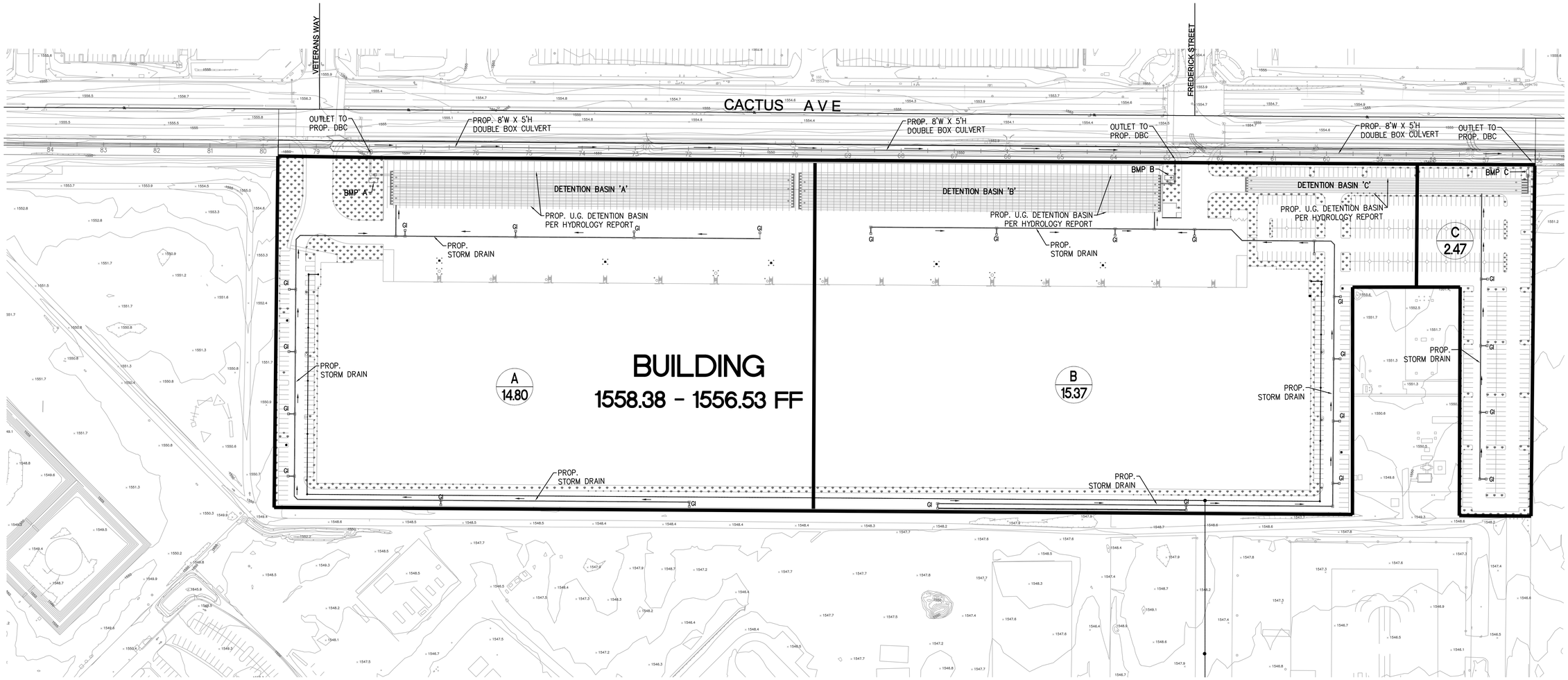
N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011



LEGEND

- DMA BOUNDARY
- LANDSCAPE AREA
- GI — GRATE INLET – MARK ALL INLETS WITH THE WORDS "ONLY RAIN DOWN THE STORM DRAIN" OR SIMILAR
- DRAINAGE FLOW PATH

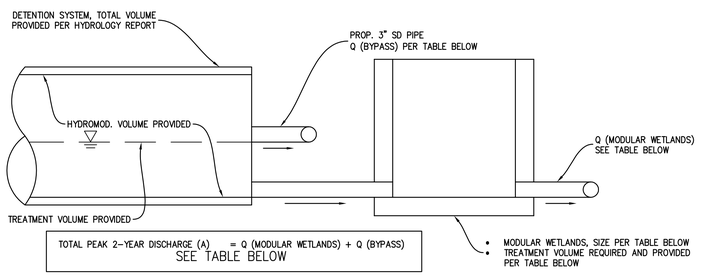
BUILDING/GENERAL SOURCE CONTROL BMP NOTES:

- INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS TO BE PLUMBED TO SANITARY SEWER.
- ALL PROCESS ACTIVITIES TO BE PERFORMED INDOORS. NO PROCESSES TO DRAIN TO EXTERIOR OR TO STORM DRAIN SYSTEM
- NO VEHICLE/EQUIPMENT REPAIR OR MAINTENANCE TO BE PERFORMED OUTSIDE.
- FIRE SPRINKLER TEST WATER TO DRAIN TO SANITARY SEWER.
- ROOF EQUIPMENT WITH POTENTIAL TO POLLUTE RUNOFF TO BE EQUIPPED WITH SECONDARY CONTAINMENT.
- CONDENSATE LINES TO DISCHARGE TO SANITARY SEWER

BMP NOTES

- NO RUN-ON ANTICIPATED FOR THE PROJECT SITE

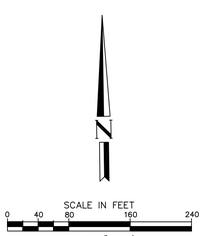
"NO DUMPING – DRAINS TO OCEAN" SYMBOL



DMA AREA	Qmws (CFS)	Qbypass (CFS)	Q 2-YR (CFS)	MWS SIZE	V treatment (CF)	V provided (CF)
A	0.462	2.367	2.829	8' X 16'	28,689	29,000
B	0.462	2.476	2.938	8' X 16'	30,331	30,500
C	0.115	0.348	0.463	4' X 8'	4,509	5,000

TYPICAL DETENTION SYSTEM AND MODULAR WETLANDS SYSTEM LAYOUT

N.T.S.



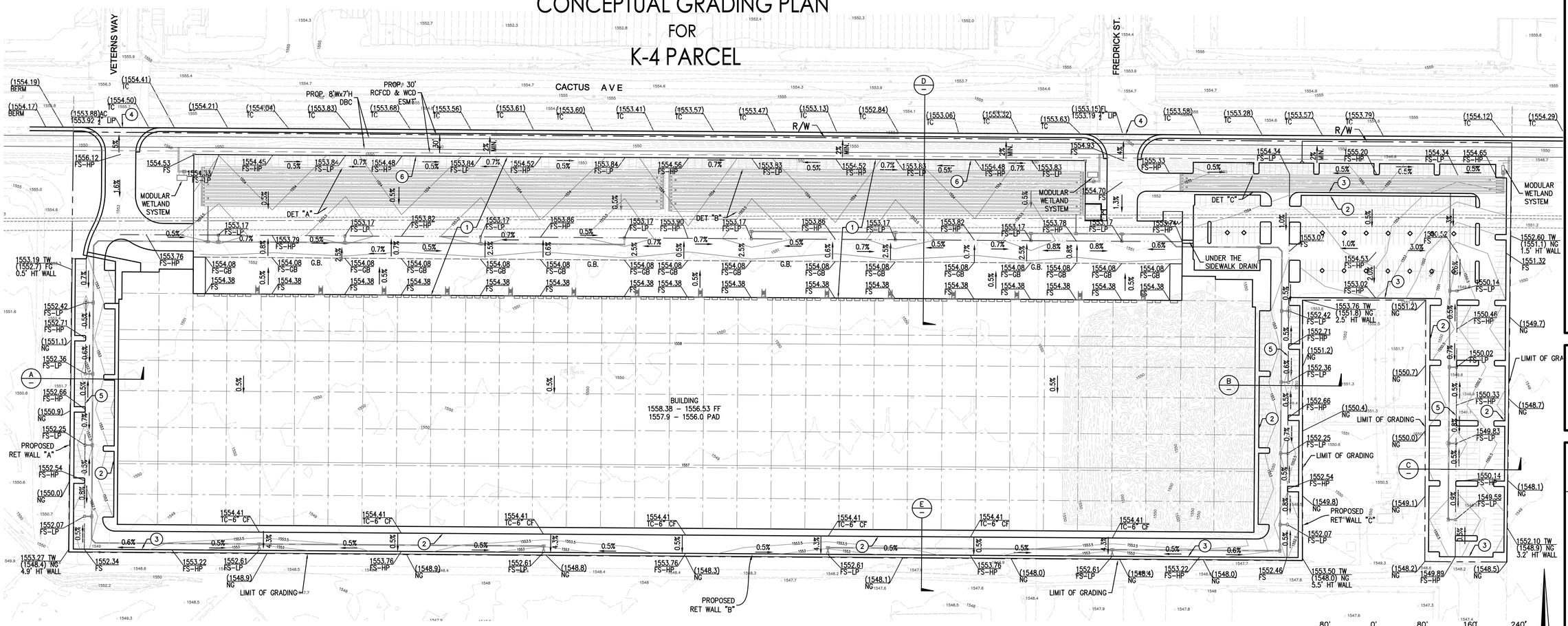
K4 PARCEL INDUSTRIAL
CAUTUS AVENUE
WQMP EXHIBIT
MORENO VALLEY, CA

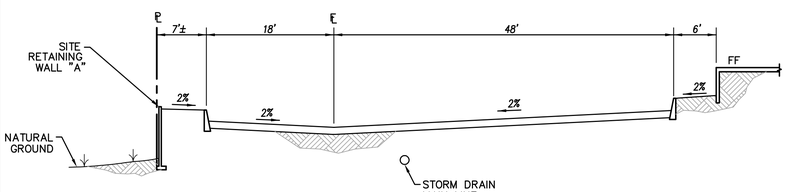
DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

Appendix 2: Construction Plans

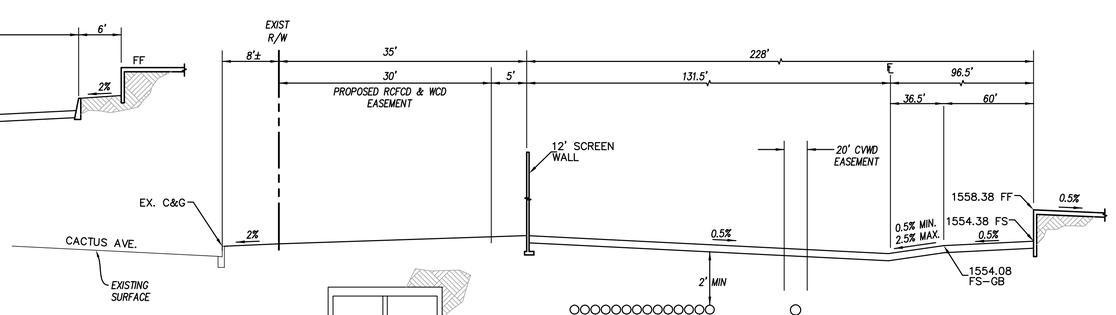
Grading and Drainage Plans

CONCEPTUAL GRADING PLAN
FOR
K-4 PARCEL

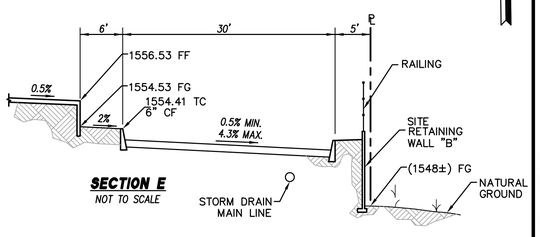




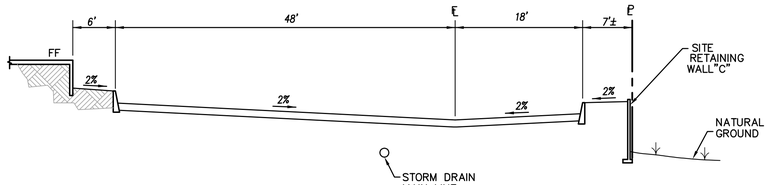
SECTION A
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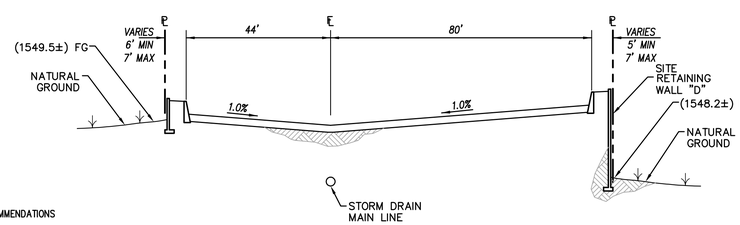
SECTION D
NOT TO SCALE



SECTION E
NOT TO SCALE



SECTION B
NOT TO SCALE



SECTION C
NOT TO SCALE

RAW EARTHWORK

	CUT (CY)	FILL (CY)
RAW	11,000	229,000
OVEREXCAVATION		
SHRINKAGE (10% OF FILL)	–	–
TOTAL	11,000	229,000
EXPORT	–	0

CONCEPTUAL GRADING NOTES:

1. CONSTRUCT PCC PAVEMENT PER GEOTECHNICAL RECOMMENDATIONS
2. CONSTRUCT 6 INCH CONCRETE CURB
3. CONSTRUCT 6 INCH CURB AND GUTTER
4. CONSTRUCT COMMERCIAL DRIVEWAY
5. CONSTRUCT RIBBON GUTTER
6. CONSTRUCT SCREEN WALL

NOTE:
ALL RETAINING/SCREEN WALL HEIGHTS ARE MEASURED FROM WITHIN ONSITE

160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

R.C.E. 74414
CHRISTOPHER MCKEE
DATE

NOT FOR CONSTRUCTION

REGISTERED PROFESSIONAL ENGINEER * VINNCENT CHRISTOPHER MCKEE * No. 74414 Exp. 9-30-19 * CIVIL * STATE OF CALIFORNIA

NO.: REVISION: DATE:

PROJECT: **MERIDIAN PARK**
K-4 PARCEL
CACTUS AVE. RIVERSIDE CA
DRAWING NAME: **CONCEPTUAL GRADING**

ISSUE:	PRELIM
DATE:	07/31/18
CHECKED: CM	DRAWN: WC
DRAWING FILE: 17380CG	
PROJECT NO.:	
SHEET NUMBER:	
OF 1	SHEETS
SCALE: AS SHOWN	

EXTERNAL REFERENCES: 17380 sd101 17380 mal01 17-380sd101 17380 utma01 17-380 CC-TB grc_ca_ztemp - 18-685 BASE 17-380 recbnfy101
FILENAME: M:\2017\17-380 Lewis K1 Site Moreno Valley\CONCEPT\17380 CG101.dwg, LAST SAVED ON: Jul 31 2018 12:46pm PLOTTED BY: WINCC, ON: Jul 31 2018 12:49pm, CFG:

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

July 30, 2018

Project No. 11979.002

Meridian Park, LLC
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Timothy Reeves

Subject: **Results of Onsite Percolation/Infiltration Testing**
Proposed Industrial Warehouse Site K-4, Cactus Avenue
Unincorporated Riverside County, near Moreno Valley, California

References: Riverside County Flood Control District, Design Handbook for Low Impact Development Best Management Practices, dated September 2011.

RGA, 2017, Meridian K-4 Parcel, Cactus Ave, Riverside, California, Preliminary Site Plan, Scheme 02, Dated March 30, 2018.

In accordance with your request and authorization, Leighton Consulting, Inc. (Leighton) is pleased to present this percolation test report for the proposed commercial development referred to as Meridian K-4 Parcel.

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to determine general infiltration rates of onsite soils for the WQMP associated with the new warehouse, parking lot, and drainage configuration. Services provided for this study consisted of the following:

- Field testing of percolation tests in accordance with the procedures outlined in the above referenced County Design Handbook, and
- Compilation of this report that presents the results of our percolation/infiltration testing and laboratory test results.

SITE DESCRIPTION

The site is generally located at the south side of Cactus Avenue between Veterans Way and Frederick Street, near Moreno Valley, in Unincorporated Riverside County, California, (see Figure 1). The property is relatively flat, draining gently in a southeastern direction. The site is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. An earthen drainage culvert bounds the northern property, adjacent to Cactus Avenue. The County Assessor Parcel Numbers (APNs) for this site are 297-160-005-8, 297-200-400-0, 297-150-006-8, -007-9, and -

038-7. Based on the provided site plan, the primarily WQMP's will be located in the parking lot in the northern portion of the site, along Cactus Avenue and in the southern parking lot at eastside of site.

SUBSURFACE INVESTIGATION

Our field investigation consisted of excavating three (3) percolation tests to a depth of approximately 6 feet below the ground surface (bgs) in the proposed basins/WQMP at a location shown on the map provided by the project Civil Engineer. Previously, during our geotechnical exploration for the site, we had excavated, logged, and sampled nine (9) deep exploratory borings to a maximum depth of 51 feet bgs. The locations of the percolation test holes and exploratory borings are shown on Figure 2.

SOILS AND GROUNDWATER CONDITIONS

The site is underlain by Quaternary Older Alluvial deposits consisting primarily of medium dense to very dense silty to clayey sand (SM/SC). Surface water or groundwater were not observed onsite during our field exploration. During our geotechnical exploration, groundwater was encountered at a depth of approximately 19 feet (LB-2) below existing ground surface (bgs) and 23 feet bgs (LB-4). Historic groundwater data, as reported by Department of Water Resource (DWR) data for Well 338995N1171958W001 located approximately 5 miles east of the subject site, reflect a groundwater elevation of 1,470 feet (about 82 feet below site elevation) in April 2017.

PERCOLATION TEST RESULTS

After presoaking the percolation test holes on July 23, 2018, and returning to site on July 24, 2018 to perform the infiltration testing, we observed that some of presoak water remained in the holes. After testing proceeded for two hours and taking water depth readings every 30 minutes, water level remained essentially unchanged.

Summary of Percolation/Infiltration Test Results

Test Hole #	Depth BGS (ft)	Percolation Rate (min/in)	Infiltration Rate (in/hr)	Soil Description/Notes
P-1	6	>120	<0.01	Dense Clayey Silty SAND (SC-SM)
P-2	6	>120	<0.01	Dense Clayey Silty SAND (SC-SM)
P-3	6	>120	<0.01	Dense Clayey Silty SAND (SC-SM)

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our testing, it is our opinion that this site is not suitable for onsite infiltration due to relatively impermeable geologic formation within the depth explored.

LIMITATIONS

The above findings and recommendations are based on a general interpretation of soils conditions between test locations, utilizing contemporary engineering principles and practice. We make no other warranty, either expressed or implied. Please notify the engineer in the event conditions are encountered that are not reflected in this report.

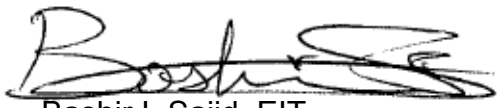
If you have any question, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON CONSULTING, INC.







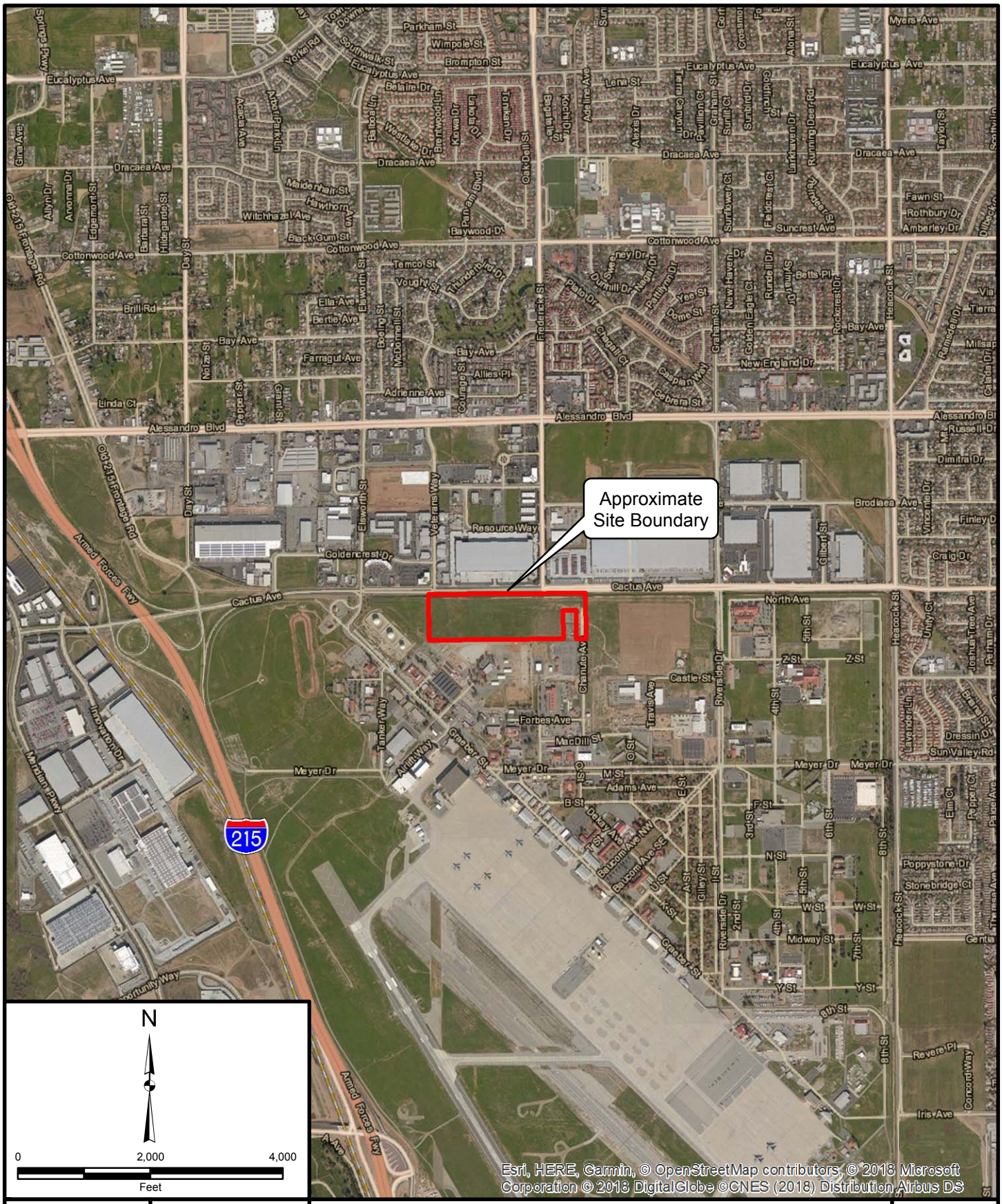
Simon I. Saiid, PE, GE
Principal Engineer

Bashir I. Saiid, EIT
Senior Staff Engineer

Attachments: Figure 1 – Site Location Map
Figure 2 – Boring Location Map
Appendix A – Field Percolation Test Results

Distribution: (1) addressee (PDF copy via email)

Leighton



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2,000 '	Date: July 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

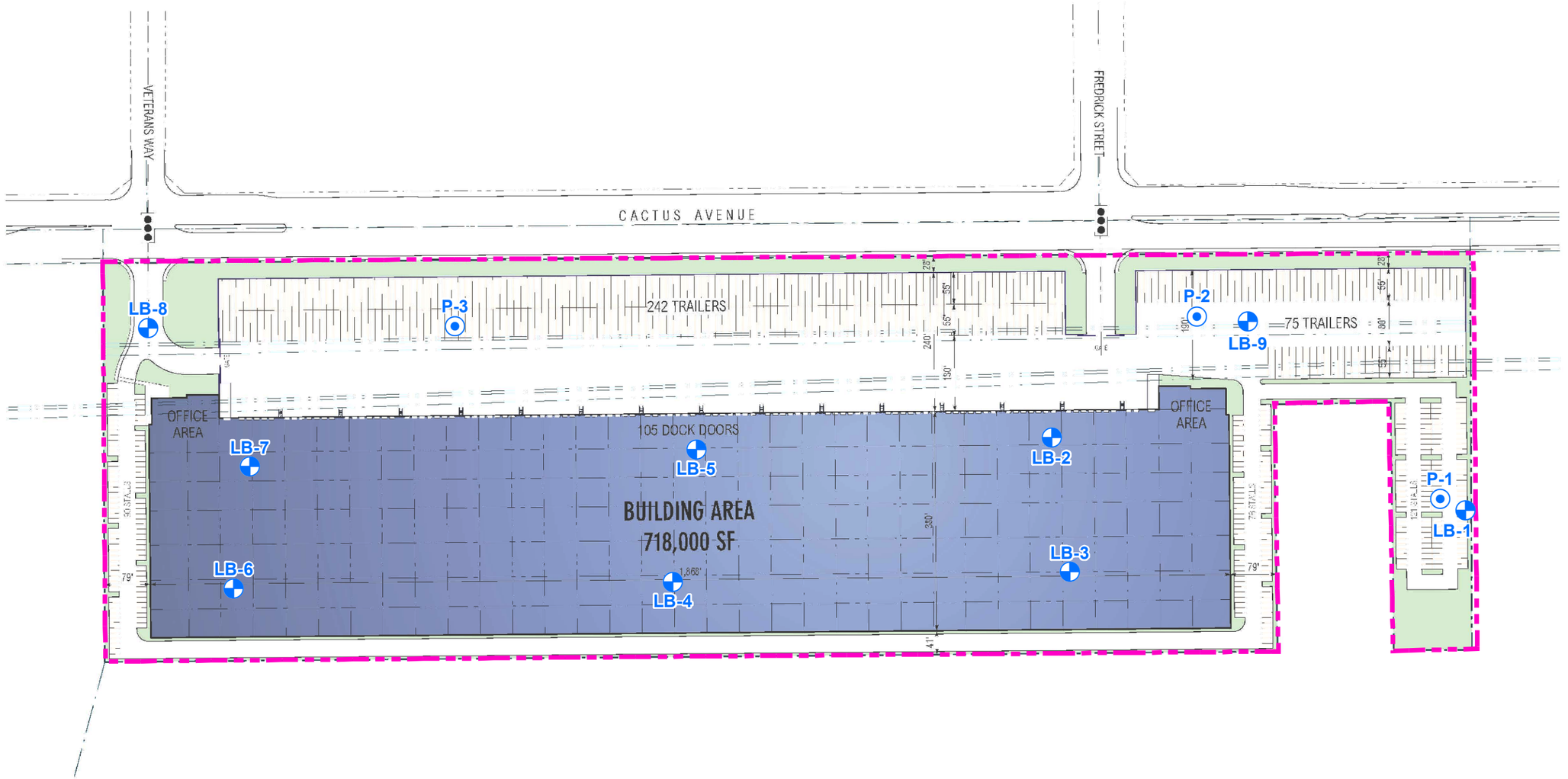
SITE LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 1

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F01_SLM_2018-05-15.mxd on 5/15/2018 11:43:36 AM



Legend

- LB-9 — Approximate Boring Location
- P-3 — Approximate Percolation Test Location
- Approximate Site Boundary

Project: 11979.002	Eng/Geol: SIS/RFR
Scale: 1 " = 200 '	Date: July 2018
Base Map: Sheet A1-02, K-4 Parcel by RGA.	
Author: Leighton Geomatics (mmurphy)	

BORING LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 2

Leighton

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APPENDIX A

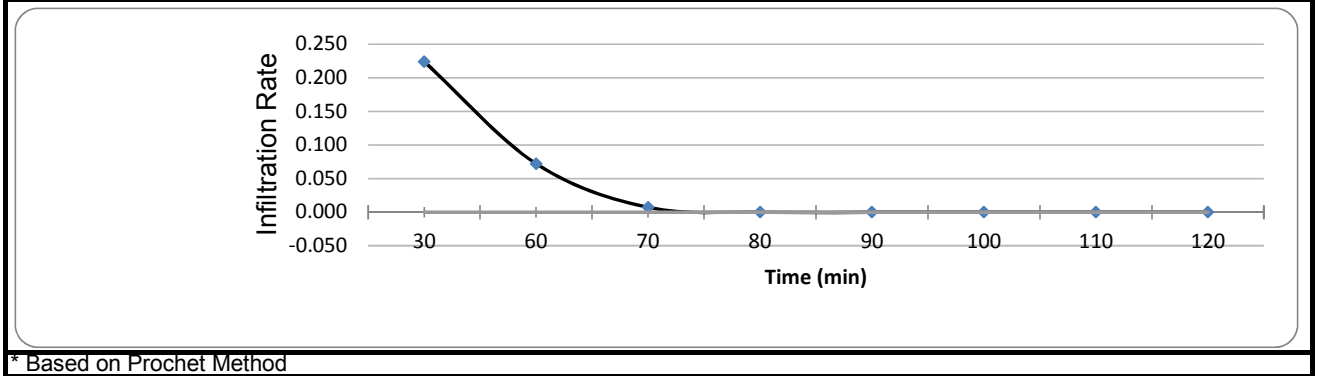
Field Percolation Test Results

Test Hole Number:	P-1	Project	Meridian K-4 Site	
Date Excavated:	7/20/2018	Project Number	11979.002	
Tested by:	BSS	Date Tested	7/24/2018	
Soil Unit:	Alluvium	Depth of Test Hole (in.)	72	
USCS Soil Type:	Reddish Brown Clayey SAND	Diameter (in.)	8	Hot 90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:45:00	30.00	50.00	51.75	1.75	0.303	17.143
9:15:00						
9:15:00	30.00	50.00	50.25	0.25	0.042	120.000
9:45:00						
10:38:00	30.00	50.00	50.00	0.00	0.000	#DIV/0!
11:08:00						
11:08:00	30.00	50.00	50.00	0.00	0.000	#DIV/0!
11:38:00						

Test Hole Number:	P-2	Project	Meridian K-4 Site	
Date Excavated:	7/20/2018	Project Number	11979.002	
Tested by:	BSS	Date Tested	7/24/2018	
Soil Unit:	Alluvium	Depth of Test Hole (in.)	72	
USCS Soil Type:	Reddish Brown Clayey SAND	Diameter (in.)	8	Hot 90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:23:00 8:53:00	30.00	46.50	48.00	1.50	0.224	20.000
8:53:00 9:23:00	30.00	46.00	46.50	0.50	0.072	60.000
9:23:00 9:33:00	30.00	46.00	46.05	0.05	0.007	600.000
9:33:00 9:43:00	30.00	46.00	46.00	0.00	0.000	#DIV/0!



* Based on Prochet Method

Percolation Test Data

P-2

Project Number: 11227.008

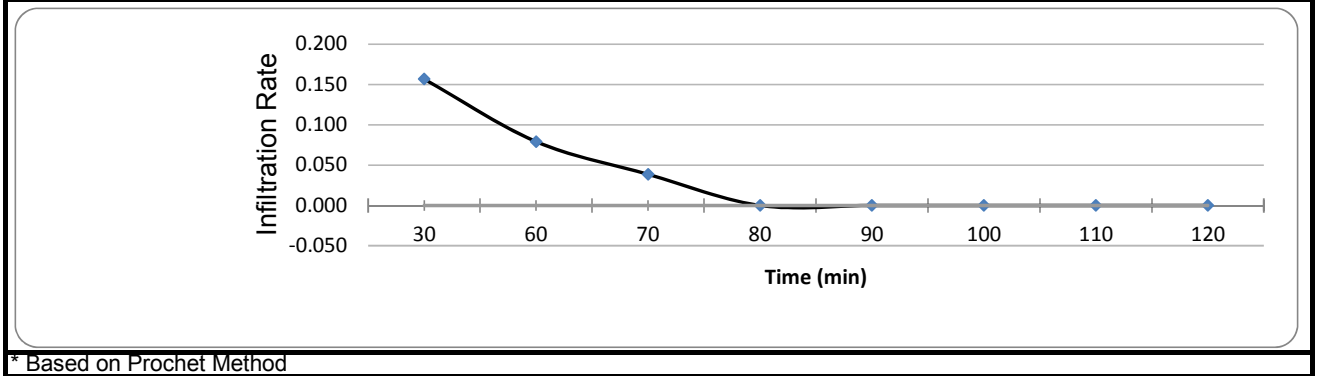
Project Name: *Meridian EDA Basin*

Date: Apr-18

Leighton

Test Hole Number:	P-3	Project	Meridian K-4 Site	
Date Excavated:	7/20/2018	Project Number	11979.002	
Tested by:	BSS	Date Tested	7/24/2018	
Soil Unit:	Alluvium	Depth of Test Hole (in.)	72	
USCS Soil Type:	Reddish Brown Clayey SAND	Diameter (in.)	8	Hot 90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:38:00 9:08:00	30.00	48.00	49.00	1.00	0.157	30.000
9:08:00 9:38:00	30.00	48.50	49.00	0.50	0.079	60.000
9:39:00 10:09:00	30.00	48.00	48.25	0.25	0.039	120.000
10:10:00 10:40:00	30.00	48.00	48.00	0.00	0.000	#DIV/0!



* Based on Prochet Method

Percolation Test Data

P-3

Project Number: 11227.008

Project Name: *Meridian EDA Basin*

Date: Apr-18

Leighton

GEOTECHNICAL EXPLORATION
PROPOSED INDUSTRIAL WAREHOUSE SITE K-4
CACTUS AVENUE
UNINCORPORATED RIVERSIDE COUNTY, NEAR MORENO VALLEY, CALIFORNIA

Prepared for

MERIDIAN PARK, LLC
1156 North Mountain Avenue
Upland, California 91786

Project No. 11979.002

May 15, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

May 15, 2018

Project No. 11979.002

Meridian Park, LLC
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Timothy Reeves

Subject: Geotechnical Exploration
Proposed Industrial Warehouse Site K-4, Cactus Avenue
Unincorporated Riverside County, near Moreno Valley, California

In accordance with your request, we are pleased to provide this update geotechnical evaluation for the subject project summarizing our geotechnical findings, conclusions and recommendations regarding the design and construction of the proposed development. Based on the results of our findings and conclusions, it is our opinion that the site is suitable for the intended use provided the recommendations included in herein are implemented during design and construction phases of development. However, it should be noted that additional geotechnical evaluations and/or reviews might be required based on final site development and/or grading plans.

If you have any questions regarding this report, please do not hesitate to contact the undersigned. We appreciate this opportunity to be of service on this project.

Respectfully submitted,

LEIGHTON CONSULTING, INC.





Simon I. Saiid, GE 2641
Principal Engineer





Robert F. Riha, CEG 192
Senior Principal Geologist

Distribution: (1) Addressee (PDF copy via email)
(1) Christopher McKee, P.E., DRC Engineering, Inc. (PDF via email)

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Appendix B – Results of Geotechnical Laboratory Tests
Appendix C – Site Specific Analysis
Appendix D – Earthwork and Grading Specifications
Appendix E – GBA - Important Information About This Geotechnical-Engineering Report

1.0 INTRODUCTION

1.1 Purpose and Scope

This geotechnical exploration is for the proposed commercial development referred to as Meridian K-4 Parcel, located generally south of Cactus Avenue between Veterans Way and extending east to Frederick Street, near Moreno Valley, in Unincorporated Riverside County, California (see Figure 1). Our scope of services for this exploration included the following:

- Review of available site-specific geologic information and Preliminary Site Plan by RGA.
- A site reconnaissance and excavation of nine (9) exploratory borings. Approximate locations of these geotechnical borings are depicted on the *Boring Location Map (Figure 2)*. The logs of exploratory borings are presented in Appendix A.
- Geotechnical laboratory testing of selected soil samples collected during this exploration. Test results are presented in Appendix B.
- Geotechnical engineering analyses performed or as directed by a California registered Geotechnical Engineer (GE) and reviewed by a California Certified Engineering Geologist (CEG).
- Preparation of this report which presents our geotechnical conclusions and recommendations regarding the proposed structures.

This report is not intended to be used as an environmental assessment (Phase I or other), or foundation plan review.

1.2 Site and Project Description

The site is located generally south of Cactus Avenue between Veterans Way and extending east to Fredrick Street, in the County of Riverside, California (see Figure 1, Site Location Map). Topographically, the site is relatively flat, draining gently in a southeastern direction. The site is currently undeveloped and vacant land covered with small vegetative growth and seasonal weeds. The County Assessor Parcel Numbers (APNs) for this site are 297-160-005-8, 297-200-400-0, 297-150-006-8, -007-9, and -038-7. An approximately 152,000 square feet area of stockpiled soil was observed in the southern portion of the site, adjacent to the transformer station.

We understand that site development (see Figure 2) includes a proposed 718,000 square feet industrial building along with associated improvements such as parking stalls and loading docks. Grading plans were not provided as of the date of this report; however, we

anticipate cut and fill grading of less than 10 feet to create finish site grades. Structural loads are expected to be less than 250 kips per column load and 10 kips/LF of continuous wall footing. If site development plans significantly differ from those described herein, the report should be subject to further review and evaluation.

2.0 FIELD EXPLORATION AND LABORATORY TESTING

2.1 Field Exploration

Our field exploration consisted of the excavation of nine (9) hollow stem borings located generally in areas of planned building to provide basis for foundation and pavement design. During exploration, disturbed/bulk samples were collected for further laboratory testing and evaluation. Approximate locations of these and previous filed explorations are depicted on the *Geotechnical Map* (see Figure 2). Sampling was conducted by a staff geologist from our firm. After logging and sampling, the excavations were loosely backfilled with spoils generated during excavation. The exploration logs from this exploration are provided in Appendix A.

2.2 Laboratory Testing

Laboratory tests were performed on representative bulk samples to provide a basis for development of earthwork control and foundation design. The laboratory testing program included maximum density and moisture content relationship, expansion index, R-value and soluble sulfate content. The results of our laboratory testing from this and previous explorations are presented in Appendix B.

3.0 GEOTECHNICAL AND GEOLOGIC FINDINGS

3.1 Regional Geology

The site is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. This province is characterized by steep, elongated ranges and valleys that trend northwestward. More specifically, the proposed site is located within the relatively stable Perris Block.

The Perris Block, approximately 20 miles by 50 miles in extent, is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the southwest. The Perris Block has had a complex tectonic history, apparently undergoing relative vertical land-movements of several thousand feet in response to movement on the Elsinore and San Jacinto Fault Zones. Thin sedimentary and volcanic materials locally mantle crystalline bedrock, consisting of the Val Verde Tonalite (Kvt) and lesser amounts of Cretaceous granitic dikes (Kg).

3.2 Site Specific Geology

3.2.1 Earth Materials

Our field exploration, observations, and review of the pertinent literature indicate that the site include is underlain by localized artificial fill and older alluvium. A more detailed description of each unit is provided on the logs of borings in Appendix A.

- **Undocumented Artificial Fill:** Undocumented artificial fill is generally associated with existing Cactus Avenue and a large stockpile. Localized pockets of artificial fill that were not identified during our exploration may also be encountered elsewhere on this site below surface.
- **Older Alluvium:** Older alluvial soils were encountered in all borings. As encountered, these soils generally consist of medium dense to very dense silty to clayey sand (SM/SC) and localized layers of sandy silty to sandy clay (ML/CL). This older alluvium is expected to generally possess a low expansion potential (EI<51) and slight collapse potential (<1%).

3.3 Groundwater and Surface Water

Groundwater was encountered during this exploration at a depth of approximately 19 feet (LB-2) below existing ground surface (bgs) and 23 feet bgs (LB-4). Historic groundwater data, as reported by Department of Water Resource (DWR) data for Well 338995N1171958W001 located approximately 5 miles east of the subject site, reflect a groundwater elevation of 1,470 feet (about 82 feet below site elevation) in April 2017. According to West San Jacinto Groundwater Management Plan, 2016 Annual Report, the groundwater elevation in the subject site vicinity are at the range of 1,520 feet msl (about 32 feet below site elevation). Surface water was not observed onsite during our exploration.

3.4 Regional Faulting and Fault Activity

The subject site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional fault systems such as the San Andreas, San Jacinto, and Elsinore Fault Zones. Based on published geologic hazard maps, this site is not located within a currently designated Alquist-Priolo (AP) Earthquake Fault Zone; nor is located within a County Fault Zone.

3.5 Seismic Coefficients per 2016 CBC

Strong ground shaking can be expected at the site during moderate to severe earthquakes in this general region. This is common to virtually all of Southern California. Intensity of ground shaking at a given location depends primarily upon earthquake magnitude, site distance from the source, and site response (soil type) characteristics. The site-specific seismic coefficients provided in this section are based on an interactive tool/program currently available on USGS website. Based on ASCE 7-10 as the Design Code Reference Document and site Class **D**, the seismic coefficients for this site are as listed in the following table:

Table 1. 2016 CBC Seismic Coefficients

CBC Categorization/Coefficient		Design Value (g)
Site Longitude (-117.26195)	Site Latitude (33.90902)	
Site Class Definition	D	
Mapped Spectral Response Acceleration at 0.2s Period, S_s		**1.50**
Mapped Spectral Response Acceleration at 1s Period, S_1		**0.60**
Short Period Site Coefficient at 0.2s Period, F_a		**1.00**
Long Period Site Coefficient at 1s Period, F_v		**1.50**
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}		**1.50**
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}		**0.90**
Design Spectral Response Acceleration at 0.2s Period, S_{DS}		***1.00***
Design Spectral Response Acceleration at 1s Period, S_{D1}		***0.60***

* g- Gravity acceleration

The results of the analysis also indicate that the adjusted Peak Ground Acceleration (PGA_M) for this site is 0.5g.

3.6 Secondary Seismic Hazards

Ground shaking can induce "secondary" seismic hazards such as liquefaction, dynamic densification, lateral spreading, flooding, seiche/tsunami, collapsible soils, and ground rupture, as discussed in the following subsections:

3.6.1 Dynamic Settlement (Liquefaction and/or Dry Settlement)

Riverside County Geologic Hazards maps indicate that the site is located in a zone of high liquefaction potential (see Figure 4). However, liquefaction-induced or dynamic dry settlement is not expected to be a significant hazard at this site due to the absence of near surface saturated sand layers and underlying dense older alluvium. Our analysis of dynamic settlement due to ground shaking based on PGA of 0.5g with a moment magnitude of 7.2 Mw is estimated to be less than 1 inch (see Appendix C). This settlement is expected to be generally global and over a large area. As such, the seismic differential settlement is not expected to exceed 0.5-inch in a 40-foot horizontal distance within this site.

3.6.2 Lateral Spreading

Due to a relatively flat terrain and dense underlying older alluvium, lateral spreading is not considered a geologic hazard on this site.

3.6.3 Flooding

The site is not within a flood plain and potential for flooding is considered very low for this site.

3.6.4 Seiche and Tsunami

Due to the site location and lack of nearby open bodies of water, the possibility of the affects due to seiches or tsunami is considered very low.

3.6.5 Collapsible Soils

Laboratory testing indicates that the onsite soils (older alluvium) are expected to possess a slight collapse potential (<1%). Based on the remedial grading recommendations to remove and compact the near surface soils (Section 4.2.1), this geologic hazard on this site is considered very low.

3.6.6 Expansive Soils

Limited laboratory testing indicated that onsite soils generally possess a low expansion potential (EI<51). The mitigation for this geologic hazard is presented in Section 4.2.4 of this report.

3.6.7 Ground Rupture

Since this site is not located within a mapped Fault Zone, the possibility of ground surface-fault-rupture is very low at this site.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on the results of this exploration, it is our opinion that the site is suitable for the proposed development from a geotechnical viewpoint. Grading of the site should be in accordance with our recommendations included in this report and future recommendations and evaluations made during construction by the geotechnical consultant.

4.2 Earthwork

Earthwork should be performed in accordance with the General Earthwork and Grading Specifications in Appendix D as well as the following recommendations. The recommendations contained in Appendix D, are general grading specifications provided for typical grading projects and some of the recommendations may not be strictly applicable to this project. The specific recommendations contained in the text of this report supersede the general recommendations in Appendix D.

The contract between the developer and earthwork contractor should be worded such that it is the responsibility of the contractor to place fill properly in accordance with the recommendations of this report, the specifications in Appendix D, applicable County Grading Ordinances, notwithstanding the testing and observation of the geotechnical consultant during construction.

4.2.1 Site Preparation and Remedial Grading

Prior to grading, the proposed structural improvement areas (i.e. all-structural fill areas, pavement areas, buildings, etc.) should be cleared of surface and subsurface pipelines and obstructions. Heavy vegetation, roots and debris should be disposed of offsite. Any onsite wells or septic waste system should be removed or abandoned in accordance with the Riverside Country Department of Environmental Health. Voids created by removal of buried/unsuitable materials should be backfilled with properly compacted soil in general accordance with the recommendations of this report.

Building Area: To reduce the potential for excessive differential settlement, the depth of removal should extend a minimum of 6 feet BGS or 4 feet below footings, whichever is deeper.

Pavement/Street Areas: The depth of removal should extend a minimum of 3 feet BGS or 2 feet below finish subgrade, whichever is deeper.

The removal limit should be established by a 1:1 (horizontal:vertical) projection from the edge of fill soils supporting structural fill or settlement-sensitive structures downward and outward to competent material identified by the geotechnical consultant. This may require remedial grading that extends beyond the limits of design grading. Removal will also include benching into competent material as the fills rise. Areas adjacent to existing property limits or protected habitat areas may require special considerations and monitoring. Steeper temporary slopes in these areas may be considered.

After completion of the recommended removal of unsuitable soils and prior to fill placement, the exposed surface should be scarified to a minimum depth of 8-inches, moisture conditioned as necessary to optimum moisture content and compacted using heavy compaction equipment to an unyielding condition. All structural fill should be compacted throughout to 90 percent of the ASTM D 1557 laboratory maximum density, at or slightly above optimum moisture.

4.2.2 Structural Fills

The onsite soils are generally suitable for re-use as compacted fill, provided they are free of debris and organic matter. Fills placed within 10 feet of finish pad grades or slope faces should contain no rocks over 12 inches in maximum dimension. In addition, encountered expansive clayey soils layers (EI>51), if any, should be placed at a depth greater than 3 feet below finished grades.

Areas to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 8 inches, conditioned to at least optimum moisture content, and recompacted. Fill soils should be placed at a minimum of 90 percent relative compaction (based on ASTM D1557) at or above optimum moisture content. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant. The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in thickness.

Fill slope keyways will be necessary at the toe of all fill slopes and at fill-over-cut contacts. Keyway schematics, including dimensions and subdrain recommendations, are provided in Appendix D. All keyways should be excavated into dense bedrock or dense older alluvium as determined by the geotechnical engineer. The cut portions of all slope and keyway excavations should be geologically mapped and approved by a geologist prior to fill placement.

Fills placed on slopes steeper than 5:1 (horizontal:vertical) should be benched into dense soils (see Appendix D for benching detail). Benching should be of sufficient depth to remove all loose material. A minimum bench height of 2 feet into approved material should be maintained at all times.

4.2.3 Import Soils

Import soils and/or borrow sites, if needed, should be evaluated by us prior to import. Import soils should be uncontaminated, granular in nature, free of organic material (loss on ignition less-than 2 percent), have very low expansion potential (E<21) and have a low corrosion impact to the proposed improvements.

4.2.4 Utility Trenches

Utility trenches should be backfilled with compacted fill in accordance with the *Standard Specifications for Public Works Construction,* ("Greenbook"), 2018 Edition. Fill material above the pipe zone should be placed in lifts not exceeding 8 inches in uncompacted thickness and should be compacted to at least 90 percent relative compaction (ASTM D 1557) by mechanical means only. Site soils may generally be suitable as trench backfill provided these soils are screened of rocks over 1½ inches in diameter and organic matter. If imported sand is used as backfill, the upper 3 feet in building and pavement areas should be compacted to 95 percent. The upper 6 inches of backfill in all pavement areas should be compacted to at least 95 percent relative compaction.

Where granular backfill is used in utility trenches adjacent to moisture sensitive subgrades and foundation soils, we recommend that a cut-off "plug" of impermeable material be placed in these trenches at the perimeter of buildings, and at pavement edges adjacent to irrigated landscaped areas. A "plug" can consist of a 5-foot long section of clayey soils with more than 35-percent passing the No. 200 sieve, or a Controlled Low Strength Material (CLSM) consisting of one sack of Portland-cement plus one sack of bentonite per cubic-yard of sand. CLSM should generally conform to requirements of the "Greenbook". This is intended to reduce the likelihood of water permeating trenches from landscaped areas, then seeping along permeable trench backfill into the building and pavement subgrades, resulting in wetting of moisture sensitive subgrade earth materials under buildings and pavements.

Excavation of utility trenches should be performed in accordance with the project plans, specifications and the *California Construction Safety Orders* (latest Edition). The contractor should be responsible for providing a "competent person" as defined in Article 6 of the *California Construction Safety Orders*. Contractors should be advised that sandy soils (such as fills

generated from the onsite alluvium) could make excavations particularly unsafe if all safety precautions are not properly implemented. In addition, excavations at or near the toe of slopes and/or parallel to slopes may be highly unstable due to the increased driving force and load on the trench wall. Spoil piles from the excavation(s) and construction equipment should be kept away from the sides of the trenches. Leighton Consulting, Inc. does not consult in the area of safety engineering.

4.2.5 Shrinkage

The volume change of excavated onsite soils upon recompaction is expected to vary with materials, density, insitu moisture content, and location and compaction effort. The in-place and compacted densities of soil materials vary and accurate overall determination of shrinkage and bulking cannot be made. Therefore, we recommend site grading include, if possible, a balance area or ability to adjust grades slightly to accommodate some variation. Based on our geotechnical laboratory results, we expect recompaction shrinkage (when recompacted to an average 92 percent of ASTM D1557) and estimate the following earth volume changes will occur during grading, and for the older alluvium, the shrinkage is expected to be in the 5 to 15% range.

4.2.6 Drainage

All drainage should be directed away from structures and pavements by means of approved permanent/temporary drainage devices. Adequate storm drainage of any proposed pad should be provided to avoid wetting of foundation soils. Irrigation adjacent to buildings should be avoided when possible. As an option, sealed-bottom planter boxes and/or drought resistant vegetation should be used within 5-feet of buildings.

4.3 Foundation Design

4.3.1 Design Parameters – Spread/Continuous Shallow Footings

Footings should be embedded at least 12-inches below lowest adjacent grade for the proposed structure. Footing embedment should be measured from lowest adjacent finished grade, considered as the top of interior slabs-on-grade or the finished exterior grade, excluding landscape topsoil, whichever is lower. Footings located adjacent to utility trenches or vaults should be embedded below an imaginary 1:1 (horizontal:vertical) plane projected upward and outward from the bottom edge of the trench or vault, up towards the footing.

- **Bearing Capacity**: For footings on newly placed, properly compacted fill soil, an allowable vertical bearing capacity of 2,000 pounds-per-square-foot (psf) should be used. These footings should have a minimum base

width of 18 inches for continuous wall footings and a minimum bearing area of 3 square feet (1.75-ft by 1.75-ft) for pad foundations. The bearing pressure value may be increased by 250 psf for each additional foot of embedment or each additional foot of width to a maximum vertical bearing value of 3,500 psf. Additionally, these bearing values may be increased by one-third when considering short-term seismic or wind loads. A modulus of subgrade reaction, K of 200 PCI may be used to relative dense bedrock or onsite soil compacted to minimum 90% relative compaction.

- **Lateral loads**: Lateral loads may be resisted by friction between the footings and the supporting subgrade. A maximum allowable frictional resistance of 0.35 may be used for design. In addition, lateral resistance may be provided by passive pressures acting against foundations poured neat against properly compacted granular fill. We recommend that an allowable passive pressure based on an equivalent fluid pressure of 350 pounds-per-cubic-foot (pcf) be used in design. These friction and passive values have already been reduced by a factor-of-safety of 1.5.

4.3.2 Settlement Estimates

For settlement estimates, we assumed that column loads will be no larger than 250 kips, with bearing wall loads not exceeding 10 kips per foot of wall. If greater column or wall loads are required, we should re-evaluate our foundation recommendation, and re-calculate settlement estimates.

Buildings located on compacted fill soils as required per Section 4.2.1 above should be designed in anticipation of 1 inch of total static settlement and 0.5-inch of static differential settlement within a 40-foot horizontal run.

4.4 Vapor Retarder

It has been a standard of care to install a moisture-vapor retarder underneath all slabs where moisture condensation is undesirable. Moisture vapor retarders may retard but not totally eliminate moisture vapor movement from the underlying soils up through the slabs. Moisture vapor transmission may be additionally reduced by use of concrete additives. Leighton Consulting, Inc. does not practice in the field of moisture vapor transmission evaluation/mitigation. Therefore, we recommend that a qualified person/firm be engaged/consulted with to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person/firm should provide recommendations for mitigation of potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

However, based on our experience, the standard of practice in Southern California has evolved over the last 15 to 20 years into a construction of a vapor retarder system that generally consisted of a membrane (such as 15-mil thick), underlain by a capillary break consisting of 4 inches of clean ½-inch-minimum gravel or 2-inch sand layer (SE>30). The structural engineer/architect or concrete contractor often require a sand layer be placed over the membrane (typically 2-inch thick layer) to help in curing and reduction of curling of concrete. If such sand layer is placed on top of the membrane, the contractor should not allow the sand to become wet prior to concrete placement (e.g., sand should not be placed if rain is expected).

In conclusion, the construction of the vapor barrier/retarder system is dependent on several variables which cannot be all geotechnically evaluated and/or tested. As such, the design of this system should be a design team/owner decision taking into consideration finish flooring materials and manufacture's installation requirements of proposed membrane. Moreover, we recommend that the design team also follow ACI Committee 302 publication for "Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" (ACI 302.2R-06) which includes a flow chart that assists in determining if a vapor barrier/retarder is required and where it is to be placed.

4.5 Retaining Walls

Retaining wall earth pressures are a function of the amount of wall yielding horizontally under load. If the wall can yield enough to mobilize full shear strength of backfill soils, then the wall can be designed for "active" pressure. If the wall cannot yield under the applied load, the shear strength of the soil cannot be mobilized and the earth pressure will be higher. Such walls should be designed for "at rest" conditions. If a structure moves toward the soils, the resulting resistance developed by the soil is the "passive" resistance. Retaining walls backfilled with non-expansive soils can be designed using the following equivalent fluid pressures:

Table 2. Retaining Wall Design Earth Pressures (Static, Drained)

Loading Conditions	Equivalent Fluid Density (pcf)	
	Level Backfill	2:1 Backfill
Active	36	55
At-Rest	55	85
Passive*	350	150 (2:1, sloping down)

* This assumes level condition in front of the wall will remain for the duration of the project, not to exceed 3,500 psf at depth.

Unrestrained (yielding) cantilever walls should be designed for the active equivalent-fluid weight value provided above for very low to low expansive soils that are free draining. In the design of walls restrained from movement at the top (non-yielding) such as basement or elevator pit/utility vaults, the at-rest equivalent fluid weight value should be used. Total depth of retained earth for design of cantilever walls should be measured as the vertical distance below the ground surface measured at the wall face for stem design, or measured at the heel of the footing for overturning and sliding calculations. Should a sloping backfill other than a 2:1 (horizontal:vertical) be constructed above the wall (or a backfill is loaded by an adjacent surcharge load), the equivalent fluid weight values provided above should be re-evaluated on an individual case basis by us. Non-standard wall designs should also be reviewed by us prior to construction to check that the proper soil parameters have been incorporated into the wall design.

All retaining walls should be provided with appropriate drainage. The outlet pipe should be sloped to drain to a suitable outlet. Wall backfill should be non-expansive (EI $\leq$ 21) sands compacted by mechanical methods to a minimum of 90 percent relative compaction (ASTM D 1557). Clayey site soils should not be used as wall backfill. Walls should not be backfilled until wall concrete attains the 28-day compressive strength and/or as determined by the Structural Engineer that the wall is structurally capable of supporting backfill. Lightweight compaction equipment should be used, unless otherwise approved by the Structural Engineer.

4.6 Sulfate Attack

Based on past experience in this area, the onsite soils are expected to possess negligible sulfate content. Type II concrete or equivalent may be used. Further testing should be performed at the completion of site grading to confirm such conditions.

4.7 Preliminary Pavement Design

Our preliminary pavement design is based on an R-value of 16 and the Caltrans Highway Design Manual. For planning and estimating purposes, the pavement sections are calculated based on Traffic Indexes (TI) as indicated in Table below:

Table 3. Asphalt Pavement Sections

General Traffic Condition	Traffic Index (TI)	Asphalt Concrete (inches)	Aggregate Base* (inches)
Automobile Parking Lanes	4.5	3.0	6.5
	5.0	4.0	5.5
Truck Access & Driveways	6.0	4.0	9.5
	6.5	4.0	13.0

Appropriate Traffic Index (TI) should be selected or verified by the project civil engineer and actual R-value of the subgrade soils will need to be verified after completion of site grading to finalize the pavement design. Pavement design and construction should also conform to applicable local, county and industry standards. The Caltrans pavement section design calculations were based on a pavement life of approximately 20 years with periodic flexible pavement maintenance.

Where applicable, we recommend that a minimum of 7 inches of PCC pavement be used in high impact load areas or if to be subjected to truck traffic. The PCC pavement should be placed on a minimum 6-inch aggregate base. The PCC pavement may be placed directly on a compacted subgrade with an R-Value of 40 or higher. The PCC pavement should have a minimum of 28-day compressive strength of 3250 psi. Other requirements of Caltrans Standard Specifications regarding mixing and placing of concrete should be followed.

The upper 6 inches of the subgrade soils should be moisture-conditioned to near optimum moisture content, compacted to at least 95 percent relative compaction (ASTM D1557) and kept in this condition until the pavement section is constructed. Minimum relative compaction requirements for aggregate base should be 95 percent of the maximum laboratory density as determined by ASTM D1557. If applicable, aggregate base should conform to the “Standard Specifications for Public Works Construction” (green book) current edition or Caltrans Class 2 aggregate base.

If pavement areas are adjacent to heavily watered landscape areas, some deterioration of the subgrade load bearing capacity and pavement failure may result. Moisture control measures such as deepened curbs or other moisture barrier materials may be used to prevent the subgrade soils from becoming saturated. The use of concrete cutoff or edge barriers should be considered when pavement is planned adjacent to either open (unfinished) or irrigated landscaped areas.

5.0 GEOTECHNICAL CONSTRUCTION SERVICES

Geotechnical review is of paramount importance in engineering practice. Poor performances of many foundation and earthwork projects have been attributed to inadequate construction review. We recommend that Leighton Consulting, Inc. be provided the opportunity to review the grading plan and foundation plan(s) prior to bid.

Reasonably-continuous construction observation and review during site grading and foundation installation allows for evaluation of the actual soil conditions and the ability to provide appropriate revisions where required during construction. Geotechnical conclusions and preliminary recommendations should be reviewed and verified by Leighton Consulting, Inc. during construction, and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- After completion of site demolition and clearing,
- During over-excavation of compressible soil,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction, and
- When any unusual conditions are encountered.

Additional geotechnical exploration and analysis may be required based on final development plans, for reasons such as significant changes in proposed structure locations/footprints. We should review grading (civil) and foundation (structural) plans, and comment further on geotechnical aspects of this project.

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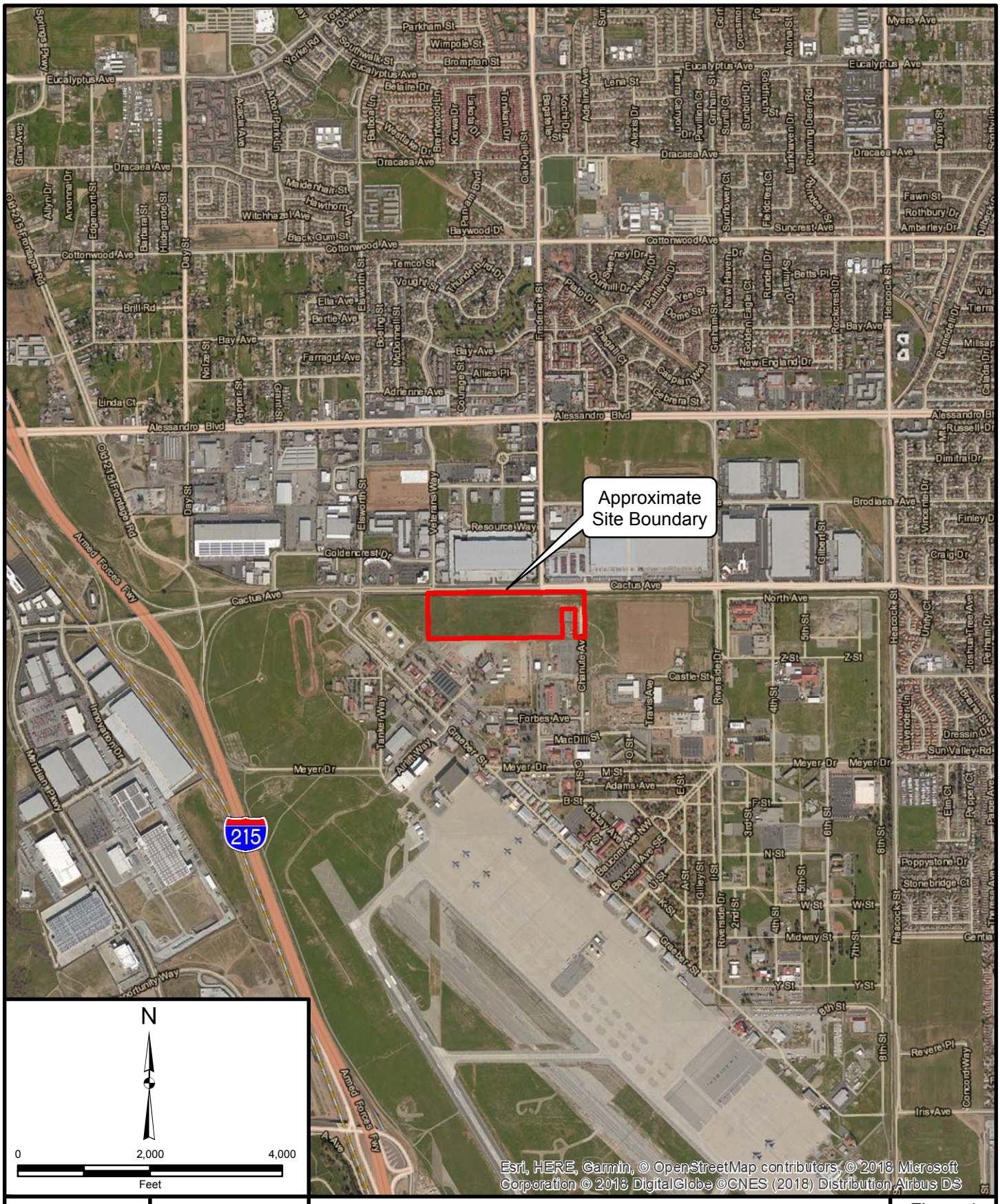
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6.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, our findings, conclusions and recommendations presented in this report are based on the assumption that we (Leighton Consulting, Inc.) will provide geotechnical observation and testing during construction as the Geotechnical Engineer of Record for this project. Please refer to Appendix E, GBA's *Important Information About This Geotechnical-Engineering Report*, prepared by the Geoprofessional Business Association (GBA) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed maintenance building, in accordance with generally accepted geotechnical engineering practices at this time in California. Any unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton Consulting, Inc. from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton Consulting, Inc.



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2,000 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

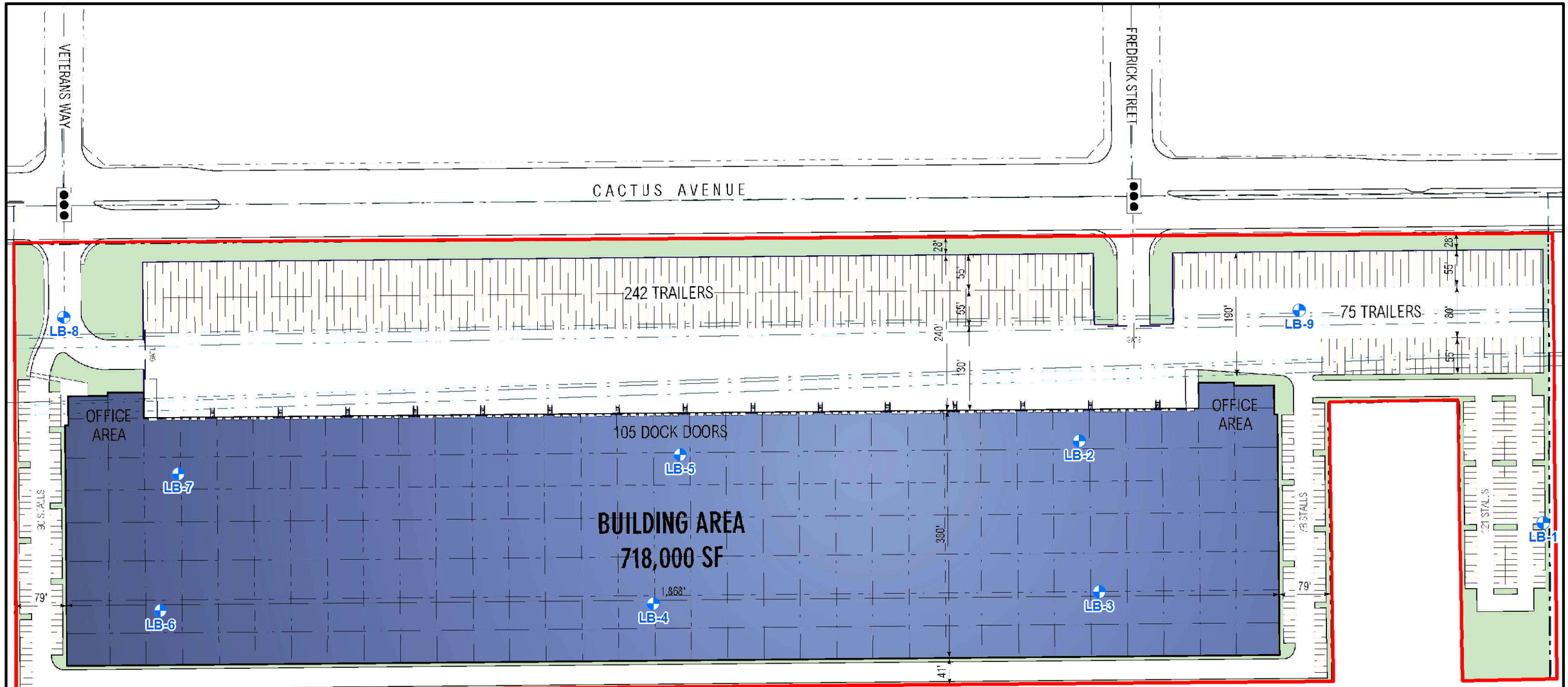
SITE LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 1

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F01_SLM_2018-05-15.mxd on 5/15/2018 11:43:36 AM



N

0 150 300

Feet

Legend

- Approximate Boring Location
- Approximate Site Boundary

Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 150 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

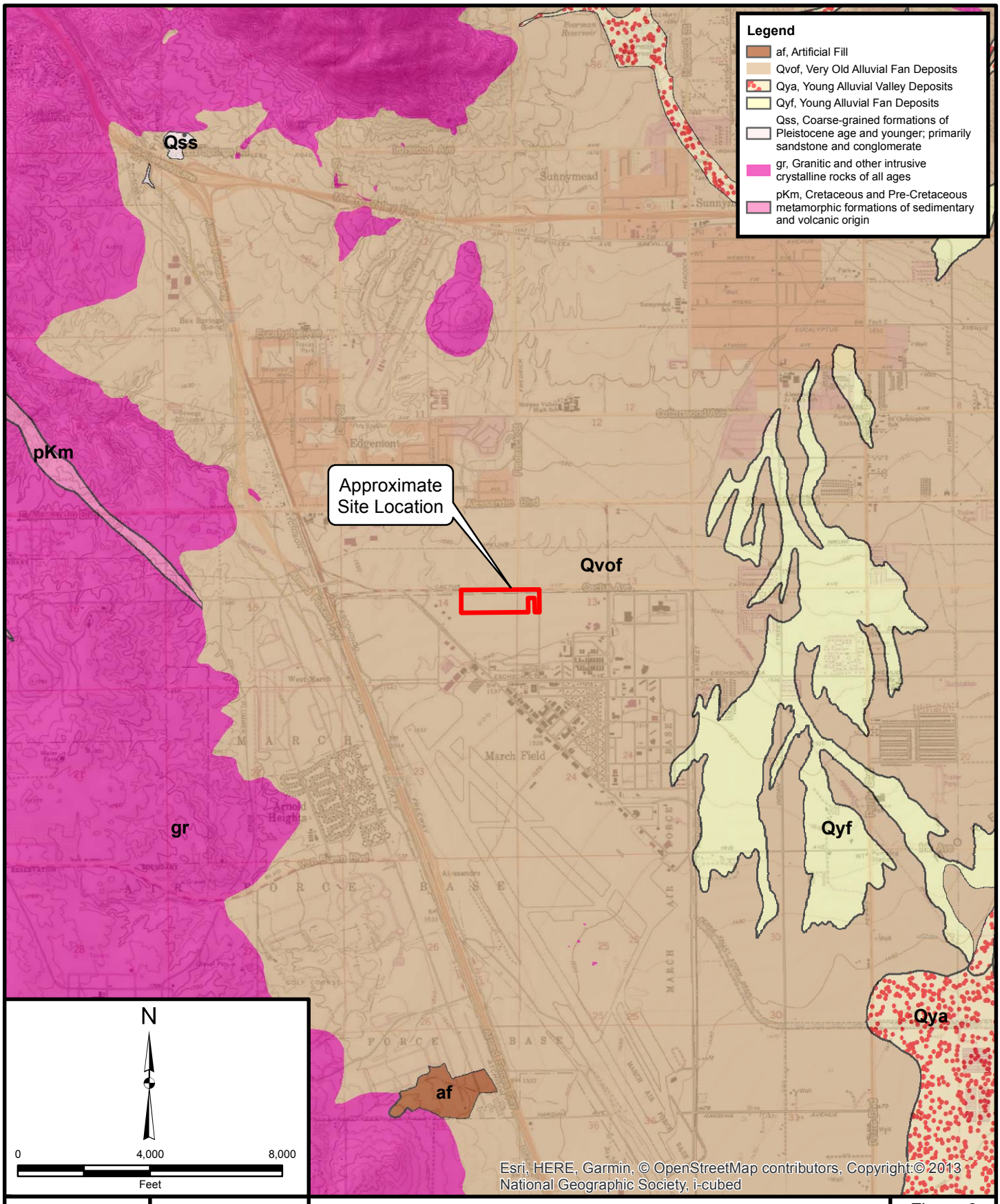
BORING LOCATION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 2

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F02_BLM_2018-04-23.mxd on 4/23/2018 11:09:05 AM



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 4,000 '	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

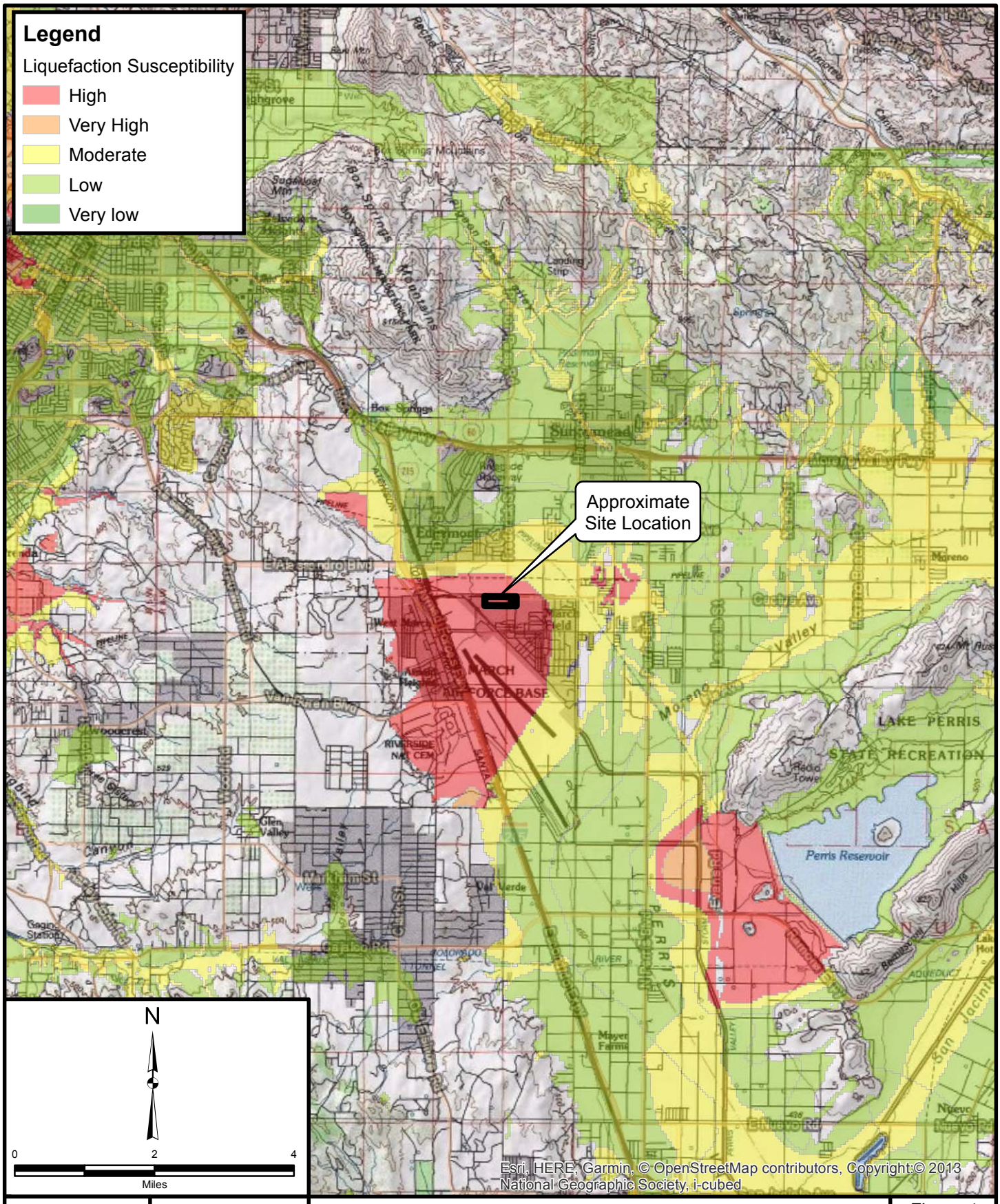
REGIONAL GEOLOGY MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 3

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F03_RGM_2018-04-23.mxd on 4/23/2018 11:08:53 AM



Project: 11979.002	Eng/Geol: SIS/RFR
Scale:1 " = 2 miles	Date: May 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

LIQUEFACTION MAP

Meridian Warehouse K-4
Cactus Avenue
Unincorporated Riverside County, California

Figure 4

Leighton

Map Saved as V:\Drafting\11979\002\Maps\11979-002_F04_LFM_2018-04-23.mxd on 4/23/2018 11:10:47 AM

APPENDIX A

LOGS OF EXPLORATORY BORINGS

Encountered earth materials were logged and sampled in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D 2488). Representative soil samples were transported to our in-house Temecula laboratory for geotechnical testing. After logging and sampling, our borings were backfilled with spoils generated during drilling.

The attached subsurface exploration logs and related information depict subsurface conditions only at the locations indicated and at the particular date designated on these logs. Subsurface conditions at other locations may differ from conditions occurring at these logged locations. Passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on these logs represent an approximate boundary between sampling intervals and soil types; and transitions may be gradual.

GEOTECHNICAL BORING LOG LB-1

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, loose, light brown, dry, fine sand, some gravel (MD: 133.3 @ 8.0)	MD
1550				R-1	31 50-3"	109	7	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, moist, fine to medium sand, few gravel, slightly porours	
	5			R-2	35 50-2"	112	7	SM	SILTY SAND with GRAVEL, very dense, light reddish brown, moist, fine to coarse sand, trace clay	
1545										
	10			R-3	49 50-5"				very dense, reddish brown, moist, fine to coarse sand with fine gravel, some interbedded clay layers	
1540										
	15			R-4	10 36 50-4"				very dense, reddish brown, moist, fine to medium sand, trace clay, some coarse sand and fine gravel	
1535									Drilled to 15' Sampled to 16.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	20									
1530										
	25									
1525										
	30									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-2

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry to moist, fine sand, few gravel	
1550				R-1	15 50-5"	115	5		very dense, light yellowish brown, dry, fine to medium sand, some caliche, slightly porous	
	5			R-2	50-6"	95	8		very dense, light yellowish brown, dry to moist, fine to medium sand, subangular, trace clay, some gravel (sample disturbed)	
1545										
	10			R-3	39 50-6"	106	13	SC-SM	SILTY, CLAYEY SAND, very dense, light yellowish brown, dry, fine to medium sand, few coarse sand and gravel	
1540										
	15			R-4	24 50-5"			SP-SM	Poorly graded SAND with SILT, very dense, brown, moist, fine to medium sand, trace gravel, micaceous	
1535										
	20			R-5	12 17 30			SM	SILTY SAND, dense, dark reddish brown, moist to wet, fine to medium sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater at 18.7' Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** * * This log is a part of a report by Leighton and should not be used as a stand-alone document. * * ***

GEOTECHNICAL BORING LOG LB-3

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				CL-ML	**Quaternary Older Alluvium (Qoa):** SILTY CLAY with sand, stiff, light yellowish brown, dry to moist, fine sand, trace gravel (54% fines, EI = 36)	SA, EI, CO
1550										
	5			R-1	50-6"	104	7	SM	SILTY SAND, very dense, light reddish brown, dry to moist, fine to medium sand, some interbedded clay layers, trace fine gravel (sample disturbed)	
1545										
	10			R-2	34 50-3"	112	11		very dense, light yellowish brown, dry to moist, fine sand, some interbedded clay layers, caliche	
1540										
	15			R-3	18 50-6"			SC-SM	SILTY, CLAYEY SAND, very dense, reddish brown, moist, fine to medium sand, some caliche, trace fine gravel	
1535										
	20			R-4	14 40 45				dense, dark reddish brown, moist, fine to medium sand, few coarse sand	
1530									Drilled to 20' Sampled to 20.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light yellowish brown, dry, fine to medium sand, some clay	
1550				R-1	34 50-2"	123	9		very dense, strong brown, moist, fine to medium sand, some interbedded clay	
	5			R-2	50-6"				very dense, reddish brown, moist, fine to medium sand, few coarse sand	
1545										
	10			R-3	30 50-5"				very dense, reddish brown, dry to moist, fine sand, trace fine gravel, some caliche (sample disturbed)	
1540										
	15			R-4	13 22 30	116	15	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine to medium sand, trace coarse sand	
1535										
	20			R-5	13 28 50			SM	SILTY SAND, dense, dark olive brown, moist to wet, fine to medium sand, some mica	
1530										
	25			R-6	7 14 25	112	18	SC	CLAYEY SAND, dense, dark grayish brown, moist to wet, fine sand, few caliche	
1525										
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-4

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	30			R-7	11 13 16	84	34	CL	SANDY CLAY, stiff, brown, moist, fine sand, caliche	
1520										
	35			R-8	10 21 30				dense, reddish brown, moist, fine to coarse sand, some weathered gravel	
1515										
	40			R-9	10 19 34	116	15	SM	SILTY SAND, dense, olive brown, moist, fine sand, trace fine gravel, micaceous	
1510										
	45			R-10	13 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, grayish brown, moist, fine sand, some coarse sand and fine gravel, micaceous	
1505										
	50			R-11	26 50-5"				very dense, light olive brown, moist, fine to medium sand, some fine gravel	
1500									Drilled to 50' Sampled to 51' Groundwater at 23' Backfilled with soil cuttings (4/19/18)	
	55									
1495										
	60									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG LB-5

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, dry, fine sand, few gravel	
1550				R-1	50-5.5"	98	8		very dense, brown, dry to moist, fine sand, some interbedded clay layers	
	5			R-2	35 50-4"				very dense, light reddish brown, dry to moist, fine to medium sand, some clay, trace gravel	
1545										
	10			R-3	16 35 50	120	13		dense, reddish brown, moist, fine sand, some mica	
1540										
	15			R-4	15 21 50	121	12	SC	CLAYEY SAND, dense, reddish brown, moist, fine to coarse sand, some gravel, weathered (CO = 0.14)	CO
1535										
	20			R-5	11 27 37			SC-SM	SILTY, CLAYEY SAND, dense, dark reddish brown, moist, fine sand, micaceous	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SOIL DESCRIPTION: This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-6

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light reddish brown, moist, fine sand, some medium sand and clay (EI = 26, MD: 130.4 @ 9.0)	EI, MD
1550										
	5			R-1	12 50-4"	93	9		very dense, light reddish brown, dry, fine to medium sand, some clay (sample disturbed)	
1545										
	10			R-2	17 50-6"				very dense, light brown, moist, fine sand, some caliche	
1540										
	15			R-3	35 50-6"			SP-SM	Poorly graded SAND with SILT, very dense, olive brown, moist, fine to medium sand, some gravel	
1535										
	20			R-4	6 10 19	97	26	CL	SANDY CLAY, stiff, dark reddish brown, moist, fine sand, some mica	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-7

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0							SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, reddish brown, dry to moist, fine sand, some clay	
1550				R-1	21 29 47	124	8	SC	CLAYEY SAND, very dense, reddish brown, dry to moist, fine to medium sand, some weathered gravel	
	5			R-2	22 27 46	118	7	SM	SILTY SAND, very dense, reddish brown, dry to moist, fine to medium sand, few fine gravel, weathered	
1545										
	10			R-3	29 50-6"				very dense, light olive brown, dry to moist, fine to medium sand, some weathered gravel, few caliche	
1540										
	15			R-4	18 50-6"			SM	very dense, olive brown, moist, fine sand, micaceous, some caliche	
1535										
	20			R-5	12 31 43			SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, some coarse sand	
1530									Drilled to 20' Sampled to 21.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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GEOTECHNICAL BORING LOG LB-8

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
1552	0			B-1				SC-SM	**Quaternary Older Alluvium (Qoa):** SILTY SAND, medium dense, light brown, dry, fine sand, few gravel, some clay (EI = 26)	EI
1550				R-1	12 14 28	114	9	SC	CLAYEY SAND, dense, dark reddish brown, moist, fine sand, few gravel	
	5			R-2	34 50-5"	101	13	SC-SM	SILTY, CLAYEY SAND, very dense, dark reddish brown, moist, fine sand, some interbedded clay layers (sample disturbed)	
1545										
	10			R-3	28 29 50			SP-SM	Poorly graded SAND with SILT, dense, yellowish brown, dry to moist, fine sand, some coarse sand and fine gravel	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



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GEOTECHNICAL BORING LOG LB-9

Project No.	11979.002	**Date Drilled**	4-19-18
Project	Meridian K-4 Warehouse	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1552'
Location	See Boring Location Plan	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0			B-1				SC	**Quaternary Older Alluvium (Qoa):** SILTY, CLAYEY SAND, dense, light yellowish brown, dry, fine sand, some fine gravel (RV = 16)	RV
1550				R-1	30 50-6"	118	7		very dense, light reddish brown, dry to moist, fine sand, trace fine gravel	
	5			R-2	24 28 30	117	4	SM	SILTY SAND, dense, dark reddish brown, dry to moist, fine to coarse sand with fine gravel	
1545										
	10			R-3	24 30 50				very dense, dark reddish brown, moist, fine to coarse sand, few gravel, some clay layers	
1540									Drilled to 10' Sampled to 11.5' Groundwater not encountered Backfilled with soil cuttings (4/19/18)	
	15									
1535										
	20									
1530										
	25									
1525										
	30									

Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



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APPENDIX B

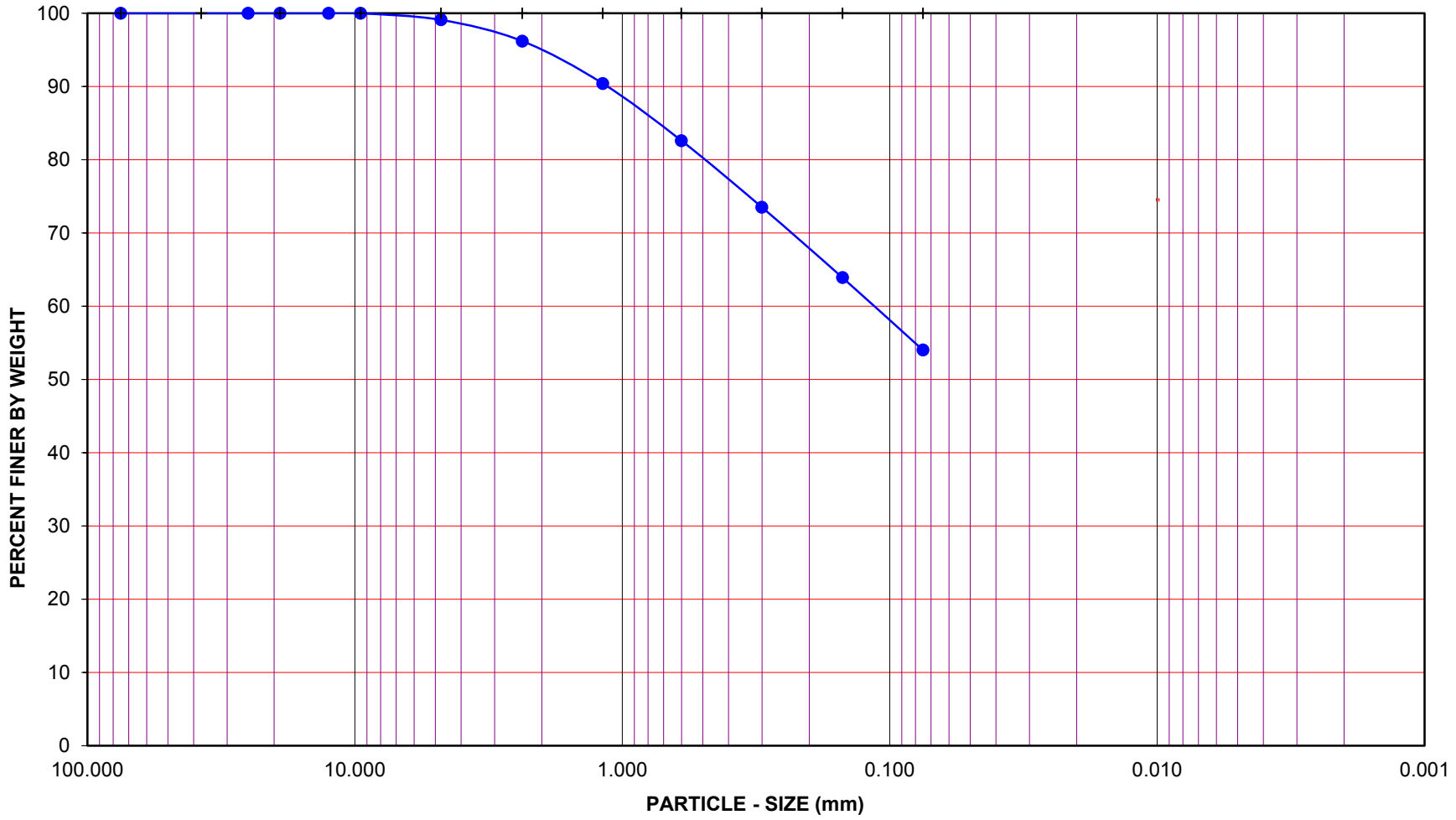
RESULTS OF GEOTECHNICAL LABORATORY TESTING

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Meridian Site K-4

Project No.: 11979.002

Boring No.: LB-3 Sample No.: B-1

Depth (feet): 0 - 5.0 Soil Type : s(ML)

Soil Identification: Sandy Silty Clay s(CL-ML), Reddish Brown.

GR:SA:FI : (%) 1 : 45 : 54

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PARTICLE - SIZE DISTRIBUTION ASTM D 6913

May-18

Sieve; LB-3, B-1 (4-19-18)

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-3	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Sandy Silty Clay s(CL-ML), Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	3328.6
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3328.6
Weight Soil Retained on #4 Sieve	7.8
Percent Passing # 4	99.8

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0393
Wt. Comp. Soil + Mold (gm.)	612.3	651.0
Wt. of Mold (gm.)	199.1	199.1
Specific Gravity (Assumed)	2.70	2.70
Container No.	7	7
Wet Wt. of Soil + Cont. (gm.)	349.6	651.0
Dry Wt. of Soil + Cont. (gm.)	324.8	379.1
Wt. of Container (gm.)	49.6	199.1
Moisture Content (%)	9.0	19.2
Wet Density (pcf)	124.6	131.2
Dry Density (pcf)	114.3	110.0
Void Ratio	0.474	0.532
Total Porosity	0.322	0.347
Pore Volume (cc)	66.6	74.7
Degree of Saturation (%) [S meas]	**51.2**	**97.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5393
5/2/18	10:00	1.0	1420	0.5393

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	39.3
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**39**

Rev. 03-08

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-6	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	9128.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	9128.7
Weight Soil Retained on #4 Sieve	35.7
Percent Passing # 4	99.6

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0264
Wt. Comp. Soil + Mold (gm.)	600.7	633.7
Wt. of Mold (gm.)	180.7	180.7
Specific Gravity (Assumed)	2.70	2.70
Container No.	9	9
Wet Wt. of Soil + Cont. (gm.)	430.7	633.7
Dry Wt. of Soil + Cont. (gm.)	407.2	387.1
Wt. of Container (gm.)	130.7	180.7
Moisture Content (%)	8.5	17.0
Wet Density (pcf)	126.7	133.1
Dry Density (pcf)	116.8	113.8
Void Ratio	0.444	0.482
Total Porosity	0.307	0.325
Pore Volume (cc)	63.6	69.1
Degree of Saturation (%) [S meas]	**51.7**	**95.4**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5264
5/2/18	10:00	1.0	1420	0.5264

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	26.4
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	5/1/18
Project No. :	11979.002	Checked By:	M. Vinet	Date:	5/4/18
Boring No.:	LB-8	Depth:	0 - 5.0		
Sample No. :	B-1	Location:	N/A		
Sample Description:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown.				

Dry Wt. of Soil + Cont. (gm.)	2553.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	2553.7
Weight Soil Retained on #4 Sieve	11.7
Percent Passing # 4	99.5

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0258
Wt. Comp. Soil + Mold (gm.)	615.2	643.9
Wt. of Mold (gm.)	200.6	200.6
Specific Gravity (Assumed)	2.70	2.70
Container No.	8	8
Wet Wt. of Soil + Cont. (gm.)	350.0	643.9
Dry Wt. of Soil + Cont. (gm.)	325.2	380.4
Wt. of Container (gm.)	50.0	200.6
Moisture Content (%)	9.0	16.5
Wet Density (pcf)	125.1	130.4
Dry Density (pcf)	114.7	111.9
Void Ratio	0.469	0.507
Total Porosity	0.319	0.337
Pore Volume (cc)	66.1	71.5
Degree of Saturation (%) [S meas]	**51.8**	**88.1**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
5/1/18	10:10	1.0	0	0.5000
5/1/18	10:20	1.0	10	0.5000
	Add Distilled Water to the Specimen			
5/2/18	9:00	1.0	1360	0.5258
5/2/18	10:00	1.0	1420	0.5258

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	25.8
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Heigh	**26**

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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-1	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5629	5724	5642			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2090	2185	2103			
Wet Weight of Soil + Cont. (g)	2235.9	2380.3	2250.3			
Dry Weight of Soil + Cont. (g)	2112.1	2214.0	2052.6			
Weight of Container (g)	152.1	200.2	159.4			
Moisture Content (%)	6.3	8.3	10.4			
Wet Density (pcf)	138.0	144.2	138.8			
Dry Density (pcf)	129.8	133.2	125.7			

Maximum Dry Density (pcf) **133.3** **Optimum Moisture Content (%)** **8.0**

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

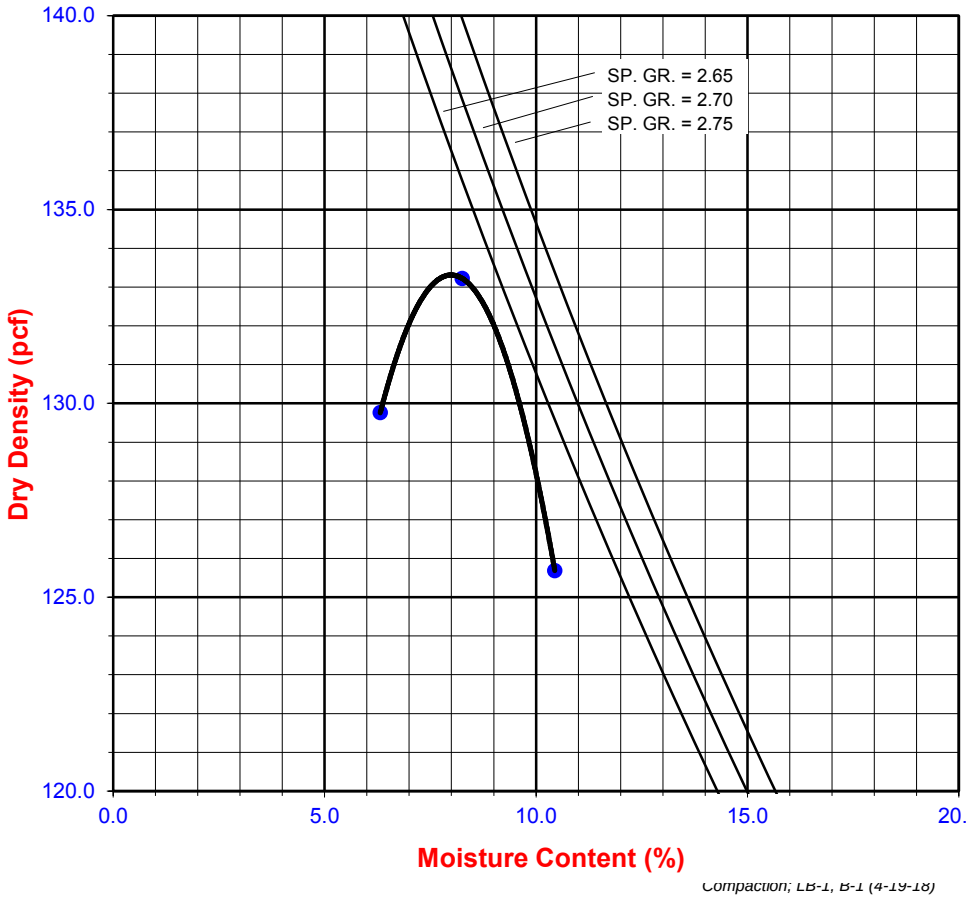
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name:	Meridian Site K-4	Tested By:	F. Mina	Date:	04/30/18
Project No.:	11979.002	Input By:	M. Vinet	Date:	05/04/18
Boring No.:	LB-6	Depth (ft.):	0 - 5.0		
Sample No.:	B-1				
Soil Identification:	Silty, Clayey Sand (SC-SM), Dark Reddish Brown				

Preparation Method: [X] Moist [ ] Dry

[X] Mechanical Ram [ ] Manual Ram

Mold Volume (ft³) 0.03340 *Ram Weight = 10 lb.; Drop = 18 in.*

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	5566	5687	5659			
Weight of Mold (g)	3539	3539	3539			
Net Weight of Soil (g)	2027	2148	2120			
Wet Weight of Soil + Cont. (g)	2144.1	2187.6	2252.2			
Dry Weight of Soil + Cont. (g)	2013.3	2014.1	2047.1			
Weight of Container (g)	118.3	44.0	144.3			
Moisture Content (%)	6.9	8.8	10.8			
Wet Density (pcf)	133.8	141.8	139.9			
Dry Density (pcf)	125.2	130.3	126.3			

Maximum Dry Density (pcf) 130.4 **Optimum Moisture Content (%)** 9.0

PROCEDURE USED

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

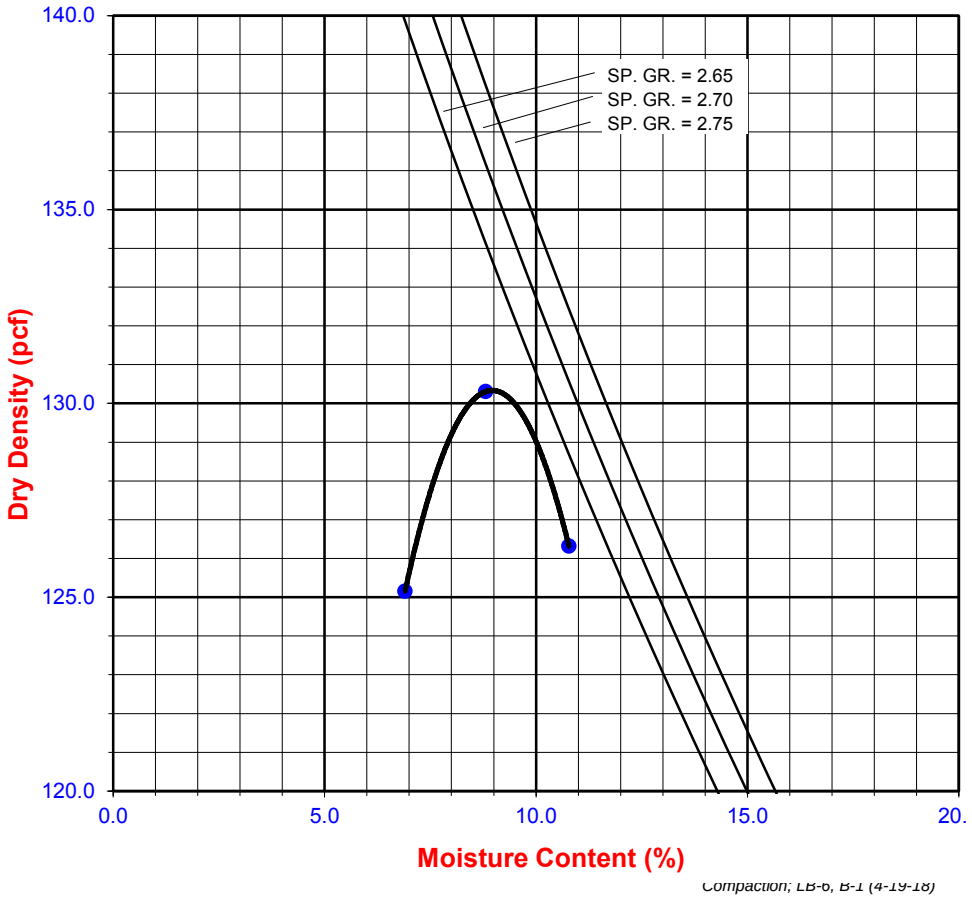
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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One-Dimensional Swell or Settlement Potential of Cohesive Soils

(ASTM D 4546) -- Method 'B'

Project Name: Meridian K-4 Site
Project No.: 11979.002
Boring No.: **LB-5**
Sample No.: **R-4**
Sample Description: Clayey Sand (SC), Reddish Brown.

Tested By: M. Vinet Date: 5/3/18
Checked By: M. Vinet Date: 5/4/18
Sample Type: IN SITU
Depth (ft.) 15.0

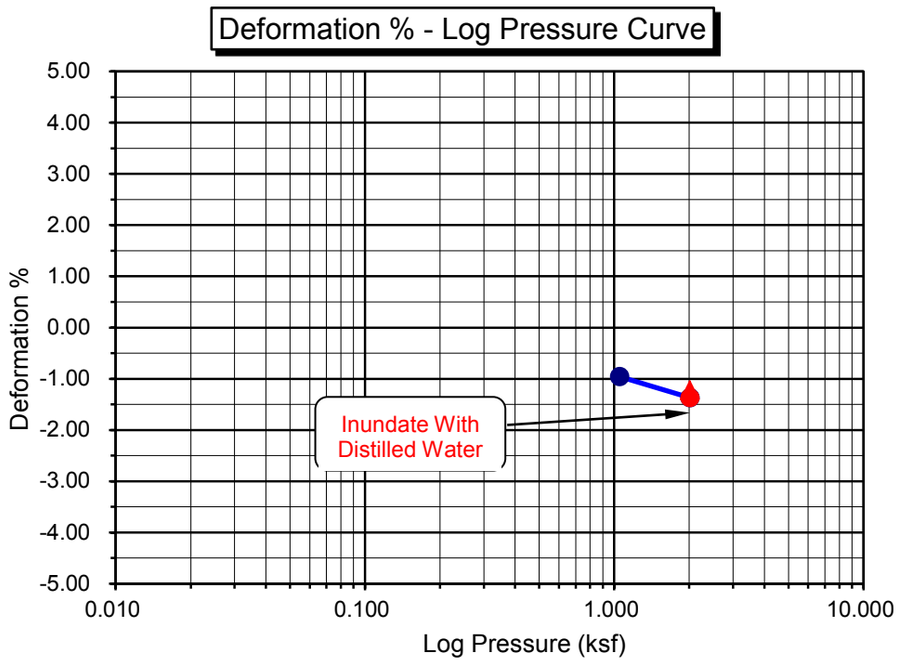
Source and Type of Water Used for Inundation: Arrowhead (Distilled)
** Note: Loading After Wetting (Inundation) not Performed Using this Test Method.

Initial Dry Density (pcf):	121.8
Initial Moisture (%):	12.4
Initial Height (in.):	1.0000
Initial Dial Reading (in):	0.0000
Inside Diameter of Ring (in):	2.416

Final Dry Density (pcf):	123.4
Final Moisture (%) :	14.0
Initial Void ratio:	0.3834
Specific Gravity (assumed):	2.70
Initial Degree of Saturation (%):	87.3

Pressure (p) (ksf)	Final Reading (in)	Apparent Thickness (in)	Load Compliance (%)	Swell (+) Settlement (-) % of Sample Thickness	Void Ratio	Corrected Deformation (%)
1.050	0.0096	0.9904	0.00	-0.96	0.3701	-0.96
2.013	0.0137	0.9863	0.00	-1.37	0.3644	-1.37
H2O	0.0123	0.9877	0.00	-1.23	0.3663	-1.23

Percent Swell / Settlement After Inundation = 0.14



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SOIL RESISTIVITY TEST

DOT CA TEST 643

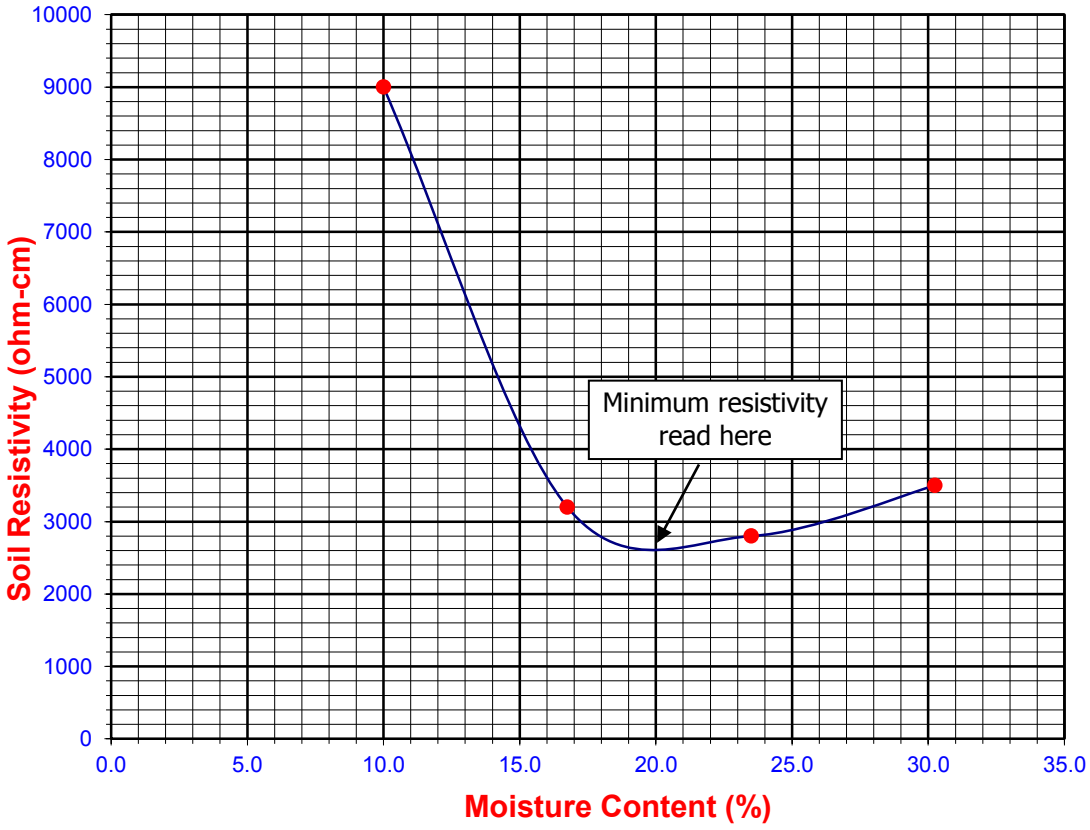
Project Name:	Meridian Site K-4		Tested By :	M. Vinet	Date: 05/03/18
Project No. :	11979.002		Data Input By:	M. Vinet	Date: 05/04/18
Boring No.:	LB-3		Depth (ft.) :	0 - 5.0	
Sample No. :	B-1				
Soil Identification:*	s(CL-ML)				

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	40	10.00	9000	9000
2	67	16.75	3200	3200
3	94	23.50	2800	2800
4	121	30.25	3500	3500
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	1.00
Initial Soil Wt. (g) (Wt)	400.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2600	**20.0**	**99**	**20**	**6.01**	**21.0**



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R-VALUE TEST RESULTS

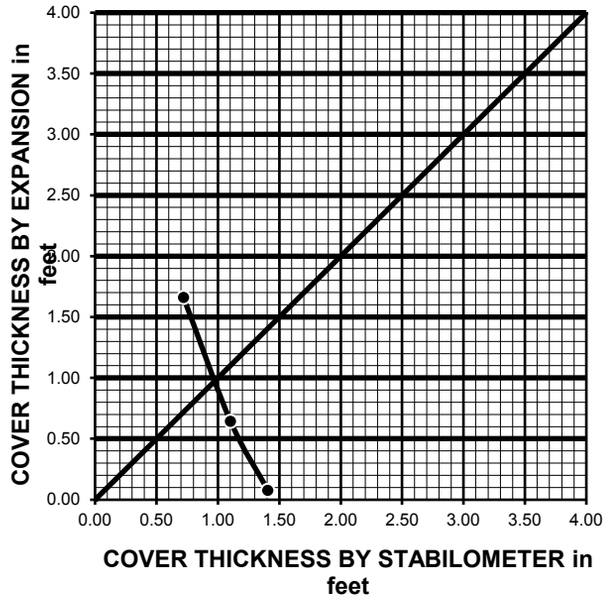
ASTM D 2844

Project Name:	Meridian Site K-4	Date:	5/1/18
Project Number:	11979.002	Technician:	F. Mina
Boring Number:	LB-9	Depth (ft.):	0 - 5.0
Sample Number:	B-1	Sample Location:	N/A
Sample Description:	Clayey Sand (SC), Dark Reddish Brown		

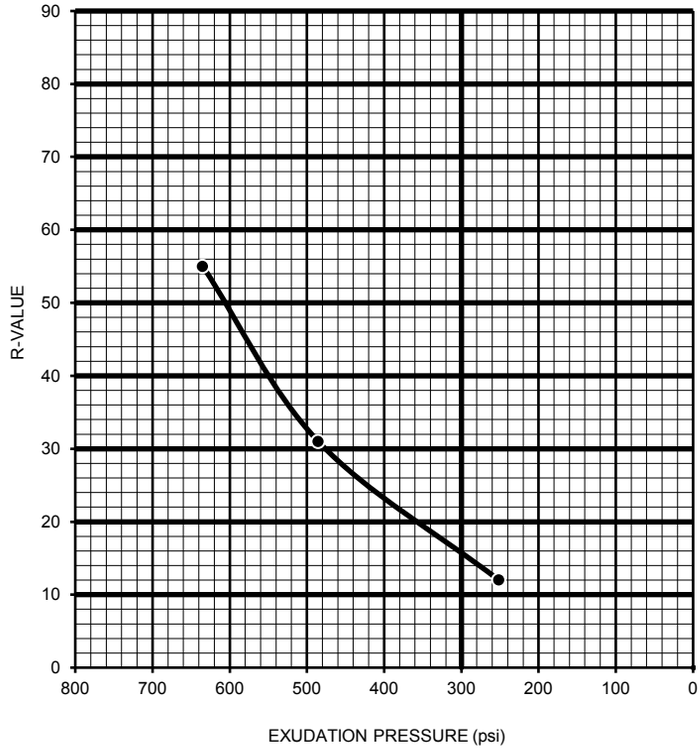
TEST SPECIMEN	A	B	C
MOISTURE AT COMPACTION %	11.5	12.6	14.7
HEIGHT OF SAMPLE, Inches	2.40	2.59	2.61
DRY DENSITY, pcf	121.5	120.1	114.7
COMPACTOR AIR PRESSURE, psi	200	175	75
EXUDATION PRESSURE, psi	635	485	251
EXPANSION, Inches x 10exp-4	44	17	2
STABILITY Ph 2,000 lbs (160 psi)	46	90	124
TURNS DISPLACEMENT	4.53	4.69	5.24
R-VALUE UNCORRECTED	58	29	12
R-VALUE CORRECTED	55	31	12

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.72	1.10	1.41
EXPANSION PRESSURE THICKNESS, ft.	1.66	0.64	0.08

EXPANSION PRESSURE CHART



EXUDATION PRESSURE CHART



R-VALUE BY EXPANSION:	38
R-VALUE BY EXUDATION:	16
EQUILIBRIUM R-VALUE:	16

APPENDIX C

SITE SPECIFIC ANALYSIS

USGS Design Maps Summary Report

User–Specified Input

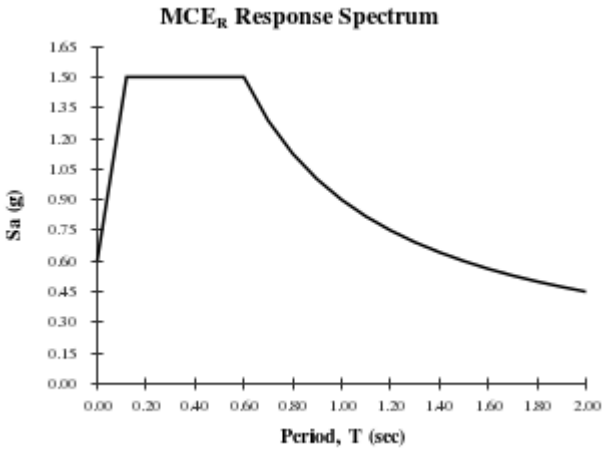
Report Title	11979.002 Wed April 18, 2018 22:12:57 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.90902°N, 117.26195°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

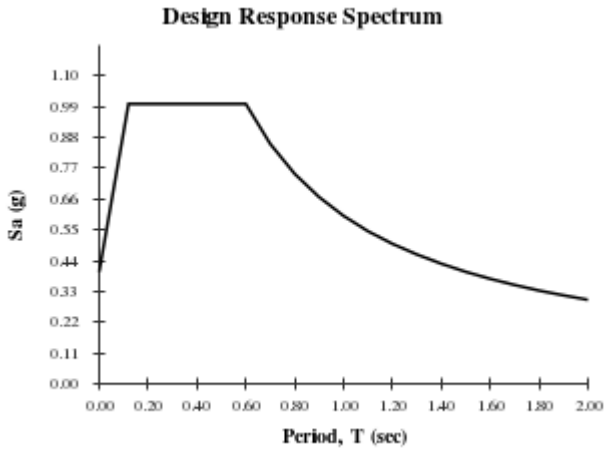


USGS–Provided Output

S_S =	1.500 g	S_{MS} =	1.500 g	S_{DS} =	1.000 g
S_1 =	0.600 g	S_{M1} =	0.900 g	S_{D1} =	0.600 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

Although this information is a product of the U.S. Geological Survey, we provide no warranty, expressed or implied, as to the accuracy of the data contained therein. This tool is not a substitute for technical subject-matter knowledge.

USGS Design Maps Detailed Report

ASCE 7-10 Standard (33.90902°N, 117.26195°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 1.500 g
From Figure 22-2 [2]	S_1 = 0.600 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content *w* ≥ 40%, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_S = 1.500 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.600 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.500 = 1.500$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.600 = 0.900$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

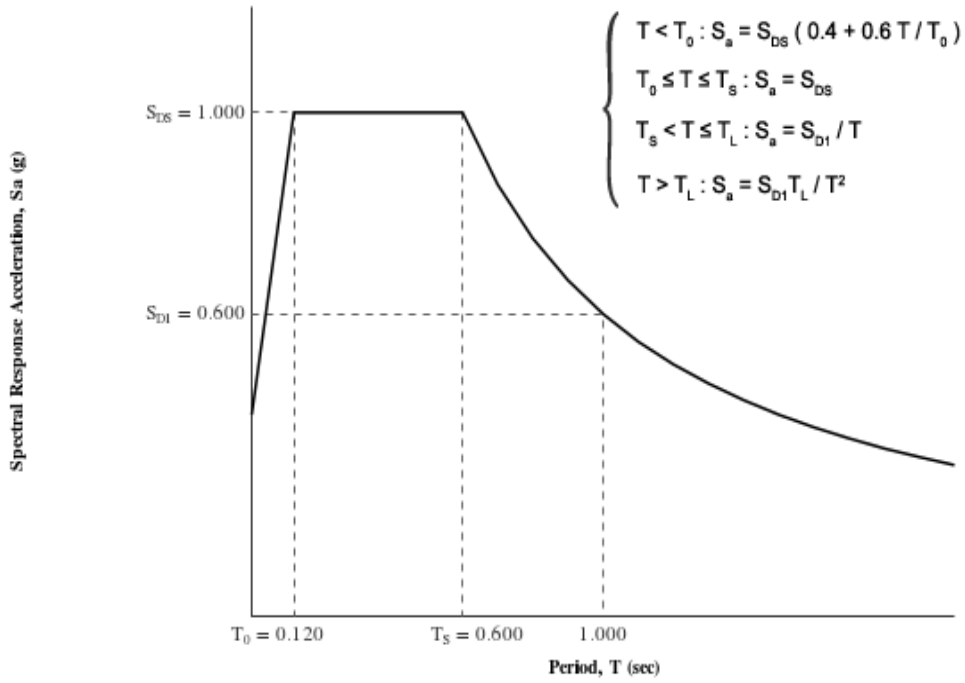
Equation (11.4–3): $S_{DS} = \frac{2}{3} S_{MS} = \frac{2}{3} \times 1.500 = 1.000$ g

Equation (11.4–4): $S_{D1} = \frac{2}{3} S_{M1} = \frac{2}{3} \times 0.900 = 0.600$ g

Section 11.4.5 — Design Response Spectrum

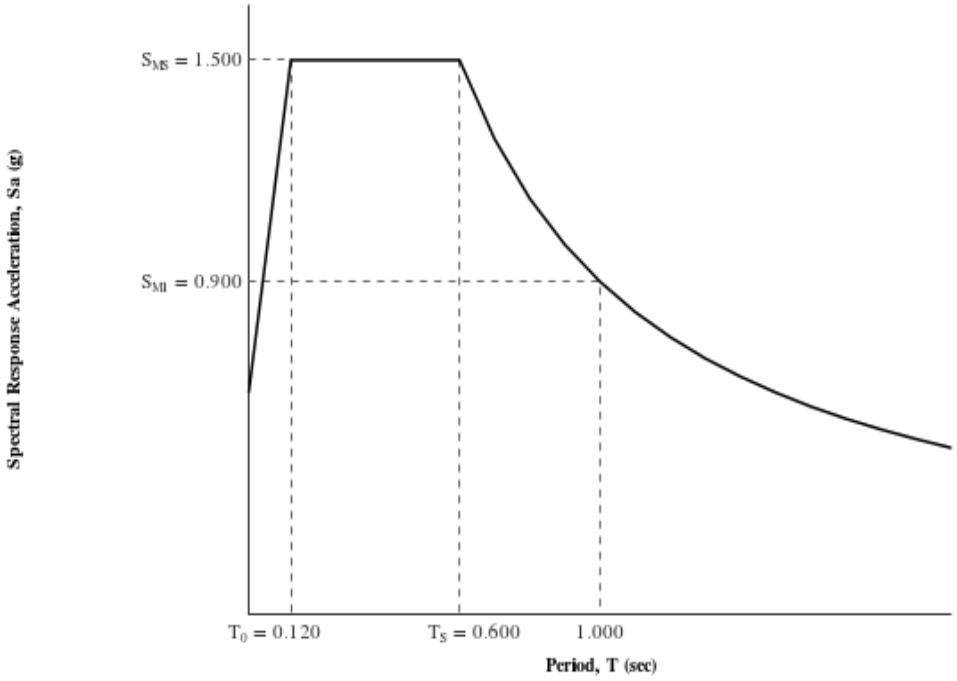
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.534

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.534 = 0.534$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.534 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 1.059

From Figure 22-18 [6] C_{R1} = 1.027

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.000 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.600 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

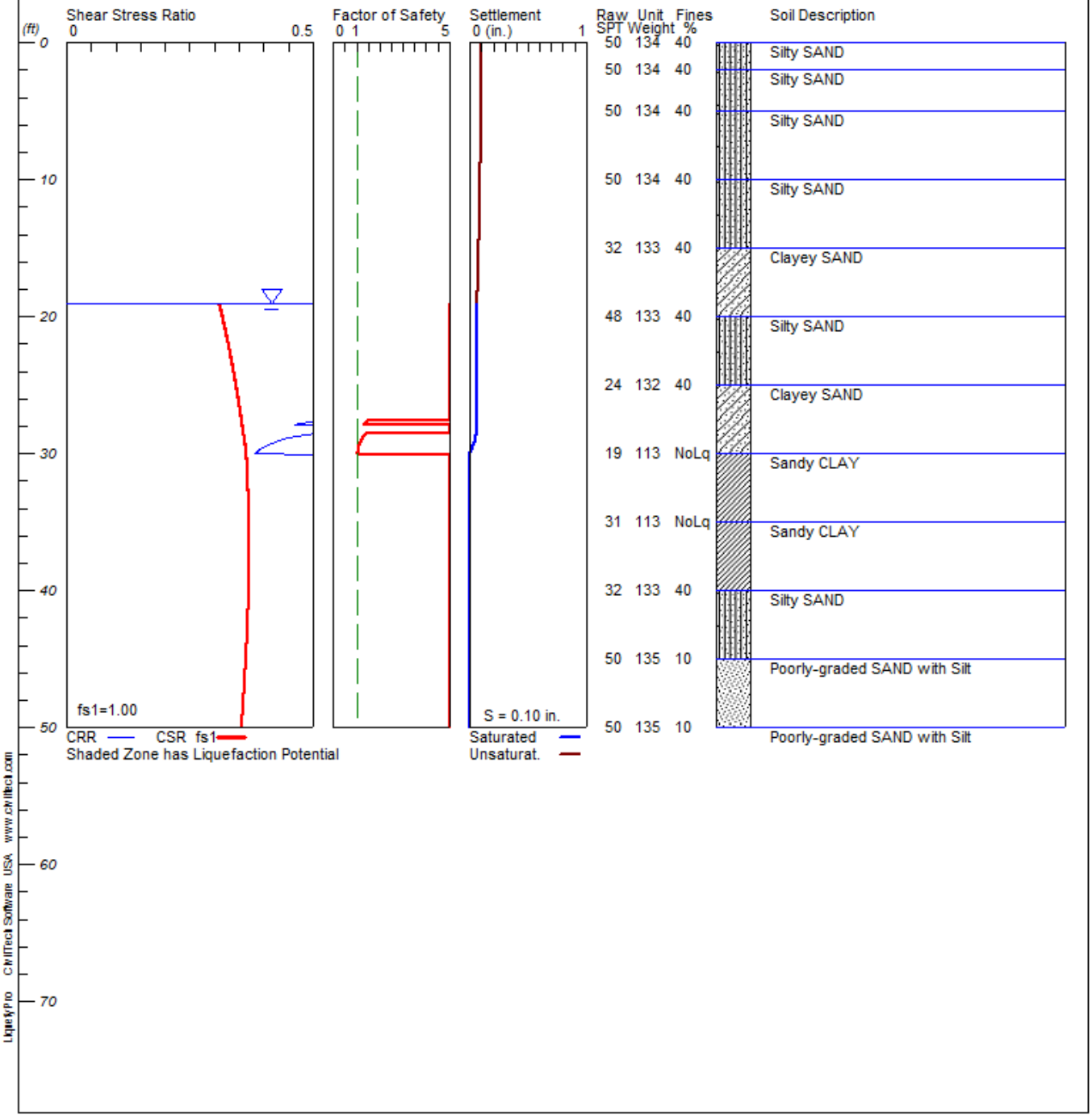
1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

DRY SETTLEMENT ANALYSIS

K-4 Warehouse

Hole No.=LB-4 Water Depth=19 ft Surface Elev.=1552

Magnitude=7.2
Acceleration=0.5g



Leighton | **11979.002** | **Plate A-1**

****

LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: P:\Leighton - Infocus\11000 - 11999\11979 Meridian Site K-4\002 Geot Exploration\Analyses\Liquefy LB-4.liq
Title: K-4 Warehouse
Subtitle: 11979.002

Surface Elev.=1552
Hole No.=LB-4
Depth of Hole= 50.00 ft
Water Table during Earthquake= 19.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration= 0.5 g
Earthquake Magnitude= 7.20

Input Data:
Surface Elev.=1552
Hole No.=LB-4
Depth of Hole=50.00 ft
Water Table during Earthquake= 19.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.20
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.00	50.00	134.00	40.00
2.00	50.00	134.00	40.00
5.00	50.00	134.00	40.00
10.00	50.00	134.00	40.00
15.00	32.00	133.00	40.00
20.00	48.00	133.00	40.00
25.00	24.00	132.00	40.00
30.00	19.00	113.00	NoLiq
35.00	31.00	113.00	NoLiq

40.00	32.00	133.00	40.00
45.00	50.00	135.00	10.00
50.00	50.00	135.00	10.00

Output Results:

Settlement of Saturated Sands=0.06 in.
Settlement of Unsaturated Sands=0.04 in.
Total Settlement of Saturated and Unsaturated Sands=0.10 in.
Differential Settlement=0.050 to 0.066 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.22	0.32	5.00	0.06	0.04	0.10
1.00	2.22	0.32	5.00	0.06	0.04	0.10
2.00	2.22	0.32	5.00	0.06	0.04	0.10
3.00	2.22	0.32	5.00	0.06	0.04	0.10
4.00	2.22	0.32	5.00	0.06	0.03	0.10
5.00	2.22	0.32	5.00	0.06	0.03	0.10
6.00	2.22	0.32	5.00	0.06	0.03	0.09
7.00	2.22	0.32	5.00	0.06	0.03	0.09
8.00	2.22	0.32	5.00	0.06	0.03	0.09
9.00	2.22	0.32	5.00	0.06	0.03	0.09
10.00	2.22	0.32	5.00	0.06	0.03	0.09
11.00	2.22	0.32	5.00	0.06	0.02	0.09
12.00	2.22	0.32	5.00	0.06	0.02	0.08
13.00	2.22	0.32	5.00	0.06	0.02	0.08
14.00	2.22	0.31	5.00	0.06	0.02	0.08
15.00	2.22	0.31	5.00	0.06	0.01	0.08
16.00	2.22	0.31	5.00	0.06	0.01	0.07
17.00	2.22	0.31	5.00	0.06	0.01	0.07
18.00	2.22	0.31	5.00	0.06	0.00	0.07
19.00	2.22	0.31	5.00	0.06	0.00	0.06
20.00	2.22	0.32	5.00	0.06	0.00	0.06
21.00	2.22	0.32	5.00	0.06	0.00	0.06
22.00	2.22	0.33	5.00	0.06	0.00	0.06
23.00	2.22	0.33	5.00	0.06	0.00	0.06
24.00	2.22	0.34	5.00	0.06	0.00	0.06
25.00	2.22	0.34	5.00	0.06	0.00	0.06
26.00	2.22	0.35	5.00	0.06	0.00	0.06
27.00	2.22	0.35	5.00	0.06	0.00	0.06
28.00	2.22	0.36	5.00	0.06	0.00	0.06
29.00	0.43	0.36	1.20	0.04	0.00	0.04
30.00	0.38	0.37	1.04	0.00	0.00	0.00
31.00	2.00	0.37	5.00	0.00	0.00	0.00
32.00	2.00	0.37	5.00	0.00	0.00	0.00
33.00	2.00	0.37	5.00	0.00	0.00	0.00
34.00	2.00	0.37	5.00	0.00	0.00	0.00
35.00	2.00	0.37	5.00	0.00	0.00	0.00
36.00	2.00	0.37	5.00	0.00	0.00	0.00
37.00	2.00	0.37	5.00	0.00	0.00	0.00
38.00	2.00	0.37	5.00	0.00	0.00	0.00
39.00	2.00	0.37	5.00	0.00	0.00	0.00
40.00	2.00	0.37	5.00	0.00	0.00	0.00
41.00	2.17	0.37	5.00	0.00	0.00	0.00
42.00	2.16	0.37	5.00	0.00	0.00	0.00
43.00	2.15	0.37	5.00	0.00	0.00	0.00
44.00	2.14	0.37	5.00	0.00	0.00	0.00
45.00	2.14	0.36	5.00	0.00	0.00	0.00
46.00	2.13	0.36	5.00	0.00	0.00	0.00
47.00	2.12	0.36	5.00	0.00	0.00	0.00
48.00	2.12	0.36	5.00	0.00	0.00	0.00

49.00	2.11	0.36	5.00	0.00	0.00	0.00
50.00	2.10	0.36	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

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1 atm (atmosphere) = 1 tsf (ton/ft2)
CRRm Cyclic resistance ratio from soils
CSRsf Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat Settlement from saturated sands
S_dry Settlement from Unsaturated Sands
S_all Total Settlement from Saturated and Unsaturated Sands
NoLiq No-Liquefy Soils

APPENDIX D

EARTHWORK AND GRADING SPECIFICATIONS

APPENDIX D

LEIGHTON CONSULTING, INC.
EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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D-1.0 GENERAL

D-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

D-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

D-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide

Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish earthwork and grading in accordance with the applicable grading codes and agency ordinances, these Guide Specifications, and recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of Leighton Consulting, Inc., unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, adverse weather, etc., are resulting in a quality of work less than required in these specifications, Leighton Consulting, Inc. shall reject the work and may recommend to the owner that earthwork and grading be stopped until unsatisfactory condition(s) are rectified.

D-2.0 PREPARATION OF AREAS TO BE FILLED

D-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that

are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

D-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section D-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

D-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

D-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

D-2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by Leighton Consulting, Inc. as suitable to receive fill. The Contractor shall obtain a written acceptance (*Daily Field Report*) from Leighton Consulting, Inc. prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys and benches.

D-3.0 FILL MATERIAL

D-3.1 Fill Quality

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by Leighton Consulting, Inc. prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to Leighton Consulting, Inc. or mixed with other soils to achieve satisfactory fill material.

D-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

D-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section D-3.1, and be free of hazardous materials ("contaminants") and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than ($\leq$) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

D-4.0 FILL PLACEMENT AND COMPACTION

D-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section D-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

D-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

D-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than (≥) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at-least (≥) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than (>) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

D-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

D-4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by Leighton Consulting, Inc.. Location and frequency of tests shall be at our field representative(s) discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

D-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

D-5.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by Leighton Consulting, Inc. during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by Leighton Consulting, Inc. based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, then observed and reviewed by Leighton Consulting, Inc. prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by Leighton Consulting, Inc..

D-6.0 TRENCH BACKFILLS

D-6.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2009 Edition or more current (see also: http://www.dir.ca.gov/title8/sb4a6.html).

D-6.2 Bedding and Backfill

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2015 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

D-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

APPENDIX E

GBA - IMPORTANT INFORMATION ABOUT THIS GEOTECHNICAL-ENGINEERING REPORT

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

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Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

N.A.

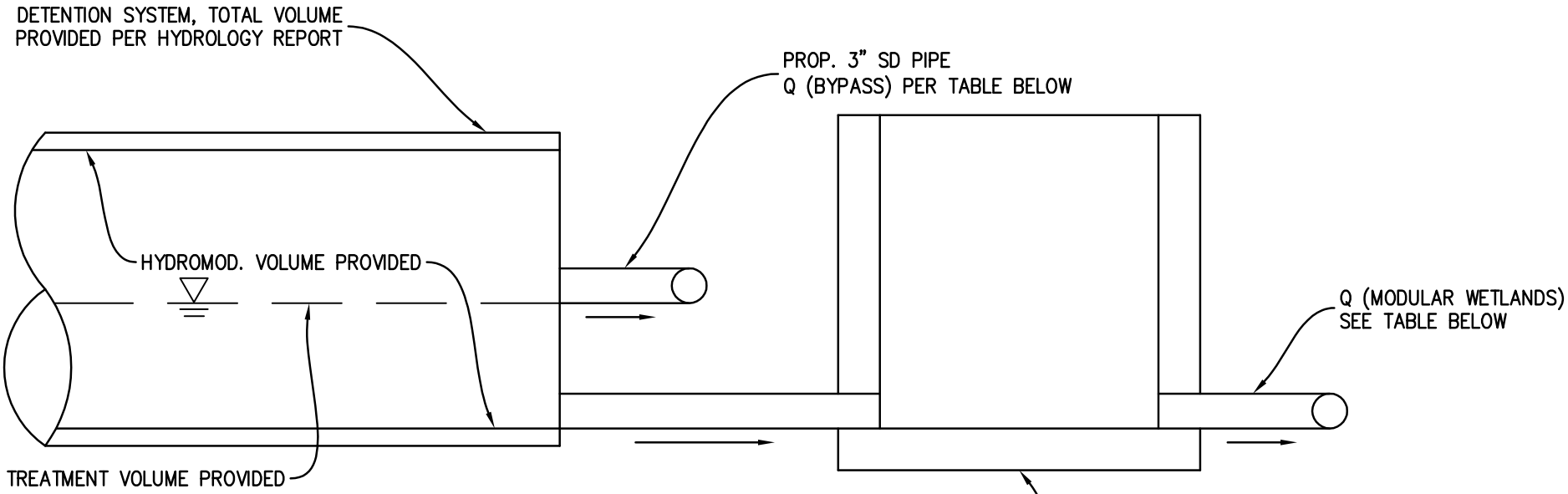
Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

N.A.

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation



DMA AREA	Qmws (CFS)	Qbypass (CFS)	Q 2-YR (CFS)	MWS SIZE	V treatment (CF)	V provided (CF)
A	0.462	2.367	2.829	8' X 16'	28,689	29,000
B	0.462	2.476	2.938	8' X 16'	30,331	30,500
C	0.115	0.348	0.463	4' X 8'	4,509	5,000

TYPICAL DETENTION SYSTEM AND MODULAR WETLANDS SYSTEM LAYOUT

N.T.S.

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.63 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-A	*346690*	*Roofs*	*1*	*0.89*	*309247.5*			
DMA-A	*267000*	*Concrete or Asphalt*	*1*	*0.892*	*238164*			
DMA-A	*31000*	*Ornamental Landscaping*	*0.1*	*0.110458*	*3424.2*			
	644690	***Total***			**550835.7**	**0.63**	***28689.4***	***29000***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering, Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP A

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMA-A	346690	Roofs	1	0.89	309247.5			
DMA-A	267000	Concrete or Asphalt	1	0.892	238164			
DMA-A	31000	Ornamental Landscaping	0.1	0.11046	3424.2			
	644690	Total			550835.7	0.20	2.5	2.6

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP B

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.63 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-A	*353800*	*Roofs*	*1*	*0.89*	*315589.6*			
DMA-A	*296710*	*Concrete or Asphalt*	*1*	*0.892*	*264665.3*			
DMA-A	*19000*	*Ornamental Landscaping*	*0.1*	*0.110458*	*2098.7*			
	669510	***Total***			**582353.6**	**0.63**	***30330.9***	***30500***

Notes:

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering, Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP B

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Rainfall Intensity (in/hr)	Design Flow Rate (cfs)	Proposed Flow Rate (cfs)
DMA-A	353800	Roofs	1	0.89	315589.6			
DMA-A	296710	Concrete or Asphalt	1	0.892	264665.3			
DMA-A	19000	Ornamental Landscaping	0.1	0.11046	2098.7			
	669510	Total			582353.6	0.20	2.7	2.8

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP C

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.63 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Storm Depth (in)*	*Design Capture Volume, V_{BMP} (cubic feet)*	*Proposed Volume on Plans (cubic feet)*
DMA-A	*95430*	*Concrete or Asphalt*	*1*	*0.89*	*85123.6*			
DMA-A	*13160*	*Ornamental Landscaping*	*0.1*	*0.110458*	*1453.6*			

Santa Ana Watershed - BMP Design Flow Rate, Q_{BMP}

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name	DRC Engineering, Inc.	Date	7/8/2018
Designed by	YH	Case No	TBD
Company Project Number/Name	Cactus Avenue K-4 Parcel Industrial		

BMP Identification

BMP NAME / ID: BMP C

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

Design Rainfall Intensity: I = 0.20 in/hr

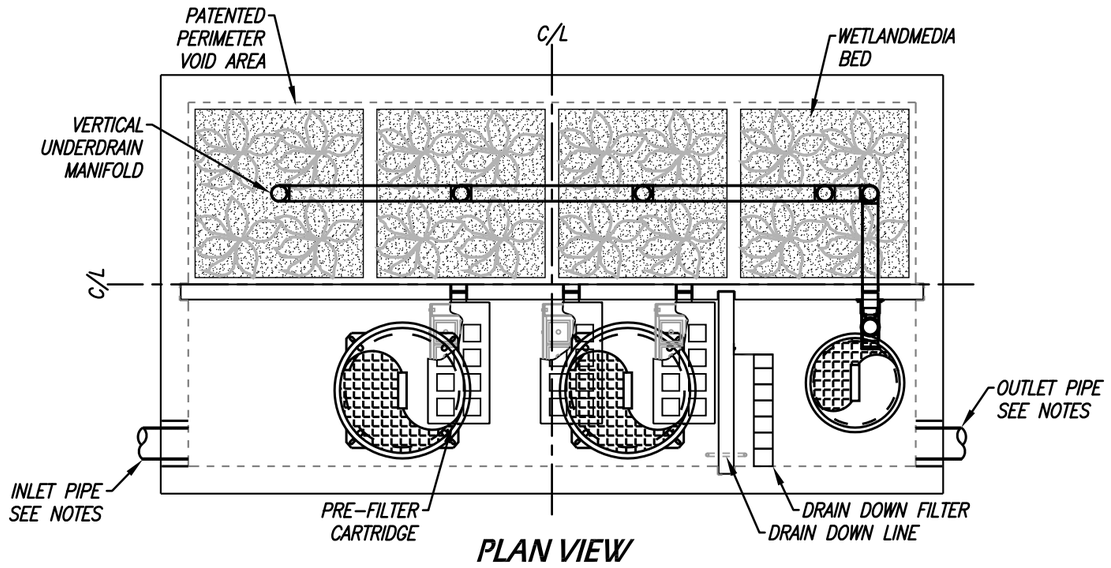
Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

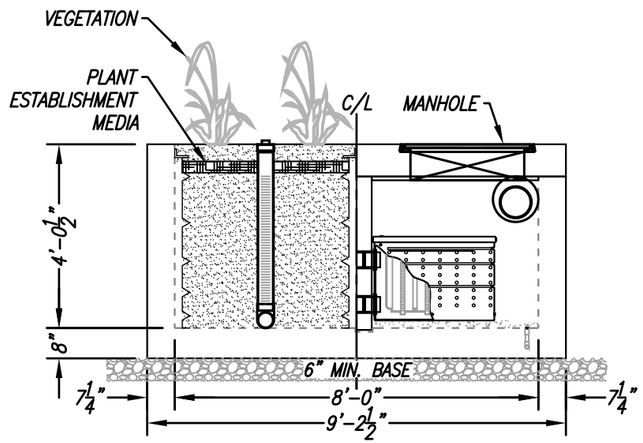
DMAs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type (use pull-down menu)	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Design Rainfall Intensity (in/hr)*	*Design Flow Rate (cfs)*	*Proposed Flow Rate (cfs)*
DMA-A	*95430*	*Concrete or Asphalt*	*1*	*0.89*	*85123.6*			
DMA-A	*13160*	*Ornamental Landscaping*	*0.1*	*0.11046*	*1453.6*			

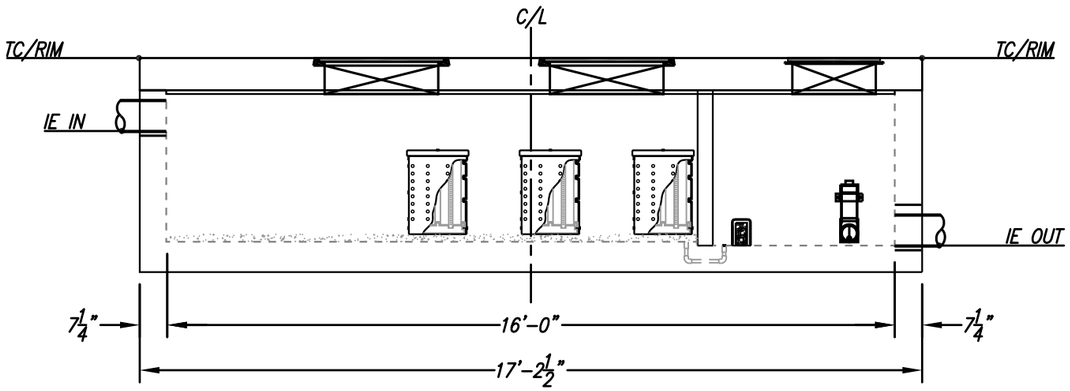
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PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	ø30"	N/A	ø24"
WETLANDMEDIA VOLUME (CY)			7.26
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø3.07"
MAXIMUM PICK WEIGHT (LBS)			TBD
NOTES:			



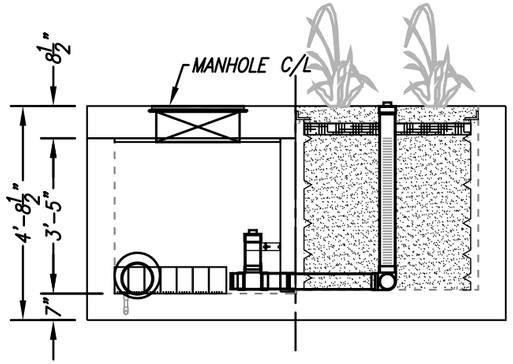
PLAN VIEW



LEFT END VIEW
BIOFILTRATION/PRETREATMENT



ELEVATION VIEW



RIGHT END VIEW
DISCHARGE/BIOFILTRATION

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURERS CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE TO VERIFY PROJECT ENGINEERS RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE. (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL GAPS AROUND PIPES SHALL BE SEALED WATER TIGHT WITH A NON–SHRINK GROUT PER MANUFACTURERS STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. DRIP OR SPRAY IRRIGATION REQUIRED ON ALL UNITS WITH VEGETATION.

GENERAL NOTES

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2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT MANUFACTURER.

TREATMENT FLOW (CFS)	0.462
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

THE PRODUCT DESCRIBED MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 7,425,262; 7,470,362; 7,674,378; 8,303,816; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

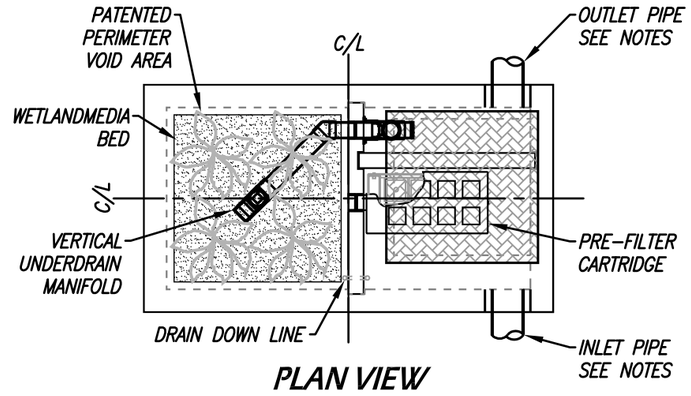
PROPRIETARY AND CONFIDENTIAL:

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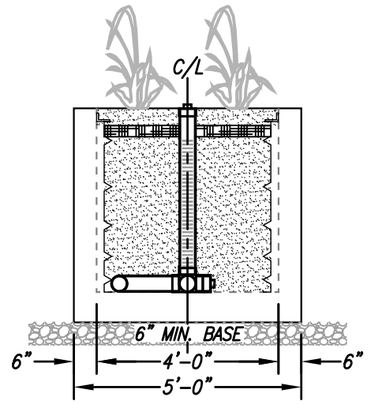
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MWS-L-8-16-V
STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL

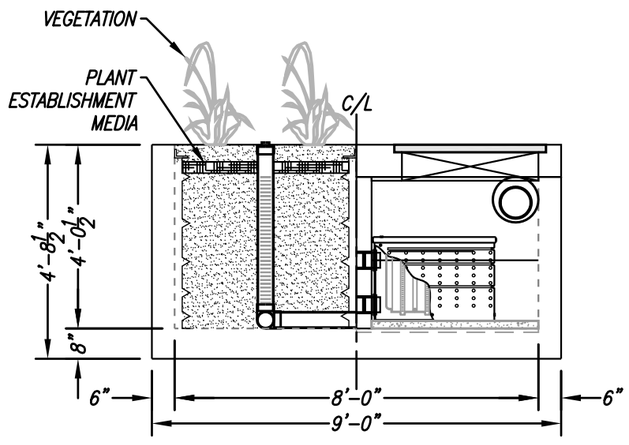
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PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
VOLUME BASED (CF)		FLOW BASED (CFS)	
TREATMENT HGL AVAILABLE (FT)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PARKWAY	OPEN PLANTER	PARKWAY
FRAME & COVER	36" X 36"	N/A	N/A
WETLANDMEDIA VOLUME (CY)			2.03
WETLANDMEDIA DELIVERY METHOD			TBD
ORIFICE SIZE (DIA. INCHES)			ø1.53"
MAXIMUM PICK WEIGHT (LBS)			15000
NOTES:			



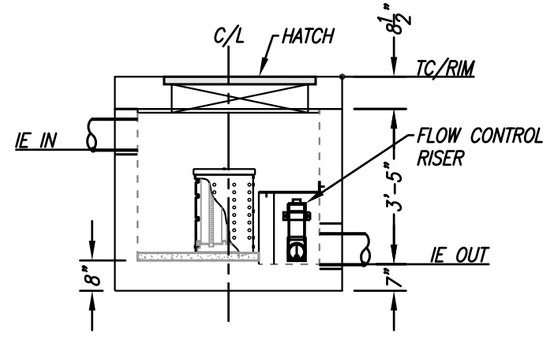
PLAN VIEW



LEFT END VIEW
BIOFILTRATION



ELEVATION VIEW



RIGHT END VIEW
PRETREATMENT/DISCHARGE

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OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	TBD
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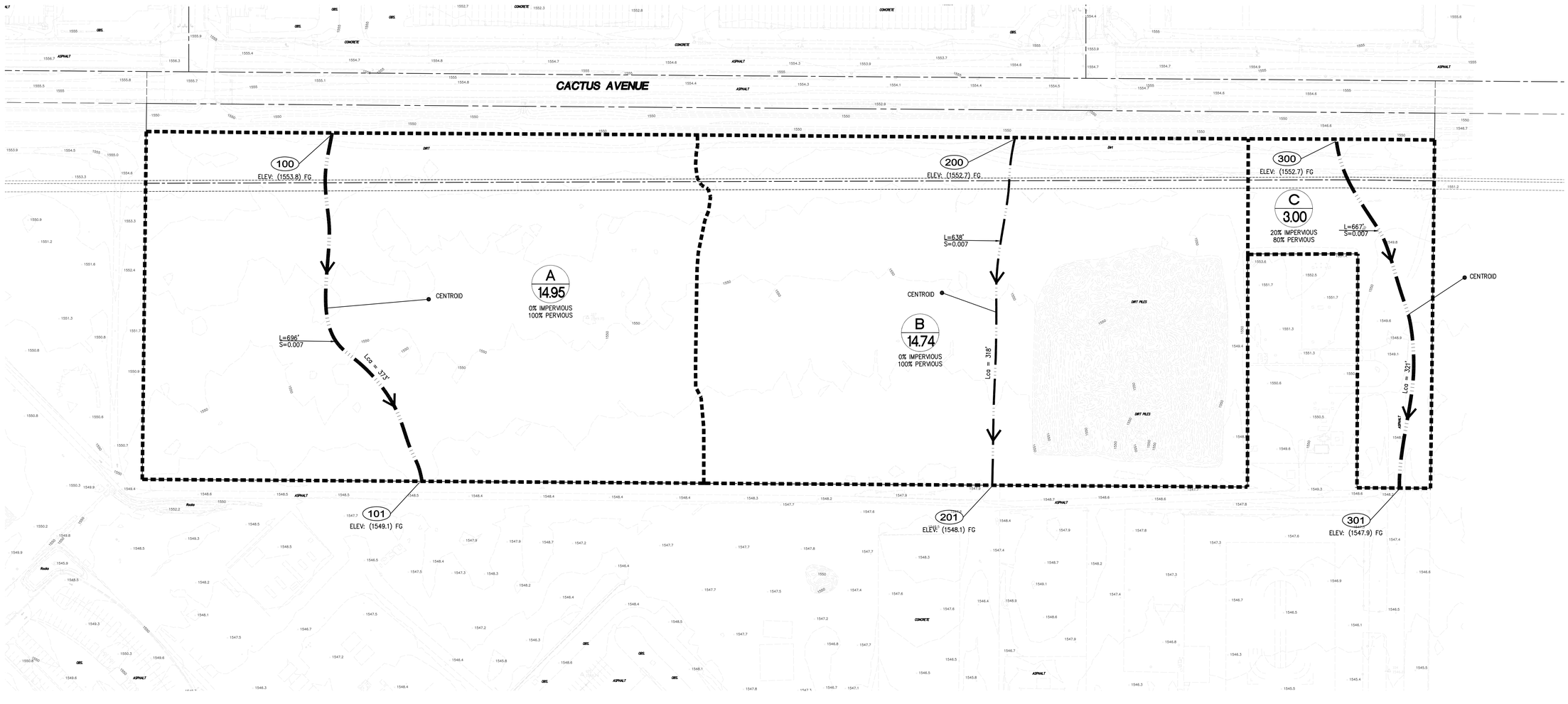
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MWS-L-4-8-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

SELECTED PAGES FROM HYDROLOGY REPORT FOR UNIT HYDROLOGY GRAPH DATA AND BASIN ROUTING CALCULATIONS



EXISITING ON-SITE CONDITION
2 YEAR 24 HOUR STORM HYDROGRAPH TABLE

STORM YEAR	AREA "A"	AREA "B"	AREA "C"	TOTAL
2	0.349 CFS	0.344 CFS	0.174 CFS	0.867 CFS

LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- X / 0.74 — DRAINAGE SUBAREA DESIGNATION / DRAINAGE SUBAREA IN ACRES
- 216 — NODE NUMBER
- LANDSCAPE AREA

DISTURBED AREA = 32.69 ACRES

TOTAL IMPERVIOUS AREA = 0 ACRES (0%)
TOTAL PERVIOUS AREA = 32.69 ACRES (100%)

TOTAL Q2 = 11.77 CFS
TOTAL Q100 = 34.04 CFS

SCALE IN FEET
0 40 80 160 240
SCALE: 1" = 80'

NOT FOR CONSTRUCTION

160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning

CHRISTOPHER MCKEE R.C.E. 74414 DATE

REGISTERED PROFESSIONAL ENGINEER CHRISTOPHER MCKEE No. 74414 Exp. 6-30-19 CIVIL STATE OF CALIFORNIA

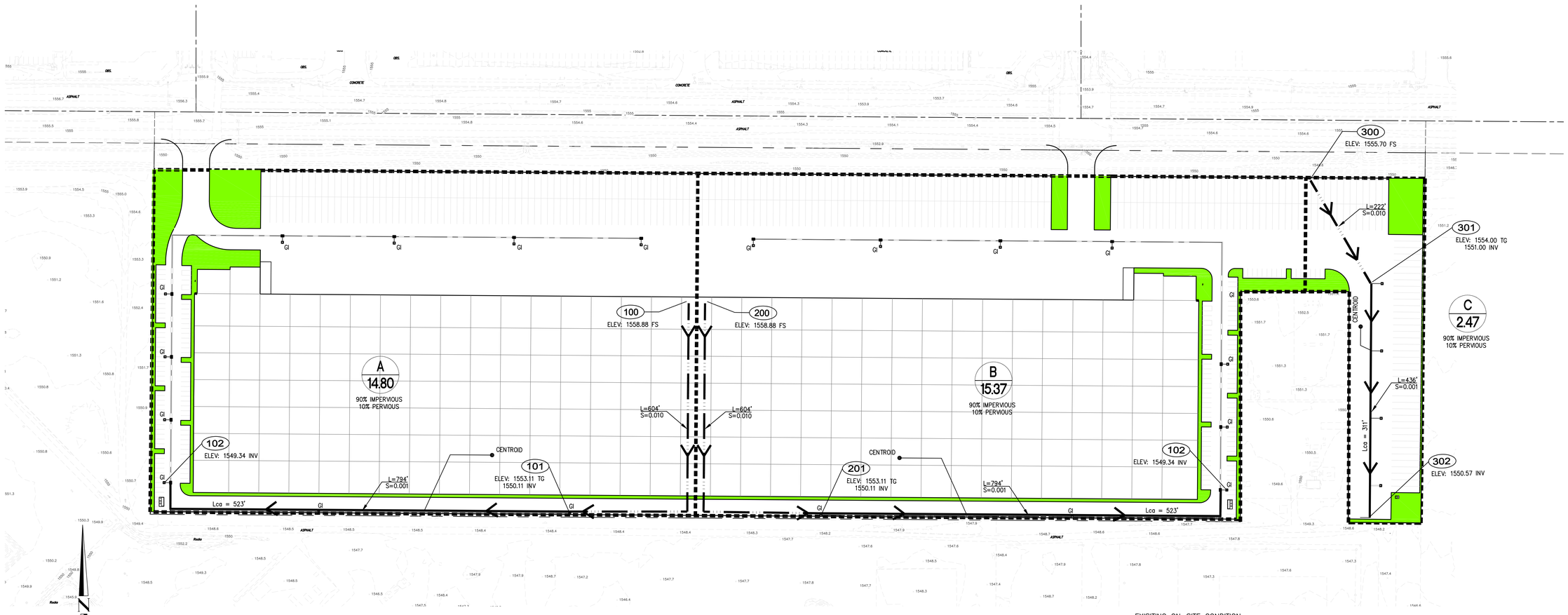
NO.: | REVISION: | DATE:

PROJECT: K-4 PARCEL INDUSTRIAL
CACTUS AVENUE
MJPA, CALIFORNIA

DRAWING NAME: EXISTING HYDROLOGY MAP

ISSUE:	HYDROLOGY
DATE:	05/16/18
CHECKED: CM	DRAWN: WXC
DRAWING FILE:	16070HMPR
PROJECT NO.:	17-380
SHEET NUMBER:	1
OF	1 SHEETS
SCALE:	AS SHOWN

EXTERNAL REFERENCES: gfc_ca_storp 16-070 MA 17-380ab101 17-380 redwdy101
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SCALE: 1" = 80'

EXISITING ON-SITE CONDITION
2 YEAR 24 HOUR STORM HYDROGRAPH TABLE

STORM YEAR	AREA "A"	AREA "B"	AREA "C"	TOTAL
2	0.349 CFS	0.344 CFS	0.070 CFS	0.763 CFS

PROPOSED ON-SITE CONDITION
2 YEAR 24 HOUR STORM HYDROGRAPH TABLE

STORM YEAR	AREA "A"	AREA "B"	AREA "C"	TOTAL
2	2.829 CFS	2.938 CFS	0.463 CFS	6.23 CFS

EXISITING ON-SITE CONDITION
100 YEAR STORM HYDROGRAPH TABLE

STORM YEAR	1 HOUR	3 HOUR	6 HOUR	24 HOUR
AREA A	35.202 CFS	23.446 CFS	20.501 CFS	6.777 CFS
AREA B	34.142 CFS	23.444 CFS	20.492 CFS	6.683 CFS
AREA C	7.061 CFS	4.910 CFS	4.296 CFS	1.397 CFS
TOTAL	76.405 CFS	51.800 CFS	45.289 CFS	14.857 CFS

PROPOSED ON-SITE CONDITION
100 YEAR STORM HYDROGRAPH TABLE

STORM YEAR	1 HOUR	3 HOUR	6 HOUR	24 HOUR
AREA A	34.672 CFS	24.264 CFS	21.285 CFS	7.442 CFS
AREA B	36.007 CFS	25.198 CFS	22.104 CFS	7.729 CFS
AREA C	6.887 CFS	4.240 CFS	3.705 CFS	1.217 CFS
TOTAL	77.566 CFS	53.702 CFS	47.094 CFS	16.388 CFS

2 YEAR 24 HOUR STORM HYDROGRAPH TABLE

	EXIST TOTAL	AREA "A"	AREA "B"	AREA "C"	PROP. TOTAL	DIFFERENCE
FLOW RATE	0.763 CFS	2.829 CFS	2.938 CFS	0.463 CFS	6.23 CFS	
VOL. TO BE DETAINED	---	62,488 CF	56,707 CF	5,176 CFS	124,371 CF	
FLOWRATE AFTER DETENTION	---	0.238 CFS	0.388 CFS	0.239 CFS	0.865 CFS	

100 YEAR 24 HOUR STORM HYDROGRAPH TABLE

	EXIST TOTAL	AREA "A"	AREA "B"	AREA "C"	PROP. TOTAL	DIFFERENCE
FLOW RATE	14.857 CFS	7.442 CFS	7.729 CFS	1.217 CFS	16.388 CFS	
VOL. TO BE DETAINED	---	71,368 CF	73,436 CF	6,187 CF	150,991 CF	
FLOWRATE AFTER DETENTION	---	7.345 CFS	7.086 CFS	1.180 CFS	15.611 CFS	

100 YEAR 6 HOUR STORM HYDROGRAPH TABLE

	EXIST TOTAL	AREA "A"	AREA "B"	AREA "C"	PROP. TOTAL	DIFFERENCE
FLOW RATE	45.289 CFS	21.285 CFS	22.104 CFS	3.705 CFS	47.094 CFS	
VOL. TO BE DETAINED	---	82,117 CF	81,544 CF	7,434 CF	171,095 CF	
FLOWRATE AFTER DETENTION	---	20.23 CFS	19.59 CFS	2.987 CFS	42.807 CFS	

100 YEAR 3 HOUR STORM HYDROGRAPH TABLE

	EXIST TOTAL	AREA "A"	AREA "B"	AREA "C"	PROP. TOTAL	DIFFERENCE
FLOW RATE	51.800 CFS	24.264 CFS	25.198 CFS	4.240 CFS	53.702 CFS	
VOL. TO BE DETAINED	---	80,519 CF	79,586 CF	7,723 CF	167,828 CF	
FLOWRATE AFTER DETENTION	---	13.16 CFS	14.56 CFS	3.485 CFS	31.205 CFS	

100 YEAR 1 HOUR STORM HYDROGRAPH TABLE

	EXIST TOTAL	AREA "A"	AREA "B"	AREA "C"	PROP. TOTAL	DIFFERENCE
FLOW RATE	76.405 CFS	34.672 CFS	36.007 CFS	6.887 CFS	77.566 CFS	
VOL. TO BE DETAINED	---	56,450 CF	57,905 CF	7,262 CF	121,617 CF	
FLOWRATE AFTER DETENTION	---	0.174 CFS	0.506 CFS	2.700 CFS	3.38 CFS	

LEGEND

- DRAINAGE SUBAREA BOUNDARY
- DRAINAGE FLOW PATH
- X / 0.74 — DRAINAGE SUBAREA DESIGNATION / DRAINAGE SUBAREA IN ACRES
- 216 — NODE NUMBER
- LANDSCAPE AREA
- STORM DRAIN PIPE

NOT FOR CONSTRUCTION

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
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CHRISTOPHER MCKEE

REGISTERED PROFESSIONAL ENGINEER — CHRISTOPHER MCKEE — No. 74414 — Exp. 6-30-19 — CIVIL — STATE OF CALIFORNIA

DATE:

NO.: REVISION:

PROJECT: K-4 PARCEL INDUSTRIAL
CACTUS AVENUE
M.P.A, CALIFORNIA

DRAWING NAME: PROPOSED HYDROLOGY MAP

ISSUE: HYDROLOGY
DATE: 5/21/18
CHECKED: CM DRAWN: WC
DRAWING FILE: 17380HMPR
PROJECT NO.: 17-380
SHEET NUMBER: 1
OF 1 SHEETS
SCALE: AS SHOWN

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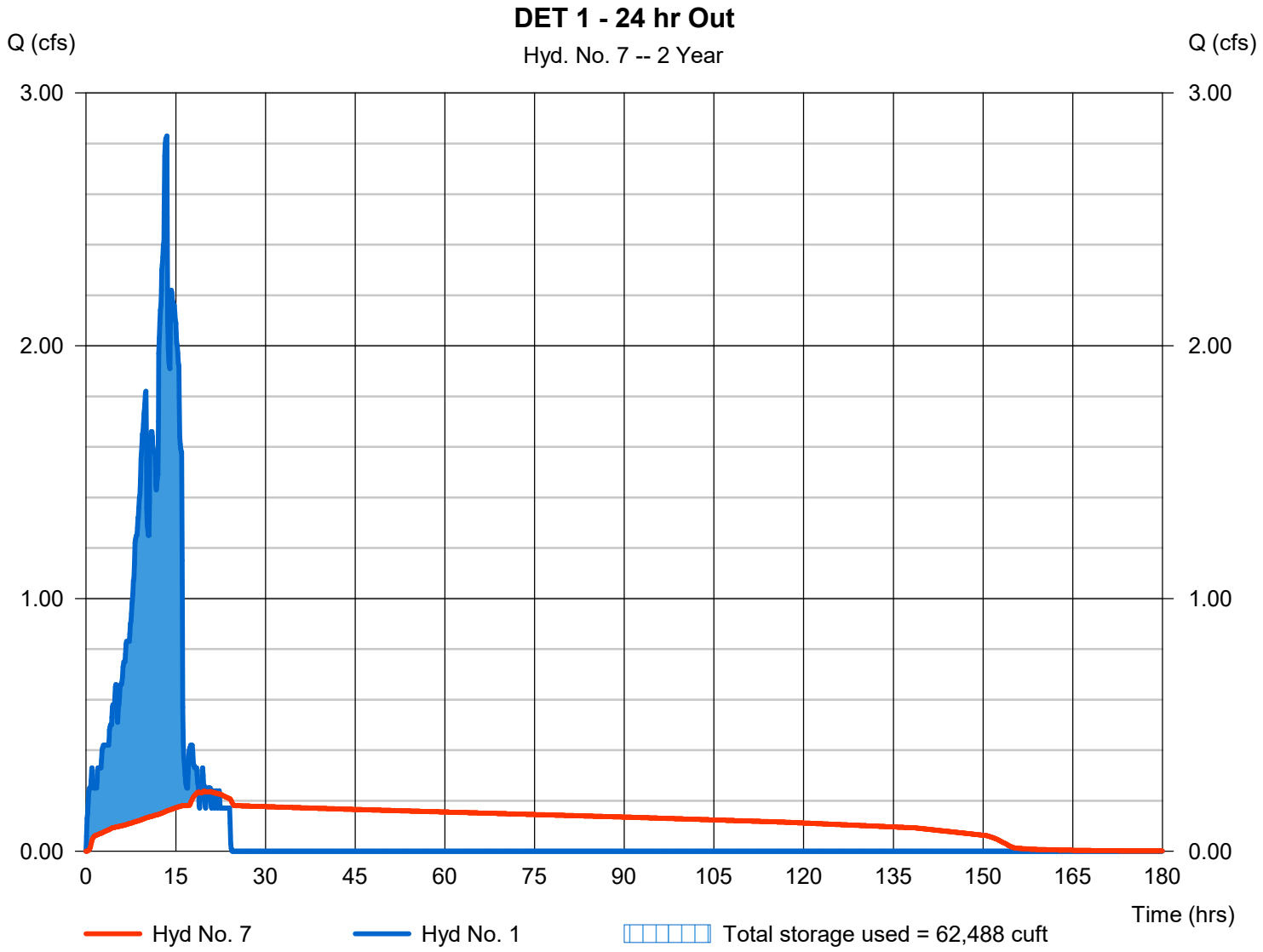
Hydrograph Report

Hyd. No. 7

DET 1 - 24 hr Out

Hydrograph type	=	Reservoir	Peak discharge	=	0.238 cfs
Storm frequency	=	2 yrs	Time to peak	=	19.83 hrs
Time interval	=	5 min	Hyd. volume	=	74,841 cuft
Inflow hyd. No.	=	1 - Drainage Area A - 24 hour	Max. Elevation	=	1551.60 ft
Reservoir name	=	DETENTION SYSTEM A	Max. Storage	=	62,488 cuft

Storage Indication method used.



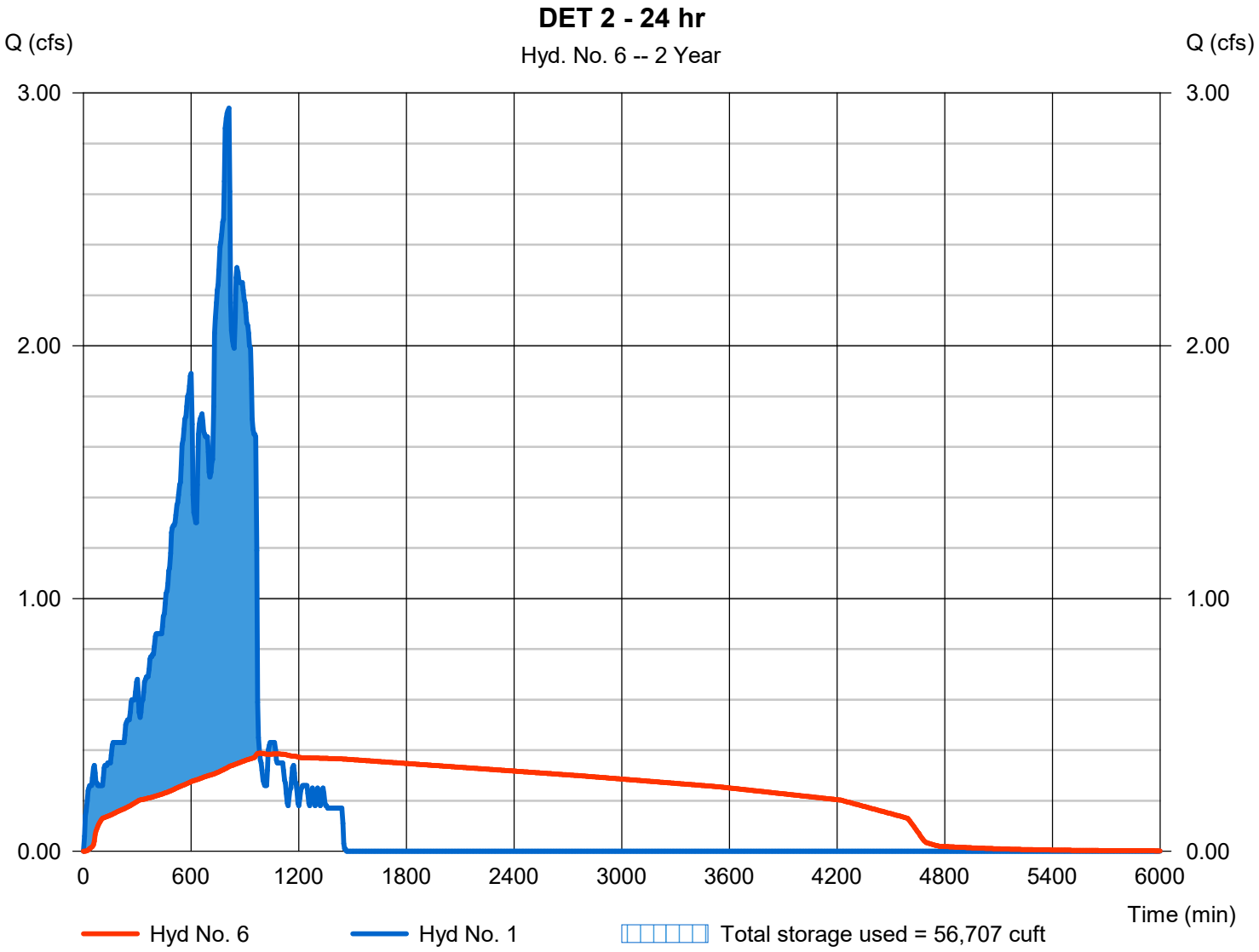
Hydrograph Report

Hyd. No. 6

DET 2 - 24 hr

Hydrograph type	=	Reservoir	Peak discharge	=	0.388 cfs
Storm frequency	=	2 yrs	Time to peak	=	980 min
Time interval	=	5 min	Hyd. volume	=	77,708 cuft
Inflow hyd. No.	=	1 - Drainage Area B - 24 hour	Max. Elevation	=	1551.11 ft
Reservoir name	=	System 2	Max. Storage	=	56,707 cuft

Storage Indication method used.



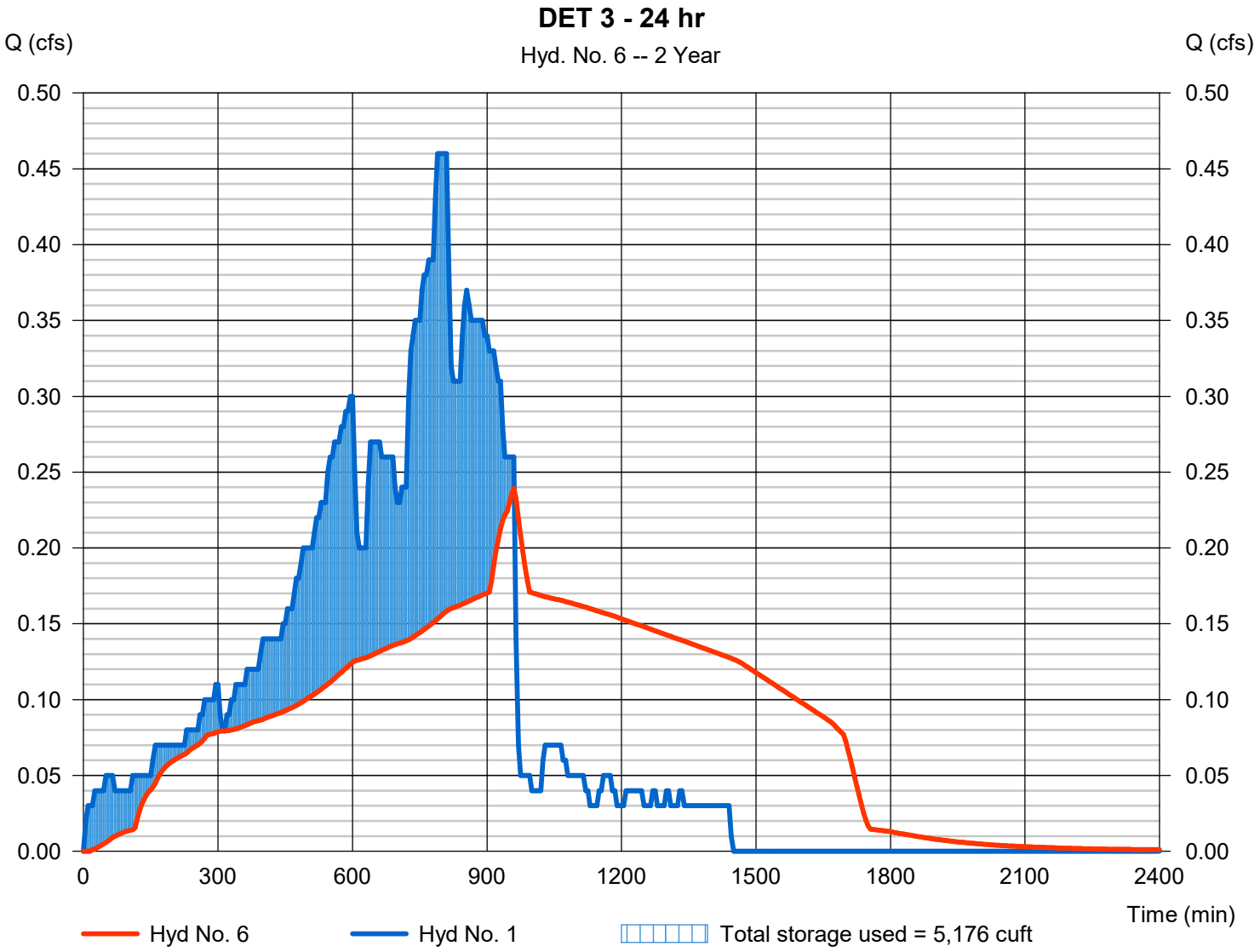
Hydrograph Report

Hyd. No. 6

DET 3 - 24 hr

Hydrograph type	=	Reservoir	Peak discharge	=	0.239 cfs
Storm frequency	=	2 yrs	Time to peak	=	960 min
Time interval	=	5 min	Hyd. volume	=	12,192 cuft
Inflow hyd. No.	=	1 - Drainage Area C - 24 hour	Max. Elevation	=	1549.73 ft
Reservoir name	=	System 3	Max. Storage	=	5,176 cuft

Storage Indication method used.



Hydromodification Susceptibility Documentation Report and Mapping: Santa Ana Region

January 18, 2017

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1 INTRODUCTION

This documentation report is part of the larger study for Riverside County Flood Control and Water Conservation District (District) to develop the Watershed Action Plan as required by the current Riverside County Santa Ana Region (SAR) Municipal Separate Storm Sewer System (MS4) Permit Order No. R8-2010-0033, NPDES No. CAS 618033 (MS4 Permit). This project includes the expansion of existing SAR maps to include lined and unlined channels and streams within the SAR Permit area with the goal of identifying those segments of existing stream channels that may be vulnerable to development impacts as required by the MS4 Permit.

1.1 Background

The Riverside SAR MS4 Permit identifies that the District and cities within the SAR (Permittees) shall develop a Watershed Action Plan (WAP) to address the entire Permit Area (see Figure 1). The District is the Principal Permittee for coordination of compliance with the MS4 Permit and is engaged in developing the components of the WAP on behalf of the Permittees. According to Section I of the MS4 Permit, as of 2006 the population of the Permit Area is approximately 1.2 million, occupying an area of approximately 1,396 square miles. The Permittees' MS4s include an estimated 59 miles of above ground channels and 75 miles of underground storm drain channels. The MS4 Permit regulates urban and stormwater runoff from the urban areas within the Santa Ana Regional Water Quality Control Board's jurisdiction, which makes up approximately nineteen percent (19.1%) of the County. All other portions of Riverside County are regulated by the San Diego or Colorado River Basin Regional Water Quality Control Boards.

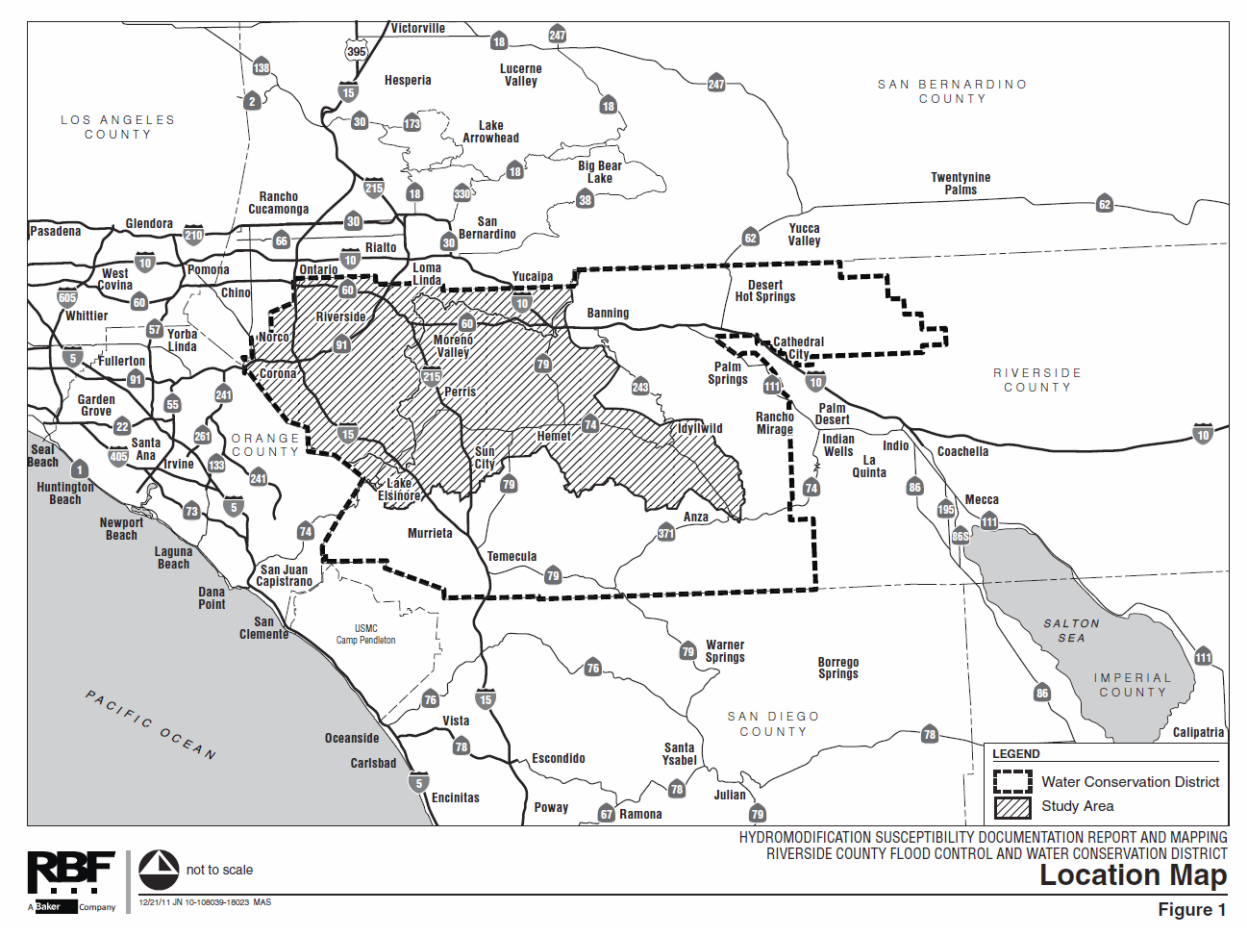
The WAP will assist the Permittees, as well as the development and environmental communities in the SAR, to integrate water quality and water conservation policies. It also encourages the capture and infiltration of stormwater into groundwater basins and the recharge of Lake Elsinore with treated runoff. According to Section XII.B of the MS4 Permit, the objective of the WAP is to address watershed scale water quality impacts of urbanization in the Permit Area associated with Urban Total Maximum Daily Load (TMDL) Waste Load Allocations (WLAs), stream system vulnerability to Hydromodification from Urban Runoff, cumulative impacts of development on vulnerable streams, preservation of Beneficial Uses of streams in the Permit Area, and protection of water resources, including groundwater recharge areas.

As part of the WAP, the Permittees are required to develop a Hydromodification Management Plan (HMP) which includes the delineation of the existing unarmored or soft-armored stream channels in the Permit Area that are identified to be vulnerable to Hydromodification from New Development and Significant Redevelopment projects.

1.2 Hydrologic Condition of Concern (HCOC)

The findings of the MS4 Permit (Section II.G) indicate that an HCOC exists when a site's hydrologic regime is altered and there are significant impacts on downstream stream channels and aquatic habitats, alone or in conjunction with impacts of other projects. Significant development has taken place in Riverside County in the last decade and urban development generally increases runoff volume, velocity, of runoff and the amount of Pollutants in the runoff.

Figure 1: Location Map



Unmitigated high volumes and velocities of discharges from MS4 facilities associated with New Development into natural watercourses from developed areas without needed controls can alter the natural rate of change of a stream and may adversely impact aquatic ecosystems and stream habitat and may cause stream bank erosion and physical modifications. These changes are the result of Hydromodification.

According to Section XII.E.9 of the Permit, a New Development and Significant Redevelopment project does not cause a HCOC if any one of the following conditions is met:

1. The project disturbs less than one acre and is not part of a common plan of development.
2. The volume and the time of concentration of stormwater runoff for the post-development condition is not significantly different from pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant). This may be achieved through Site Design and Treatment Control BMPs.
3. All downstream conveyance channels to an Adequate Sump (e.g., Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River or other lake, reservoir or natural resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity, and no sensitive stream habitat areas will be affected; or not identified in the Permittees' Hydromodification sensitivity maps required in Section XII.B, and no sensitive stream habitat areas will be affected.
4. The Permittees may request a variance from these criteria based on studies conducted by the Southern California Monitoring Coalition (SMC), Southern California Coastal Watershed Research Project (SCCWRP), California Association of Stormwater Quality Agencies (CASQA), or other regional studies.

1.3 Goals and Objectives

The goal of this study was to conduct a screening level analysis to identify and map stream channel segments that may be vulnerable to Hydromodification as required by the MS4 Permit. The purpose of mapping the susceptible stream channel segments was to develop a comprehensive map of the MS4 Permit area to assist the District, Co-Permittees, and project proponents to determine whether or not a project will drain to a potentially susceptible stream channel segment and may be subject to the HCOC requirements.

The study was divided into eight tasks:

1. Research and data collection;
2. Delineate and map existing stream channel segments;
3. Define and categorize groups of existing stream channel segments based on common characteristics;
4. Verify groups using provided data and site visits;
5. Identify an appropriate definition for an "engineered and regularly maintained" stream channel segment;
6. Conduct Susceptibility Assessment of the stream channels to identify segments that may be susceptible to Hydromodification;
7. Delineate and map existing hydrology watershed boundaries to stream channel segments that may be susceptible to Hydromodification; and
8. Create the comprehensive HCOC Applicability Map of the MS4 Permit area.

This report documents the methodologies used to determine whether an existing stream channel segment may be susceptible to Hydromodification due to future development. It discusses the delineation of the existing stream channel segments and the watershed areas in the MS4 Permit area. It also provides two

maps: Existing Stream Channel Delineation Map and HCOC Applicability Map as required by Sections II.G.10 and XII.B.4 of the MS4 Permit.

2 EXISTING CHANNEL DELINEATION MAP

This section discusses how the existing stream channels were delineated. It also discusses the grouping system used for the stream channel segments and provides the Existing Stream Channel Delineation Map, see Map 1.

2.1 Research and Data Collection

Data requests were provided to the Permittees (see Table 1) to assist in the collection of background data needed for the delineation of existing channels. The information collected from the Permittees included: aerial photographs, topography, as-built plans, Geographic Information System (GIS) data bases, drainage studies, Federal Emergency Management Agency (FEMA) floodplain studies, and more. The data provided by the Permittees was reviewed and verified for accuracy.

Table 1: Permittees

Principal Permittee	RCFC&WCD (District)	
Co-Permittees	1. Beaumont	9. Lake Elsinore
	2. Calimesa	10. Menifee
	3. Canyon Lake	11. Moreno Valley
	4. Corona	12. Norco
	5. County of Riverside	13. Perris
	6. Eastvale	14. Riverside
	7. Hemet	15. San Jacinto
	8. Jurupa Valley	

2.2 Delineation of Existing Stream Channels

The goal of this task was to delineate all regional stream channels (above and below ground) within the Permit Area. Local stream channels were also mapped if it was found pertinent to determining if a subwatershed drained to a stream channel segment potentially vulnerable to Hydromodification or if "all downstream conveyance channels to an Adequate Sump that will receive runoff from the project" are not vulnerable to Hydromodification.

The existing stream channels were predominately delineated using the District's GIS shapefile called: RCFC_FACILITIES_LINE. This shapefile provided GIS linework for all District above and below ground stream channels. Below ground stream channels are channel segments that convey stormwater in underground drainages structures. Typical underground drainage structures are made of reinforced concrete, corrugated metal, or material of equivalent shear resistance.

Additional stream channels were delineated using GIS shapefiles provided by the Co-Permittees and National Hydrography Dataset (NHD). This additional data was used to fill in gaps found in heavily urbanized and natural areas.

The shapefiles were verified through an investigation of as-built plans and aerial photography. Some stream channel delineations were added solely based on the aerial photography investigation. Any stream channel delineations in question were verified by site visits.

2.3 Existing Stream Channel Groups

To complete the initial mapping, the existing stream channels were categorized into five groups to better describe the individual stream channel segments by common traits. The groups are described below:

1. **Engineered, Fully Hardened and Maintained (EFHM):** This group includes constructed facilities that are fully armored (e.g., concrete, soil cement, riprap rock, etc.) on three sides and verified by as-builts, aerial photographs and/or a site visit. This group includes piped and boxed stream channel segments. The facility must also be maintained and designed based on an engineering criteria (e.g., a specific storm event.)

2. **Engineered, Partially Hardened and Maintained (EPHM):** This group includes constructed facilities that have some armoring (e.g., concrete, soil cement, riprap rock, turf reinforcing mats, etc.) on less than three sides and verified by as-builts, aerial photographs and/or a site visit. The armoring can include bank and/or invert lining that has been placed based on engineering criteria. The facility must also be maintained.

3. **Engineered, Earthen and Maintained (EEM):** This group includes constructed facilities that do not contain armoring but have been engineered to be stable systems and are verified by as-builts. The facility must also be maintained. This group is intended to be channel segments constructed for flood conveyance, which generally have a design capacity in excess of a 10-year storm event.

4. **Not Engineered and Earthen (NEE):** This group includes constructed facilities that are modified by anthropogenic activities, which may include floodplain encroachments by development, culverts, bridges, privately owned bank and/or invert stabilization (such as riprap or other forms of bank protection, roads, etc.) and other man-made modifications to the natural channel system that are not necessarily continuous or designed to meet any specific engineering standard, but have modified the natural hydrologic characteristics of the facility. The improvements may or may not be maintained.

5. **Natural (NAT):** This group includes stream channel facilities that are in a natural state, where the geometry has not been modified. The stream channel facility may or may not be maintained.

2.4 Categorization of Existing Stream Channel Groups

A desktop study was conducted to categorize each individual stream channel segment into one of the above groups. The desktop study included an examination of as-built plans and aerial photography. The segments that were in question were field verified. Field verification included visiting an accessible location along the segment of stream channel. Photographs and notes were taken in regards to the stream channel segment condition and armoring.

Any stream channel facilities that could not be accessed and/or were still in question were discussed and verified with the Permittee with jurisdictional responsibility for the facility.

3 SUSCEPTIBILITY ASSESSMENT

This section discusses the definition for an "engineered and regularly maintained" stream channel and the characteristics of stream channels that are identified to be not susceptible to adverse impacts from Hydromodification.

3.1 Definition for "Engineered and Regularly Maintained"

To satisfy Condition iii from Section XII.E.9.b of the MS4 Permit (refer to Section 1.2 of this Report), an "engineered and regularly maintained "stream channel must be defined. The basic definition is a stream channel facility constructed for storm water conveyance that is owned and maintained by a responsible agency and is not susceptible to adverse impacts from Hydromodification, but a more comprehensive definition is hard to establish because it is subjective. After careful consideration, this study has combined the five stream channel groups (EFHM, EPHM, EEM, NEE, and NAT) into two categories: Potentially Susceptible and Not Susceptible to Hydromodification. The groups themselves can then be used as the term's definition.

The five groups were combined into the two categories as shown below:

1. Not Susceptible

    a. EFHM – The risk for adverse impacts caused by Hydromodification is insignificant due to the armoring of the stream channel segment and the engineered design which would prevent erosion and degradation of the channel.

    b. EPHM - The risk for adverse impacts caused by Hydromodification is very low due to the partial armoring of the stream channel segment and the engineered design which would significantly lower the risk of erosion and degradation of the channel.

    c. EEM - The risk for adverse impacts caused by Hydromodification is low due to the engineered design of the stream channel segment which would lower the risk of erosion and degradation of the channel.

2. Potentially Susceptible

    a. NEE – It cannot be verified that the stream channel segment could handle the changes in runoff volume and duration associated with New Development or Significant Redevelopment without degradation. The risk for adverse impacts caused by Hydromodification is potentially significant. Future technical studies could determine the level of risk of Hydromodification in individual stream channel segments.

    b. NAT – The findings of the MS4 Permit indicate that these stream channel segments are vulnerable to Hydromodification resulting from runoff from New Development or Significant Redevelopment. The risk for adverse impacts caused by Hydromodification is potentially significant. The level of risk may be determined through future technical studies.

3.2 Adequate Sump

An Adequate Sump is a river, reservoir, or basin that provides significant regional flood protection for the downstream watershed areas and mitigates flows such that any New Development or Significant Redevelopment project upstream will not cause a significant change in the downstream flow conditions.

The MS4 Permit identifies Prado Dam, Lake Elsinore, Canyon Lake, and the Santa Ana River as Adequate Sumps.

The Permittees reserve the right to add additional facilities if they are identified to meet the above definition of an Adequate Sump. Mystic Lake, and Lake Matthews have been identified as reservoirs and basins that meet the Adequate Sump criteria. In the future, additional updates to the associated maps may be required in order to reflect the identification of additional Adequate Sumps.

3.3 San Jacinto River

Based on the hydrology assessment and analysis of the 3.8 mile reach of the San Jacinto River upstream of Canyon Lake, it has been determined that the San Jacinto River is a natural resistant feature that exhibits the following characteristics:

- Drainage area higher than 100 square-miles and a 100-year peak discharge higher than 20,000 cfs;
- The natural hydrology and sediment loading of different watercourses within the SAR are significantly impacted by the upstream impoundments, which regulate downstream flow;
- Permittees participate in the National Flood Insurance Program and enforce a floodplain management ordinance to regulate development in mapped flood hazard areas; and
- The low-gradient of this segment of the San Jacinto River are results in deposition of coarse-grained sediments.

Under the existing and future hydrologic conditions, there will be no scouring of the bed and bank of the stream. The additional lines of evidence show that the San Jacinto River is not an HCOC:

- The river has a flat slope and a wide alluvial floodplain;
- A review of historical aerial photographs did not identify lateral migration of the streambed, even though historical urbanization has occurred;
- The production of bed sediment occurs in the San Jacinto Mountain, thus future development in the alluvial floodplain will not impact the production and conveyance of bed sediment to the downstream reaches;
- Field observations did not identify erosion within the bed and banks of the channel. Deposition of sediment within the streambed indicated that the stream exhibits aggradation;
- Dense vegetation is present within the streambed, particularly within the low-flow channel. The vegetation provides a higher resiliency to erosive forces.
- Bed sediment is composed of coarse sand and very fine gravel, which are typical in an alluvial floodplain environment. The bed is predominantly composed of very fine gravel (D50 = 6mm), which provides a high resiliency to erosive forces; and
- The rapid stream assessment concluded that the 3.8-mile segment has a low-risk for future erosion.

The San Jacinto Assessment and is included as Attachment A.

4 APPLICABILITY CRITERIA

This section describes the HCOC applicability criteria and discusses the methodology for determining watershed areas where HCOC requirements may be applicable. The results of the HCOC Applicability Assessment are used to develop a comprehensive map of the MS4 Permit area which identifies those areas that are tributary to potentially susceptible stream channel segments and where runoff from New Development or Significant Redevelopment may cause a HCOC. The HCOC Applicability Map (see Map 2) provides a delineation of the potentially susceptible stream channel segments and the watershed areas that are applicable to the HCOC requirements.

4.1 Delineation of Existing Hydrology Watershed Boundaries

The existing hydrology watershed boundaries were delineated using a desktop approach. The NHD GIS shapefile called: NHDArea, provided GIS linework for the Santa Ana River Basin watershed. The NHD data was compared with Drainage Area Plans and GIS data provided by the Permittees (drainage areas and local system storm drain data) and USGS topography.

The watershed boundaries were simplified using the collected data to delineate areas tributary and adjacent to stream channel segments that are not potentially susceptible to Hydromodification.

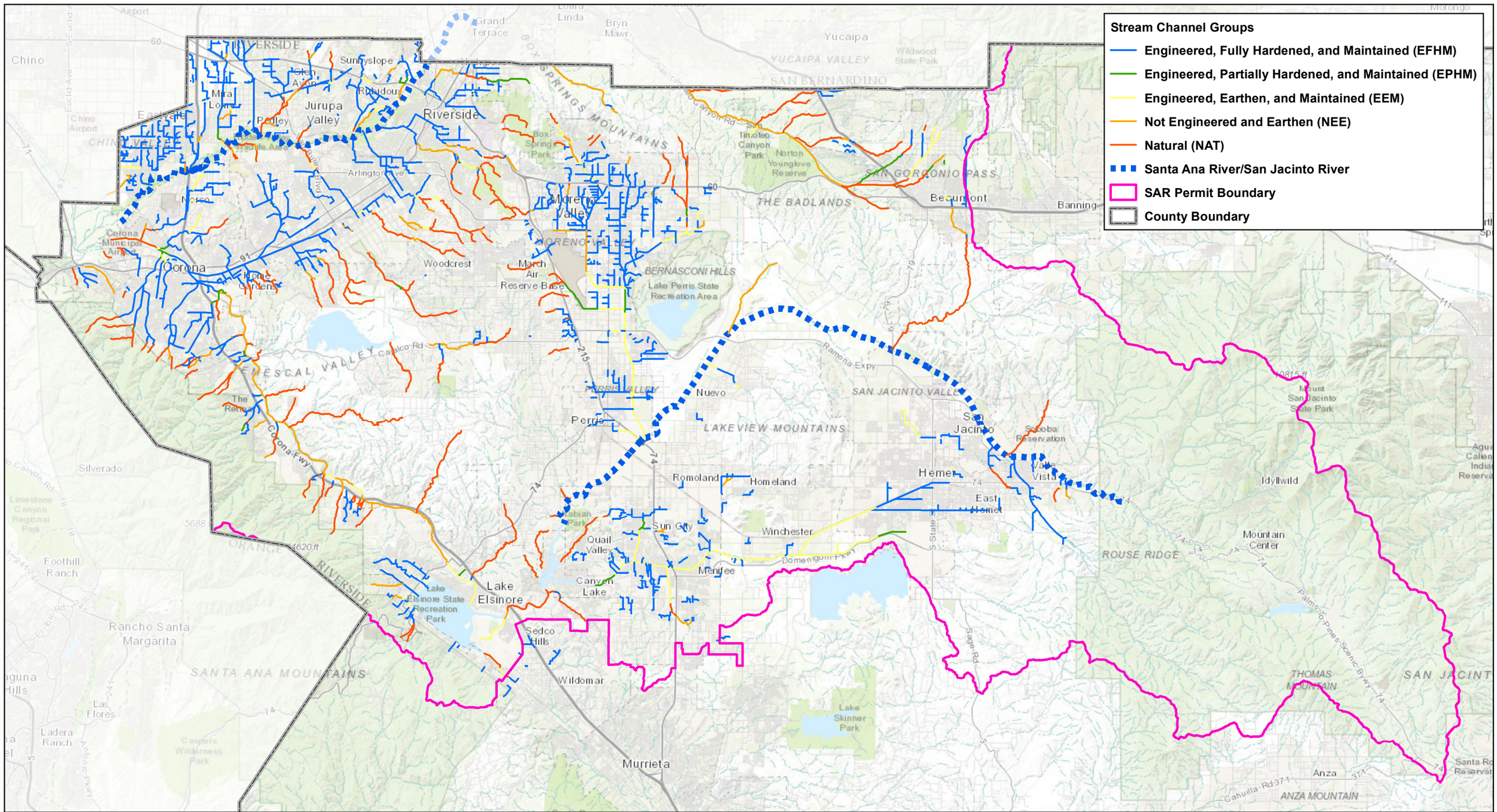
4.2 HCOC Applicability Map

The Permit Area has been divided into two different watershed areas: Applicable and Not Applicable. The Not Applicable watershed areas would potentially be excluded from the HCOC requirements. New Development and Significant Redevelopment projects in the "applicable areas" shall continue to determine applicability in accordance with the HCOC requirements in Section XII.E.9 of the MS4 Permit.

- Applicable Watershed Areas – Watershed areas that drain to susceptible stream channels, where future New Development and/or Significant Redevelopment projects may adversely impact downstream erosion, sedimentation, or stream habitat by increasing the volume and/or duration of storm runoff.
    - Susceptible stream channels include watershed areas tributary to:
        - Non-Engineered, Earthen Stream Channels (NEE); and
        - Natural Stream Channels (NAT).
    - New Development and Significant Redevelopment projects that are located within an Applicable Watershed Area should reference the HMP or WQMP for the specific qualifying criteria to meet the HCOC requirements.
- Not Applicable Watershed Areas - Watershed areas that drain directly to an Adequate Sump (e.g., Santa Ana River, Lake Elsinore, Canyon Lake, and Prado Dam) or naturally resistant feature such as the San Jacinto River (see Section 3.3) via a drainage facility that is not susceptible to Hydromodification.
    - Not Susceptible drainage facilities fall under the term "Engineered and Regularly Maintained" per the Permit and includes:
        - Engineered, Fully Hardened and Maintained Drainage Facilities (EFHM);
        - Engineered, Partial Hardened and Maintained Drainage Facilities (EPHM); and
        - Engineered, Earthen and Maintained Drainage Facilities (EEM).

- For New Development or Significant Redevelopment projects in a Not Applicable watershed area, if the site does not drain directly to a mapped stream channel, then the project must show that all downstream conveyance channels to the mapped segment are "engineered and regularly maintained" facilities. Refer to the HMP or WQMP for the specific qualifying criteria to meet the HCOC requirements.

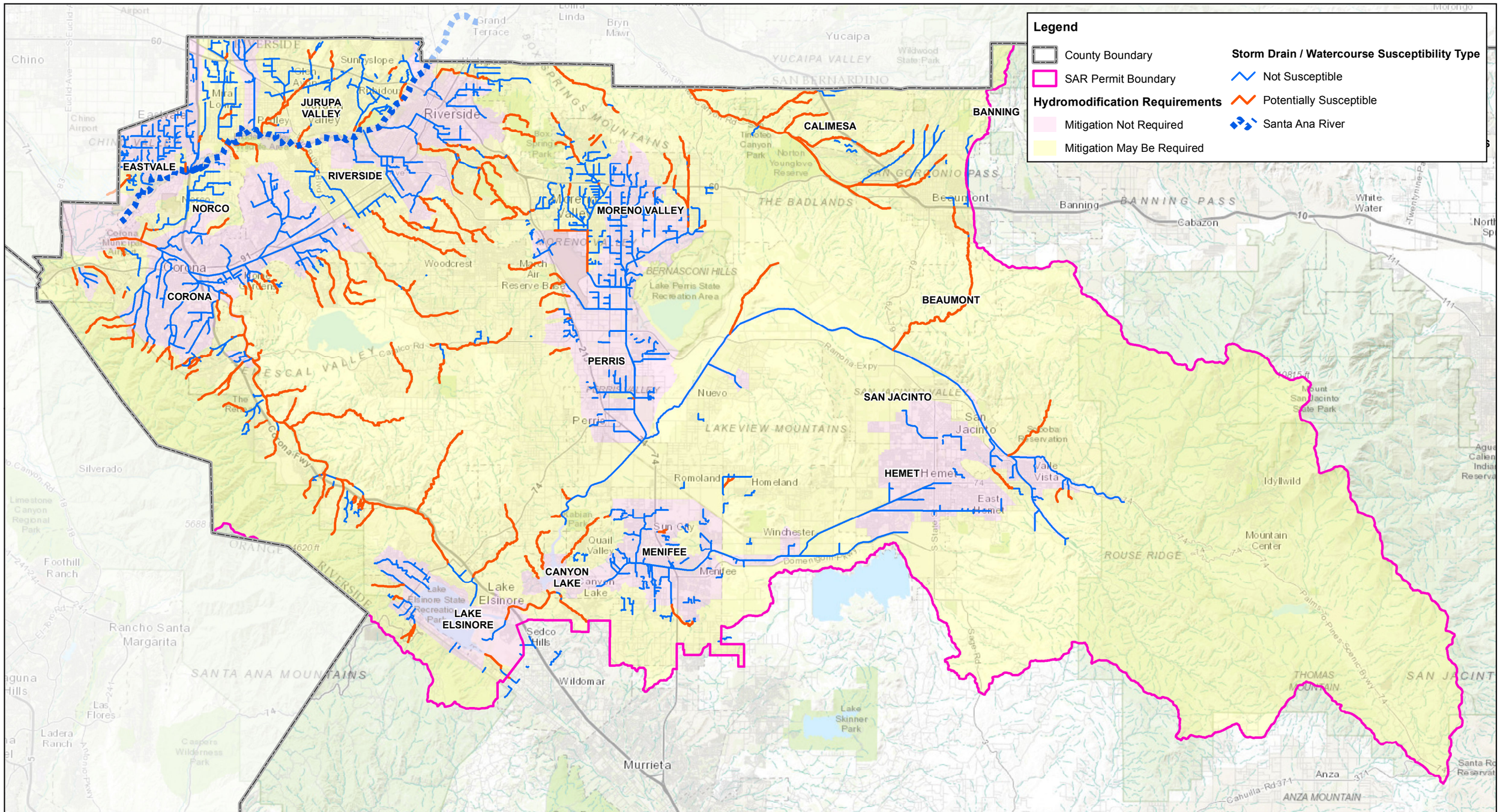
MAP 1



Existing Storm Drain / Watercourse Delineation Map
SAR Permittees

Map 1

MAP 2


Legend
County Boundary
SAR Permit Boundary
Hydromodification Requirements
Mitigation Not Required
Mitigation May Be Required
Storm Drain / Watercourse Susceptibility Type
Not Susceptible
Potentially Susceptible
Santa Ana River
EASTVALE
JURUPA VALLEY
RIVERSIDE
NORCO
CORONA
MORENO VALLEY
PERRIS
CALIMESA
BANNING
BEAUMONT
SAN JACINTO
HEMET
MENIFEE
CANYON LAKE
LAKE ELSINORE
Riverside
Corona
Moreno Valley
Perris
Hemet
Beaumont
Banning
Menifee
Lake Elsinore
Murrieta
Wildomar
Temecula
Canyon Lake
Sun City
Quail Valley
Romoland
Homeland
Nuevo
Winchester
Idyllwild
Mountain Center
Cabazon
White Water
Woodcrest
Foothill Ranch
Rancho Santa Margarita
Ladera Ranch
Las Flores
Silverado
Limestone Canyon Regional Park
Lake Elsinore State Recreation Park
Lake Skinner Park
Lake Perris State Recreation Area
March Air Reserve Base
Box Spring Mountains
Bernasconi Hills
Lakeview Mountains
San Gorgonio Pass
The Badlands
Rouse Ridge
Thomas Mountain
Anza Mountain
Santa Ana Mountains
Yucaipa Valley
San Jacinto Valley
Temescal Valley
Riverside
San Bernardino
Orange
Chino
Yucaipa
Grand Terrace
Loma Linda
Bryn Mawr
Redlands
Calimesa
Norton Younglove Reserve
Tinoteo Canyon Park
Box Spring Park
Sycamore Canyon Park
Mount San Jacinto State Park
Santa Rosa Plateau Reserve
Agua Caliente Indian Reservation
Soboba Reservation
Pechanga Reservation
Sedco Hills
Sunnyslope
Mira Loma
Rubidoux
Pedley
Eastvale
Cajalco Rd
Ramona Expy
Temescal Canyon Rd
Palms to Pines Scenic Byway
Cahuilla Rd
Domenigoni Pkwy
Scott Rd
Goetz Rd
Antelope Rd
Clinton Keith Rd
Newport Rd
Winchester Rd
Cherry Valley Blvd
Sky Canyon Dr
Limonite Ave
Mission Blvd
Van Buren Blvd
Central Ave
Magnolia Ave
Euclid Ave
Chino Airport
Corona Municipal Airport
Riverside Municipal Airport
Hemet-Ryan Airport
Elsinore Valley Municipal Airport
Perris Valley Airport
Flabob Airport
Anza
Idyllwild
Valle Vista
East Hemet
Mount San Jacinto
Santa Rosa Reservation
Ramona Expy
Cajalco Rd
Temescal Canyon Rd
Domenigoni Pkwy
Scott Rd
Goetz Rd
Antelope Rd
Clinton Keith Rd
Newport Rd
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Riverside Municipal Airport
Hemet-Ryan Airport
Elsinore Valley Municipal Airport
Perris Valley Airport
Flabob Airport
Anza
Idyllwild
Valle Vista
East Hemet
Mount San Jacinto
Santa Rosa Reservation
N
0
2.5
5
10
Miles
Updated February 2017
HCOC Applicability Map
SAR Permittees
Map 2

Attachment A

San Jacinto River Study

September 16, 2016
Submitted by:
Santa Ana Region MS4 Permittees

1 INTRODUCTION

The Upper San Jacinto Subwatershed is located on the northeast portion of the SAR. The headwaters of the San Jacinto River originate in the San Jacinto Mountains of San Bernardino County. The downstream point of the Upper San Jacinto Subwatershed is at the confluence of Bautista Creek, Poppet Creek, and the San Jacinto River in the city of San Jacinto. The subwatershed drainage area to this confluence encompasses 190 square miles. The upper portion of the San Jacinto River flows through the San Bernardino National Forest and unincorporated land of Riverside County. The upper portion of the San Jacinto River is about 23 miles long and ranges from the outlet of Lake Hemet and the confluence herein specified.

The middle and lower San Jacinto subwatershed is located within the central part of the Santa Ana River (SAR) watershed. The downstream point of the lower San Jacinto subwatershed is the outlet of Lake Elsinore. The drainage area of the middle and lower San Jacinto subwatershed encompasses 510 square miles (approximately 700 sq. miles including the upper subwatershed). The combined middle and lower segments of the San Jacinto River are 35 miles long. Major tributaries to the subwatershed include Potrero Creek, Perris Valley Channel, and Salt Creek Channel. The San Jacinto River flows through the cities of San Jacinto, Perris, Menifee, Canyon Lake, and Lake Elsinore. The upper and middle and lower subwatershed areas are included in Figure 1 below.

The findings of the municipal separate storm sewer system (MS4) Permit (Section II.G) indicate that a Hydrologic Condition of Concern (HCOC) exists when the hydrologic regime of a Priority Development Project (PDP) site is altered resulting in hydromodification of downstream channels and aquatic habitats, alone or in conjunction with impacts of other PDPs.

The San Jacinto River is an example of the following:

- The *Flood Insurance Study: Riverside County, California and Incorporated Areas* (Federal Emergency Management Agency (FEMA), 2014) reports a 100-year 24-hour peak discharge of 24,500 cubic-feet per second and a 692 square-mile watershed at Canyon Lake Spillway;
- The natural hydrology and sediment loading of the San Jacinto River is significantly modified by the reservoirs and Lakes, which provide significant peak flow attenuation and control the sediment discharge. These impoundments include Lake Hemet, Mystic Lake (due to continued subsidence increasing the storage capacity), Canyon Lake, Lake Elsinore (due to reconfiguration of the Lake) and a number of federal and locally built facilities.
- Lower gradients are observed in the San Jacinto River downstream of the existing Army Corps Levee, downstream of the confluence with Bautista Creek to Canyon Lake (less than 0.001 feet/feet). The low-gradient of the San Jacinto River results in deposition of coarse-grained sediments.
- The San Jacinto River exhibits a wide floodplain as illustrated in Figure 6. This floodplain is managed by the Permittees through floodplain management ordinances consistent with the requirements of the National Flood Insurance Program.
- Finally, the SAR is located within the Peninsular Zone per the California Geological Survey. The geology of the Peninsular Zone is characterized by the granitic rocks intruding the older metamorphic rocks, which contributes to the erosion and deposition of coarse-grained sediment

within the San Jacinto River. The San Jacinto River Watershed exhibits similar macro-scale geomorphic trends as the watersheds of Large Rivers within San Diego County.

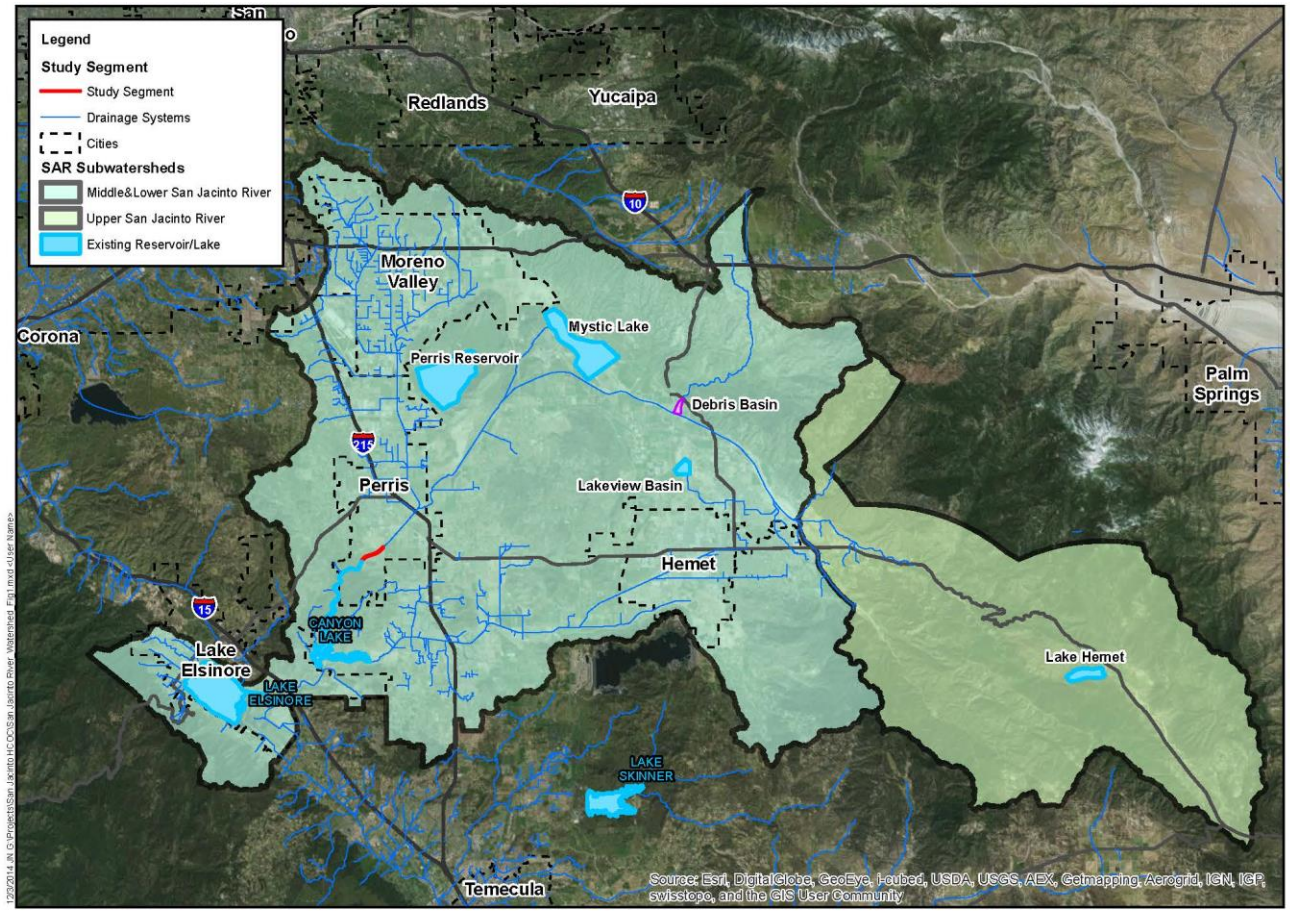
At the request of the Santa Ana Regional Water Quality Control Board (Santa Ana Regional Board), a stream stability study for the 3.8-mile segment of the San Jacinto River upstream of Canyon Lake was performed (Figure 1) to show that the San Jacinto River is not an HCOC. The reach is representative of the conditions observed along the San Jacinto River, downstream of the confluence with Bautista Creek. The analysis demonstrates that both drainage and stream characteristics provide a basis to exempt the San Jacinto River from the HCOC mitigation requirements.

Investigations included:

- A thorough understanding of the hydrology of the San Jacinto River and its hydraulic infrastructure;
- A review of the sediment processes within the watershed by performing a Geomorphic Landscape Units (GLU) analysis as recommended by Southern California Coastal Watershed Research Project (SCCWRP);
- A review of historical aerial photographs, 1962-2010, depicting the geomorphological evolution of the stream segment, along with adjacent urbanization;
- Field observations of channel morphology, vegetation, bed sediment, and signs of channel degradation if any, at three field assessment sites that are representative of the conditions observed along the 3.8-mile segment;
- A review of both bed sediment and vegetation cover, in terms of resiliency to scouring, at three field assessment sites;
- A Rapid Stream Assessment (RSA) characterizing the future risk for channel degradation.

Figure 1 shows the location of the 3.8 mile study reach and watershed boundaries.

Figure 1 - Watershed Map



2 HYDROLOGY & GEOMORPHICALLY SIGNIFICANT FLOWS

Lake Hemet is the major water storage facility within this subwatershed. The dam was established in 1895 downstream of the Garner Valley Basin and operates on the principles of water supply. In addition to regulating the flow rate downstream the dam acts as a major debris basin.

Mystic Lake provides regulation of flow in the middle and lower San Jacinto River. Mystic Lake is a 200-acre ephemeral lake in the San Jacinto Valley that lies parallel to the San Jacinto River. The lake acts as a natural sump where flows from the San Jacinto River flow into the lake area during moderate to high storm events. Information provided by the Riverside County Flood Control and Water Conservation District (District) indicates that an earthen levee near Mystic Lake was constructed to contain low-flows (5-year storm events and below) within the San Jacinto River channel. Lower frequency events overtop the levees and flow into Mystic Lake. The Application for a Letter of Map Revision (LOMR) for a portion of the San Jacinto River was prepared for submittal to FEMA (Webb, 2010). The LOMR identifies that, when there is significant flooding into the San Jacinto River, flows will "break out" of the low flow channelization of the river and flow towards Mystic Lake. A relatively small amount of runoff is allowed to flow along the channel to the south. Once Mystic Lake is full, storm runoff flows around the small hill that is in the middle of the floodplain. The San Jacinto River comes back together near Davis Road, and flows then progress downstream towards Railroad Canyon. Flood flows recharge the San Jacinto Wildlife Area Waterfowl sites located on the southeastern parts of Mystic Lake's bed (California Department of Fish and Wildlife Project).

Other physical modifications that affect flow include the construction of the California Interstate 215 Freeway Bridge over the San Jacinto River, which constricts flow creating a backwater condition upstream of the Railroad Canyon Gorge. The existing bridge and culvert crossing have a relatively small conveyance capacity compared to the 100-year flow rate of the San Jacinto River. The road embankment causes a significant backwater upstream of Ramona Expressway. This backwater extends over several thousands of acres into the Mystic Lake area. Within this backwater is a significant storage area that can attenuate peak flows (and corresponding water surfaced elevations) downstream of Ramona Expressway (Webb, 2010).

The stream discharges along San Jacinto River were obtained from FEMA and the District. Table 1 summarizes the 10 year and 100-year peak discharges measured on the San Jacinto River. The peak flow rate along the study reach is in excess of 24,500 cfs for a 100-year storm event. This flow rate exceeds previous standards that have been used to exempt streams from Hydromodification requirements throughout the state. The peak discharges reported in the 2014 Flood Insurance Study were computed on the assumption that Mystic Lake is full, to conservatively ensure the level of flood protection required by the District enrollment in the National Flood Insurance Program.

Table 1 – 2014 Flood Insurance Study Peak Discharge

River Name	Concentration Point	Drainage Area	100-year Flow Rate	10-year Flow Rate
		(sq. mi)	(cfs)	(cfs)
San Jacinto River	At Canyon Lake Spillway	692	24,500[1]	1,200[1]

San Jacinto River	At Escondido Freeway (I-215)	509	22,403[1]	8,737[1]

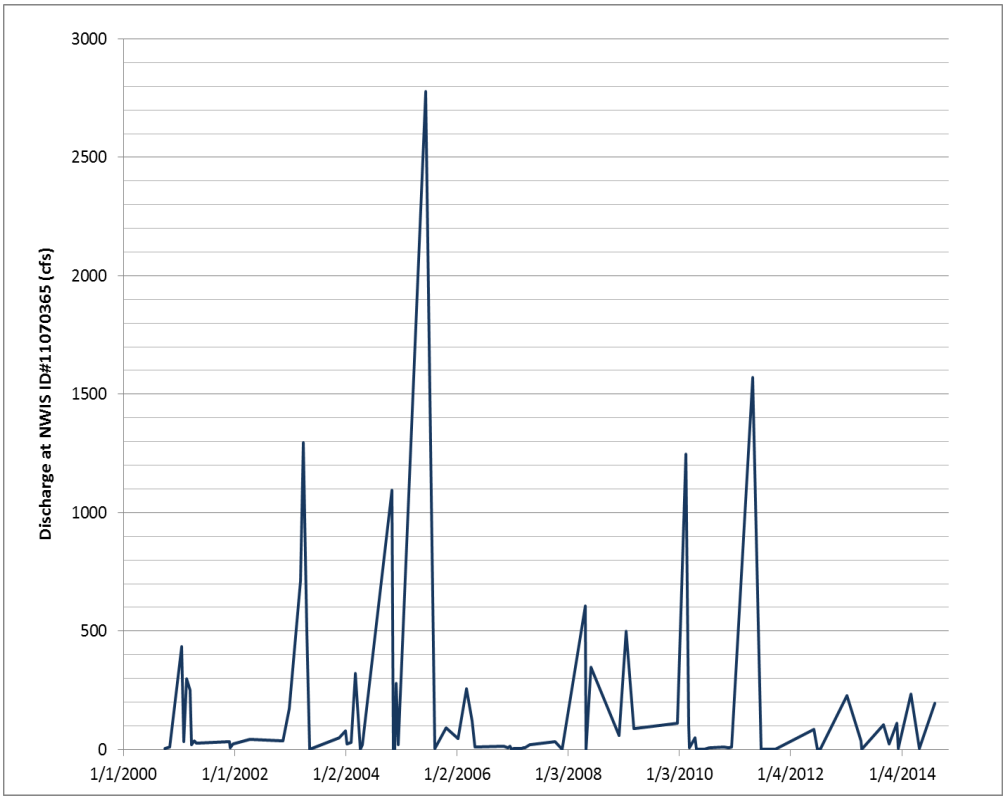
1 – 2014 FEMA Flood Insurance Study

An evaluation of USGS Streamgage 11070365, located 2,900 feet downstream of Goetz Road on the San Jacinto River, was performed to characterize the actual peak discharges resulting from the engineered levees in the San Jacinto River adjacent to Mystic Lake, the backwater effects caused by the Ramona Expressway bridge and culvert, while not hypothetically assuming that Mystic Lake is full. Limited available data at USGS Streamgage 11070365 extends from October 01, 2000 to November 07, 2014. The maximum discharge observed at the streamgage was approximately 2,780 cfs in December 2005.

A Flood Frequency Analysis (FFA) was performed on daily discharges at gage #11070365. The FFA assumed partial duration series, a 48-hour interval separating two independent events, and the Cunnane plotting position. The assumptions are consistent with FFAs performed on streams in Southern California for flood events that are more frequent than the 10-year flood event. The 2-year discharge and the 10-year discharge equaled 544 cfs and 1,658 cfs, respectively. These actual peak discharges are used as the basis for assessing the resiliency of bed and banks to erosive forces in Section 7.

The selection of the 2-year discharge and 10-year discharge is supported by the current state of the science on hydromodification in Southern California. The 2-year discharge has been identified as the dominant discharge by Leopold (1964), i.e. which performs the most work cumulatively on the channel that may result in channel degradation and serves as the basis to the SAR HMP. Additional studies have identified the range of geomorphically-significant flows, i.e. the range of flows that perform 95-percent of the cumulative work on the channel (10-percent of the 2-year discharge to the 10 year discharge). Conservatively, hydraulic computations and the rapid stream assessment of this stream stability study are based on the upper boundary of the range of geomorphically-significant flows, i.e. the 10-year discharge. The construction of Lake Hemet, the operation of historical levees to the San Jacinto River adjacent to Mystic Lake, and the backwater effects caused by the Ramona Expressway bridge all play a major part in attenuating flows into the lower reach of San Jacinto River as seen on the flow records at the streamgage(s) of Figure 2.

Figure 2 - USGS Gage #11070365



3 SEDIMENT DISCHARGE

The evaluation of the sediment discharge along the study reach was prepared using the guideline developed by SCCWRP entitled "Hydromodification Screening Tools: GIS-Based Catchment Analyses of Potential Changes in Runoff and Sediment Discharge" dated March 2010. The report states that three factors were found to exert the greatest influence on the variability of sediment production rates in a watershed:

1. Geology Types;
2. Land Cover; and
3. Hillslope Gradient

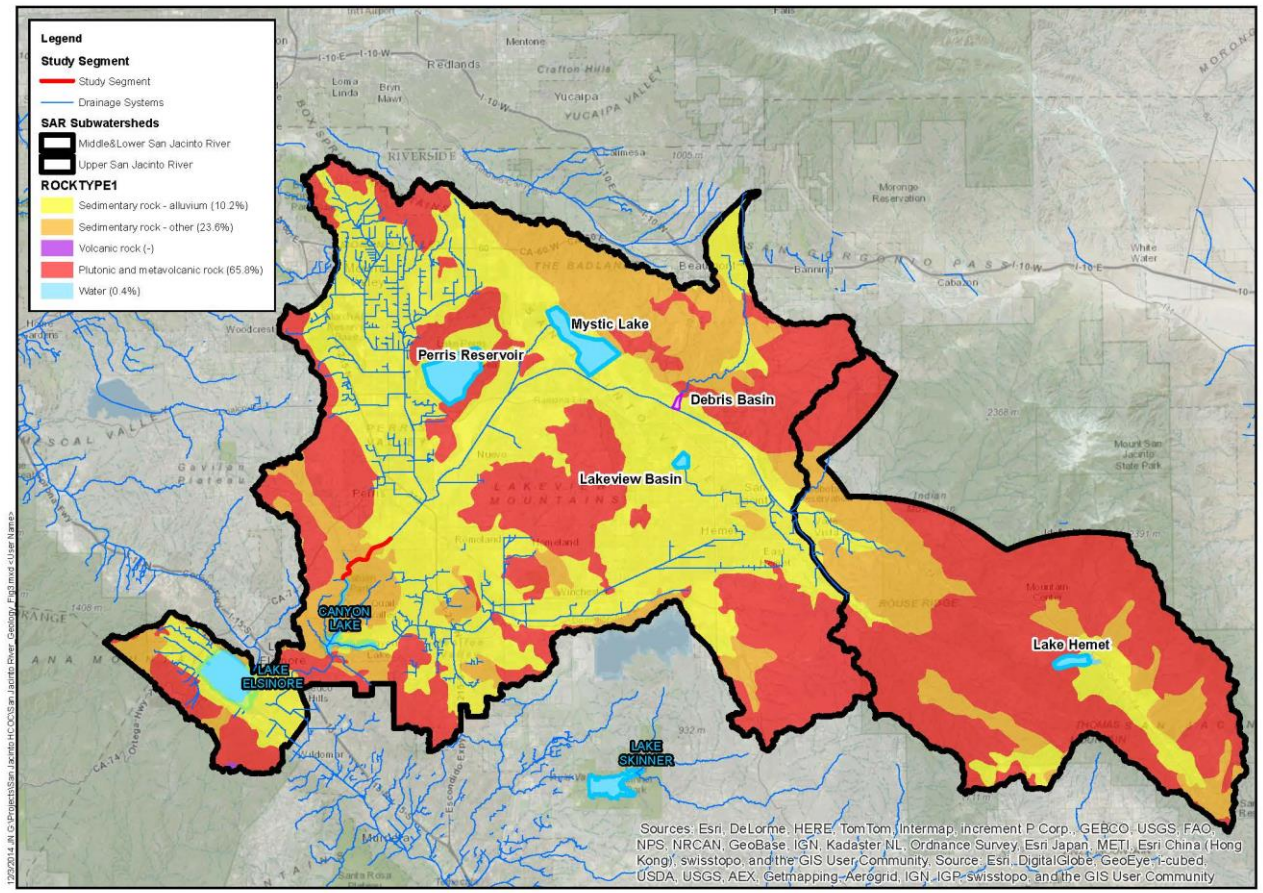
The SCCWRP report used the three factors to create GLUs. In this study the factors were investigated separately.

3.1 Geology Type

The Upper San Jacinto River Subwatershed is dominated by plutonic and metavolcanic rocks (65.8%) in the upper reaches. Lower reaches of the upper San Jacinto River subwatershed, as well as the Lake Hemet plateau, are for the most part made of sedimentary rock, including alluvium, gneiss, argillite, and sandstone. Sedimentary rocks have the highest relative potential for erosion. The presence of Lake Hemet contributes to the capture of coarse grained sediments detached from reaches upstream of the Lake; the clear reservoir outflow increases the potential for erosion along the lower reaches.

The soils present within the middle and lower San Jacinto River valley consist primarily of sedimentary rocks (67.6%). Sedimentary rocks notably account for 50.7% of alluvium and have the highest relative potential for erosion. Plutonic and metavolcanic rocks account for 32.4% of soil types within the middle and lower subwatershed, notably on the Santa Rosa Hills and the Lakeview Mountains that are in proximity to the San Jacinto River. The soil types in the San Jacinto River watershed are illustrated in Figure 3.

Figure 3 - San Jacinto River Watershed Geology Types

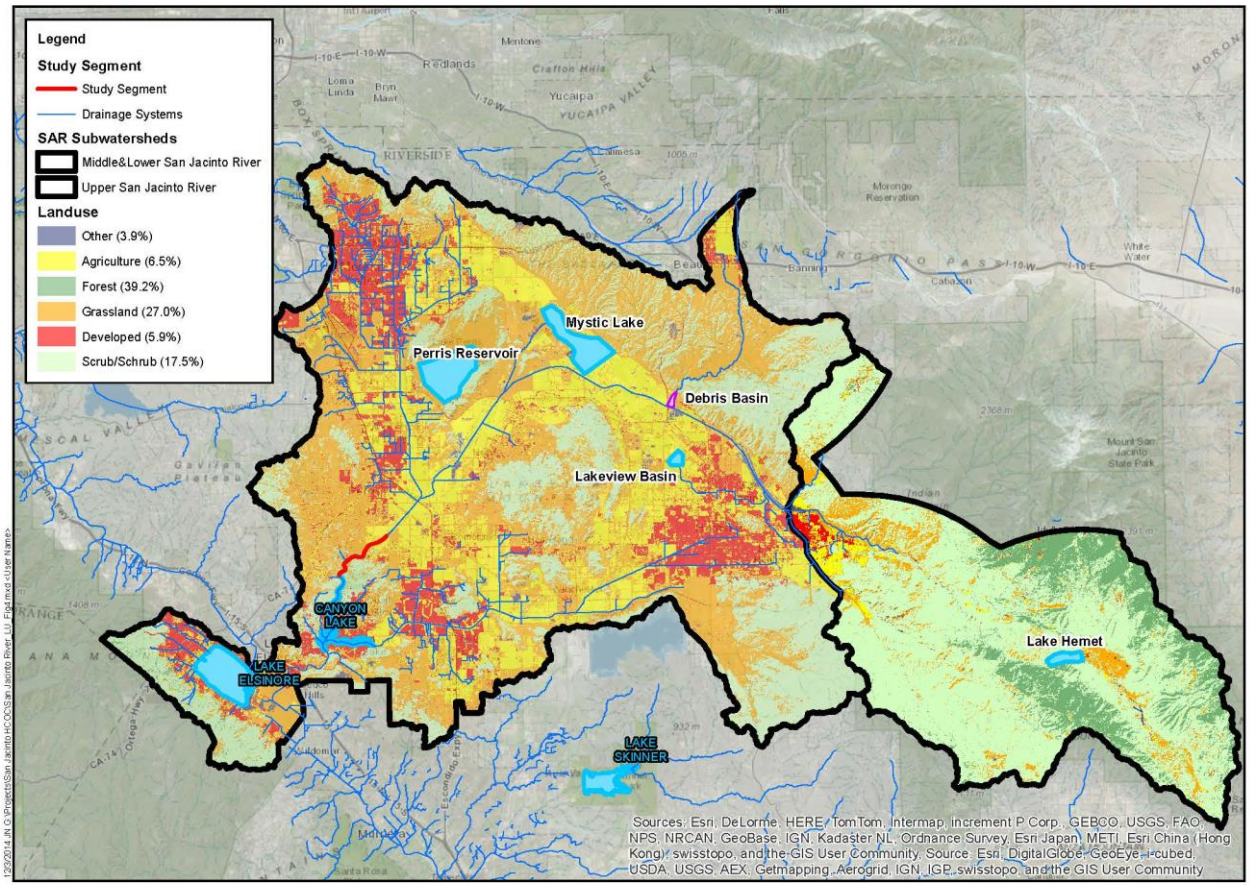


3.2 Land Uses

Urbanization potentially leads to reduced sediment supply to a receiving channel, increased runoff discharge and volume, and decreased infiltration. The development of several communities within the subwatershed tributary to the study segment has resulted in an increase in the imperviousness and associated increase in the frequency and flow experienced in the channel. Areas of urban land use (31.6% of the middle and lower San Jacinto River subwatershed) are concentrated within Moreno Valley, the Hemet area down gradient from the Santa Rosa Hills, Menifee and Canyon Lake, as well as the northwest side of Lake Elsinore. Agriculture and grassland remain the predominant land uses within the lowlands of the middle and lower subwatershed, constituting more than 49.1% of the area. Aerial photographs confirmed that several segments of the San Jacinto River have been channelized to convey runoff from the observed urban development.

The Upper San Jacinto Subwatershed is for the most part undeveloped. Valle Vista, along with pockets of development in the upper reaches of the subwatershed, account for 5.9% of the entire drainage area located within Riverside County. Undeveloped areas include forest (39.2%), scrub/shrub (17.5%), grassland (27.0%), and agriculture (6.5%). The low levels of development have contributed to the maintenance of the natural hydrologic response of the subwatershed. The land use types in the San Jacinto River watershed are illustrated in Figure 4.

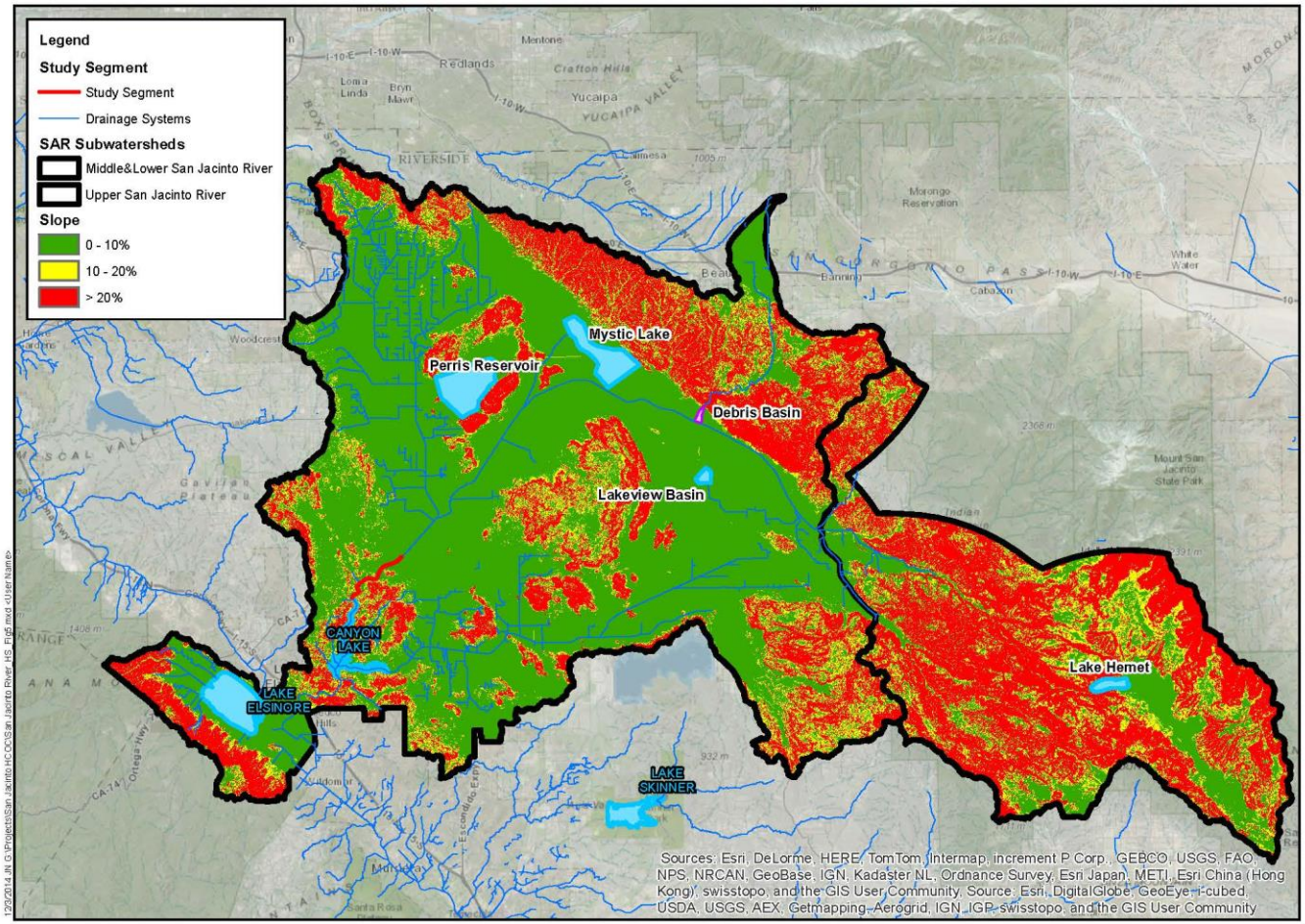
Figure 4 - San Jacinto River Watershed Land use Types



3.3 Hillslope Gradient

The subwatershed areas with a hillslope gradient greater than 21% provide the highest potential for erosion. These areas are concentrated on the upper reaches of the San Jacinto River near the San Jacinto Mountains, the Santa Rosa Hills, the Lakeview Mountains, and the Santa Ana Mountains surrounding Lake Elsinore. Majority of the middle and lower subwatershed has a hillslope gradient of 0-10% and has a lower potential for sediment production. While the majority of the developed land is located in the lower sediment production areas, the construction of the impoundments mentioned in section 1 have effectively obstructed a majority of the coarse sediment produced in high yield areas from reaching the downstream watercourse. The hillslope gradients for the San Jacinto River watershed are illustrated in Figure 5.

Figure 5 - San Jacinto River Watershed Hillslope Gradients



RBF CONSULTING
A Baker Company

0 1 2 4 Miles

Source:

SAN JACINTO RIVER
WATERSHED HILLSLOPE GRADIENT
FIGURE 5

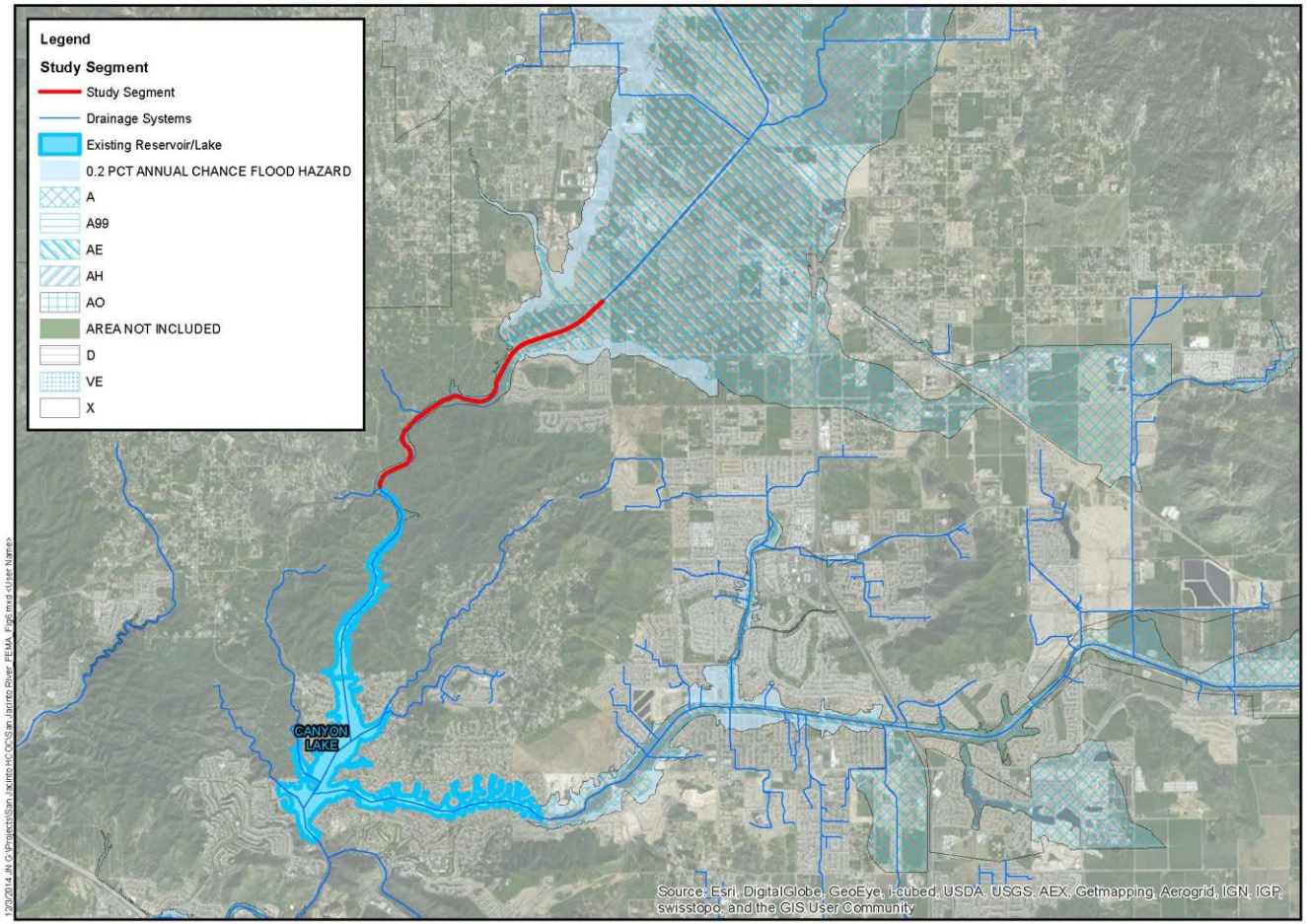
3.4 Sediment Assessment

Most of the sediment within San Jacinto River watershed is produced by the upper watershed where open space land use and steeper slopes are predominant. Most of the sediment produced is captured by Lake Hemet, Mystic Lake, I-215 Freeway Bridge, and a number of federal and locally built facilitates and therefore a small fraction is transported downstream to the lower and middle reaches of the river.

4 CHANNEL FLOODPLAIN

A review of the FEMA Flood Insurance Study (FIS),effective Flood Insurance Rate Maps (FIRMs) dated 08/18/2014 and historical FIRMs dated, 04/15/1980, 11/20/1996, and 08/28/2008 for the study segment indicate little to no change in the floodplain limits. Portions of the floodplain have been revised based on improvements that allow for new development along the study segment.

Figure 6 - FEMA Floodplain (FIRM 06065C2032G, 06065C2055H)



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0 0.5 1 2 Miles

Source:

SAN JACINTO RIVER
FEMA Floodplain
FIGURE 6

5 HISTORICAL EVOLUTION & LATERAL MIGRATION

A qualitative overview of historical movement and trends was conducted using a sequence of historical aerial photographs (1962-2010), focusing on the planimetric form and relative width as well as the encroachment of urban development and agricultural operations. The results of this historical assessment identified the channel shape as remaining consistent, with no lateral migration being observed.

The 2013 Riverside County Progress Report (RCTLMA, 2013) identifies that significant housing development has occurred within the San Jacinto River watershed between 1980 and 2013. For instance, housing has increased by a factor of 5 and a factor of 6 in the City of San Jacinto and in the City of Perris, respectively. Between 1980 and 2014, the historical aerials do not show any significant lateral migration. As illustrated in Figure 7, there is some lateral migration of the channel, which can be attributed to the ortho-rectification of the historical aerial photographs and the angle at which they were taken. Figure 8 shows that both the width of the stream and the distance to the reference marks have not changed over time.

Historical aerial photographs also show no noticeable erosion on the bed and banks of the channel. In addition, the vegetation within the streambed has remained dense and consistent over time along the study reach. Historical aerial photographs are included in Appendix A.

Figure 7 - Historical Streambank Comparison

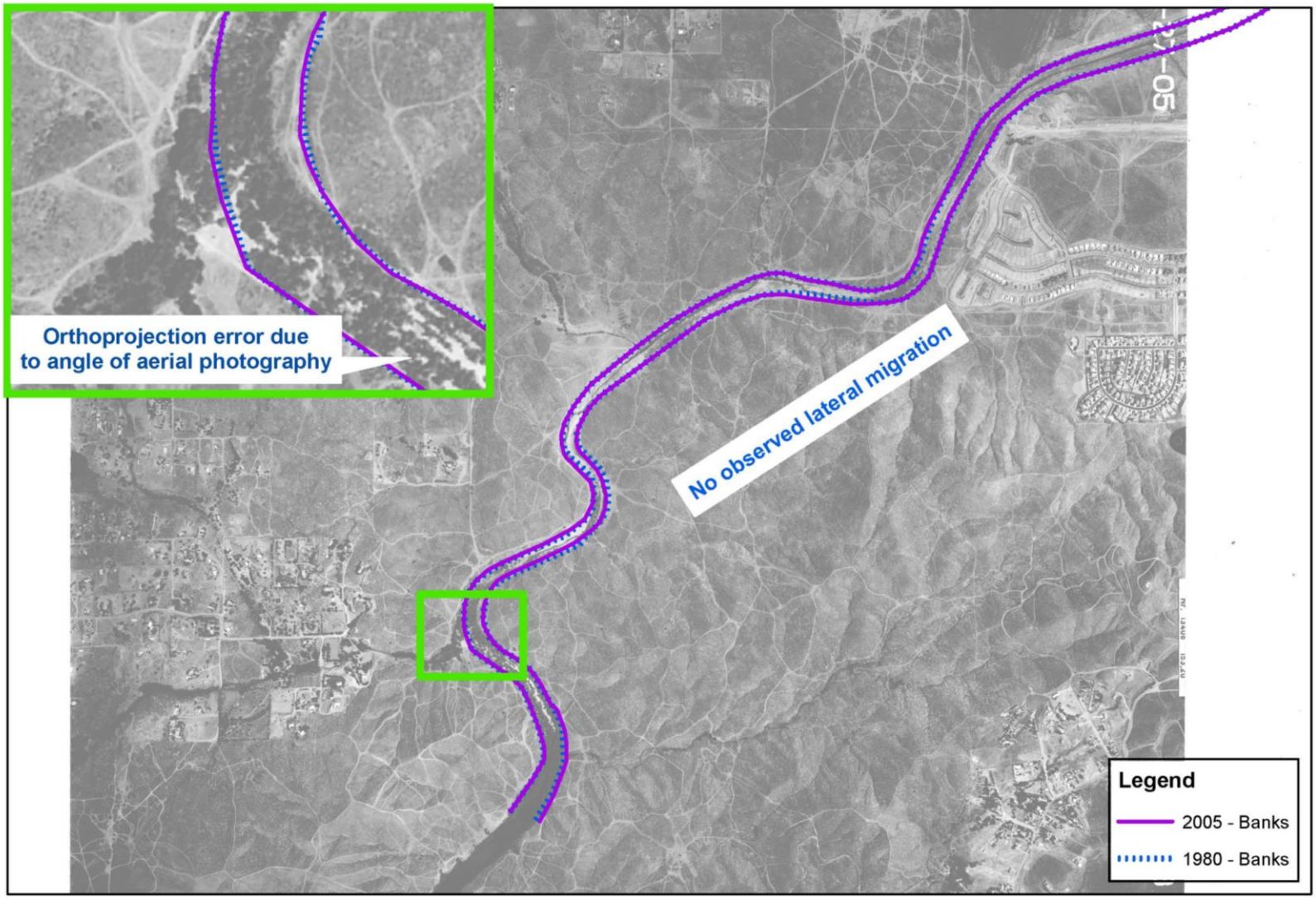
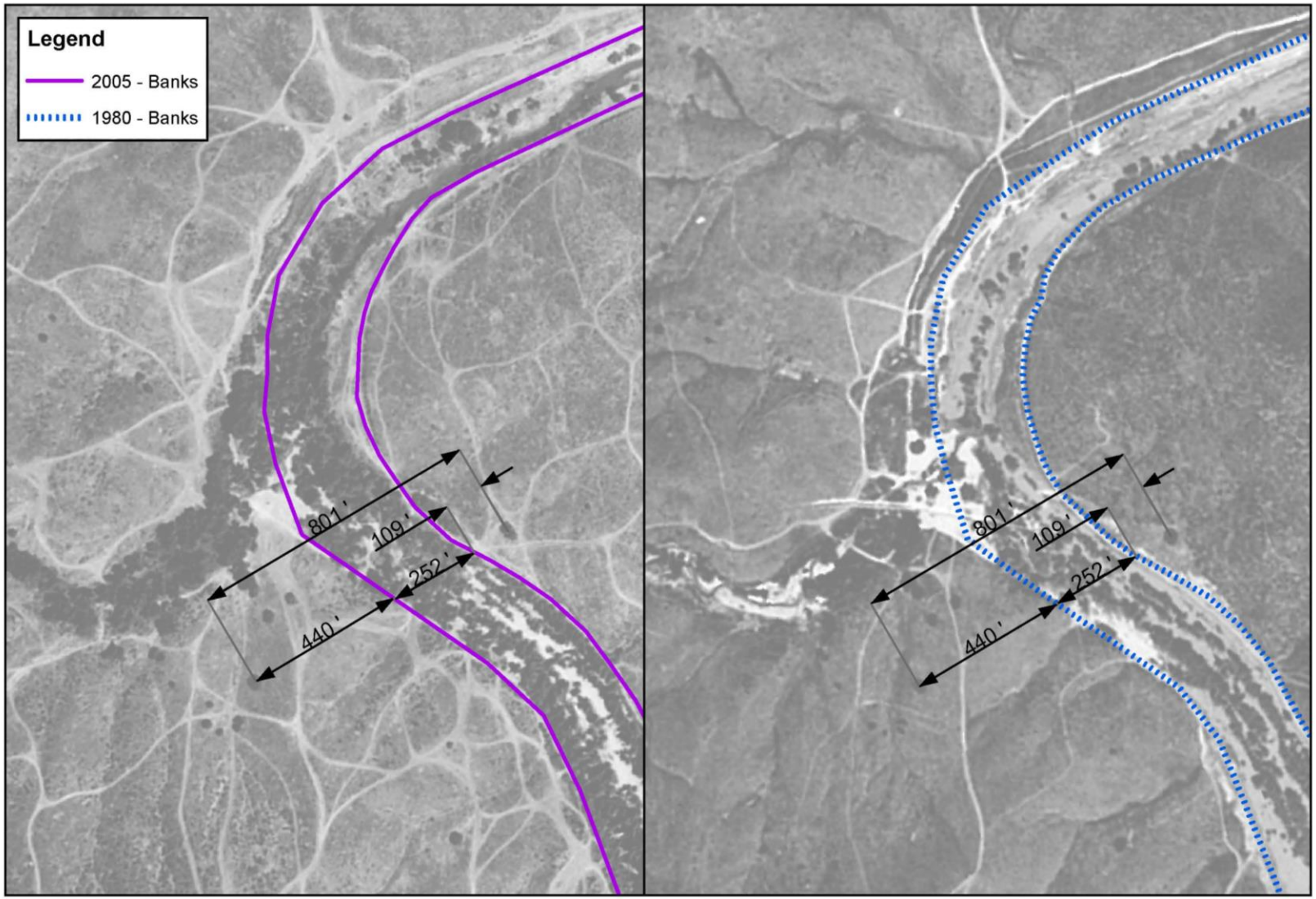


Figure 8 - No Lateral Migration



6 FIELD ASSESSMENT

A field assessment was conducted at three sites within the study segment to show that the San Jacinto River is not an HCOC. The geomorphologic condition of the stream segment is based on channel platform/planform and stream features.

The lower San Jacinto River is a meandering channel. Meandering channels act as a natural grade control feature by elongating the channel length and decreasing the slope. The channel slope for the study segment is approximately 0.02%. As the water meanders energy is lost and velocities reduced.

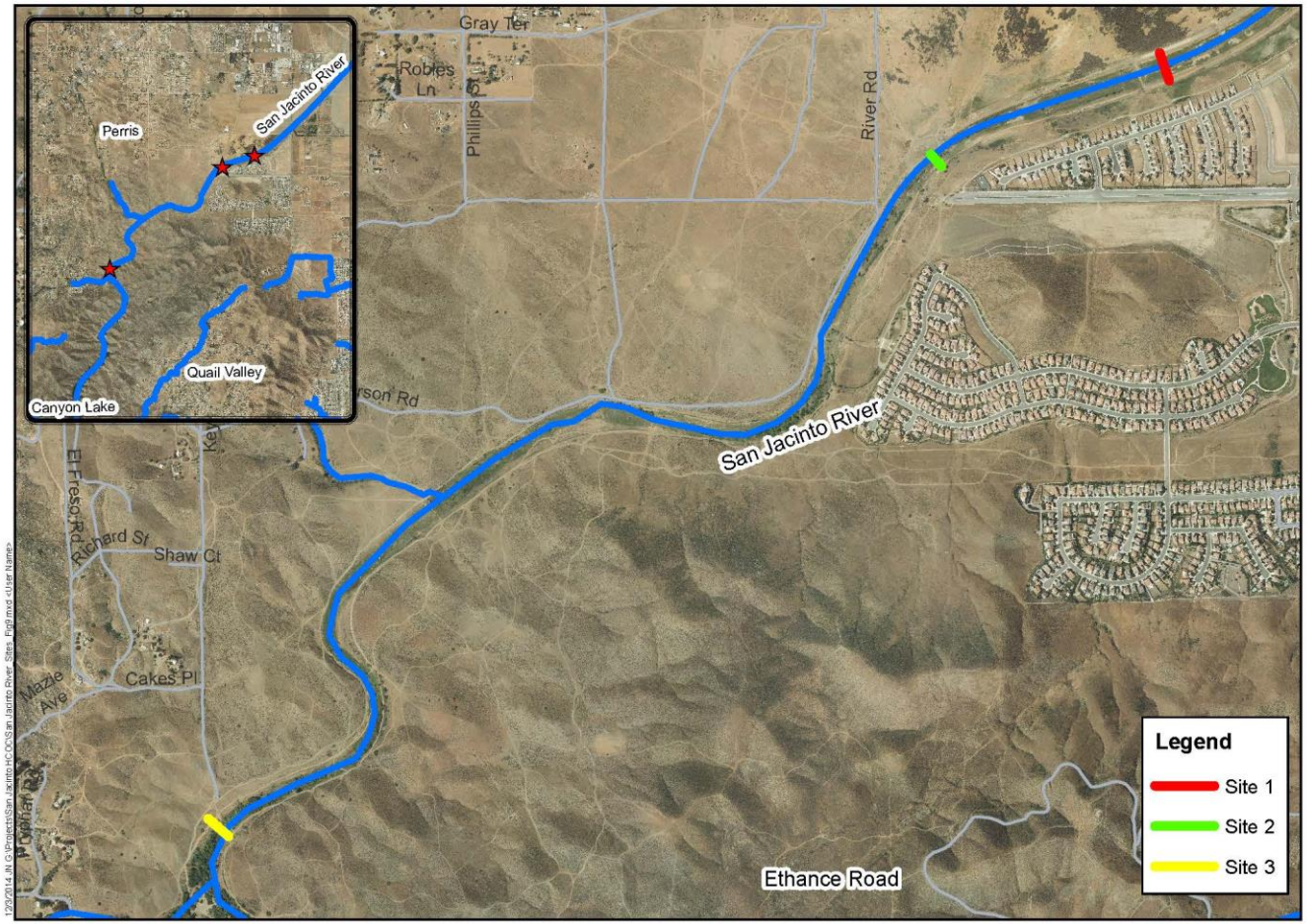
As part of the development of the Canyon Lake community, the upper 1.4-mile of the study segment was improved prior to 1980 to provide 100-year flood protection to the community adjacent to the left bank of the San Jacinto River. The improvements included straightening of a wide and flat channel, construction of a levee on the left bank, establishment and maintenance of vegetation, and creation of a low-flow channel of dense vegetation. Both field assessment sites 1 and 2 are within a segment of improved channel.

Field assessment site 3 is 2.4-mile downstream of field assessment site 2. At this location, the San Jacinto River flows through a canyon of defined topography, meanders, and includes tall and dense vegetation.

The three field assessment sites were selected as they are representative of the conditions found along the 3.8-mile stream segment. Below is a description of the field observations made at each of the field assessment sites.

Figure 9 shows the location of the field assessments.

Figure 9 – Field Assessment Locations



Site 1: The channel at this field assessment site shows no signs of headcutting or channel incision. The channel is fairly vegetated with grass, and trees have grown within the low-flow channel. This location is 3,000 feet downstream of Goetz Road. There is a dip crossing roadway 200 feet downstream of this location. These features act as a hard point and resist erosive forces which help with channel stabilization. The channel width is approximately 200-ft with a bank height of approximately 20-ft. The site location is along an engineered earthen section/levee. The low-flow channel at this location has a capacity of approximately 150 cfs.



Vegetation on the channel banks



Low Flow channel – Looking upstream



Looking downstream at dip crossing

Site 2: This field assessment site is located within the segment of improved channel. There is no active erosion or headcuts visible, the channel is moderately vegetated and the toe of the natural channel bank is in good condition. There is a dip crossing roadway 2,500-foot upstream of this site location. This feature could act as a grade control by reducing the stream slope and flow velocity. The channel bottom width is approximately 130-ft with a height of approximately 25-ft. The low-flow channel is approximately 15-ft wide by 5-ft high. The low-flow channel at this location has a capacity of approximately 340 cfs.

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Low-flow channel looking upstream</td>
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Moderately uniform vegetation.</td>
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Channel bed</td>
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Channel Banks</td>
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Site 3: This field assessment site contains some bedrock features along with dense vegetation. There are limited signs of toe erosion along the channel bank (less than 0.5'). The bed sediment is composed of coarser sediment (D50 = 6 mm), as determined by a pebble count analysis. The channel width is uniform at this location. Low-flow channels are braided and separated by tall trees and dense vegetation, although the dominant discharge will submerge the entire bed uniformly. The low-flow channel at this location has a capacity of approximately 870 cfs.



Left bank looking upstream – wide floodplain



Coarse material along low-flow channel invert



Coarse material along low-flow channel invert



Dense vegetation along channel

7 BANKS AND STREAMBED ASSESSMENT

7.1 Bank conditions

Channel banks are a significant parameter in determining channel resistance to erosion. Based on the field assessment and desktop aerial study the reach of the San Jacinto River consists of earthen banks with moderate to dense vegetation. Vegetation typically plays a major role in river mechanics which include flow resistance, strengthening of channel banks and restricting sediment. The study reach is 60%-90% covered with vegetation.

Field observations did not identify any noticeable erosion at the three locations along the streambed or on the banks, with the exception of a minimum toe erosion (less than 0.5 feet) of the low flow braided channel at Field Assessment Site 3. The dense and established vegetation provides resiliency to stresses engendered by geomorphically-significant flows. In addition, the field observation identifies coarse bed sediment at field assessment site 3.

Bed sediment deposition was observed in the low-flow channel at the three field assessment sites, and is an indication of potential aggradation of the bed profile.

Table 2 – San Jacinto River Bank and streambed conditions

Field Assessment Site	**1**	**2**	**3**
	Bank Conditions		
Bedrock	No	No	No (gravel in low flow bed)
Bank protection	Good (Vegetated)	Good (Vegetated)	None
Vegetation	Dense (60 to 90%)	Dense (60 to 90%)	Dense (40 to 60%)
Stratification	No	No	No
Bank erosion	None	None	None
Toe erosion	None	None	None
	Streambed Conditions		
Headcuts	No	No	No
Degradation	No	No	Less than 0.5’ in low flow channel
Downstream hardpoint	Yes (dip crossing)	No	No

Sediment source	No	No	Yes

7.2 Sediment Composition and Allowable Velocity

The watershed soil characteristics were established to assess the erosion potential incorporating vegetative/land cover and soil. Surface pebble count was performed on October 20, 2014 at the three field assessment sites and found that the channel invert consisted of sand to medium cobble particles.

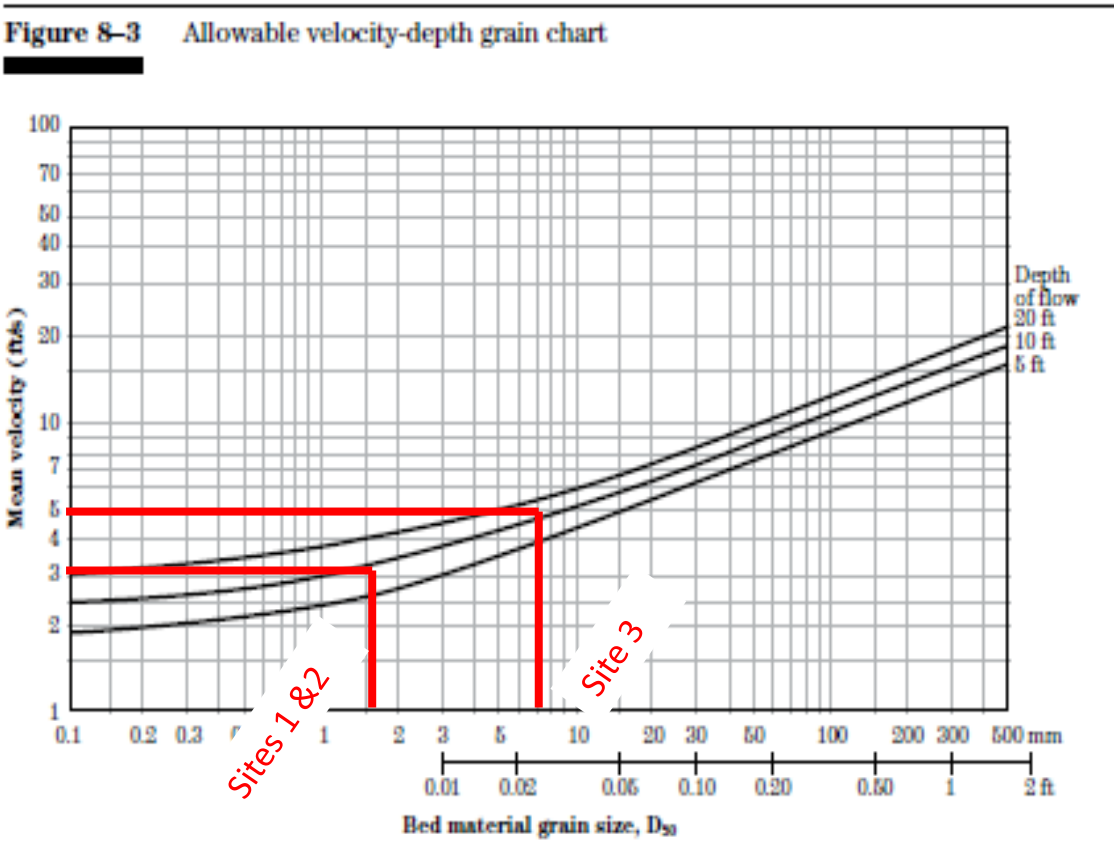
At field assessment Site 1 (D50 = 1.5 mm) and Site 2 (D50 = 2.0 mm), bed sediment is composed primarily of very coarse sand. Uniform flow computations performed using HEC-RAS show a water surface elevation of 8.57 feet and 8.67 feet for the 10-year flow event, respectively. Uniform flow computations performed using the Flowmaster normal depth model determined a mean flow velocity of 2.40 feet per second and 2.01 feet per second for the 10-year flow event, respectively. Comparatively, the 2014 FEMA FIS for the study segment shows the velocity ranging from 6.2 feet per second to 12.1 feet per second within the 100-year floodway.

At field assessment Site 3 (D50 = 6 mm), bed sediment is primarily composed of fine gravel. Uniform flow computations performed using HEC-RAS show a water surface elevation of 14.58 feet for the 10-year flow event. Uniform flow computations performed using the Flowmaster normal depth model determined a mean flow velocity of 3.36 feet per second for the 10-year flow event, respectively.

The *Allowable velocity-depth grain* chart developed by United States Army Corp of Engineers (USACE) (1991b) identifies the allowable mean velocity of unprotected and non-vegetated stream bed that will not engender any scouring. The chart accounts for the average sediment grain size and the depth of flow. At field assessment site 3, the allowable mean velocity is of 5 feet per second, if the stream was fully unvegetated. At field assessment Sites 1 and 2, the hypothetical allowable mean velocity is of 3 feet per second. Practically, the allowable mean velocity is higher because of the established and maintained vegetation (see Section 6.3).

The evaluated stream segment lies within the alluvial floodplain of the San Jacinto River watershed. Because of its topographic location, the field-verified longitudinal slopes are lower than 0.05-percent, thus the mean velocities associated with the 10-year event do not exceed the allowable mean velocities at the three field assessment sites.

Figure 10 - Allowable velocity-depth grain chart (USACE, 1991)



7.3 Role of Vegetation Allowable Velocity

As part of the development of master-planned community adjacent to the East bank of the study segment, the channel was improved to provide a 100-year flood protection to the community. Channel improvements included the implementation of vegetation to stabilize soils and offer additional resiliency against potential scouring and the construction of a levee to protect the community.

	
Established vegetation on the channel bed	Left bank levee protecting the community

The established and maintained vegetation provides a higher allowable velocity without observing any scouring at field assessment Sites 1 and 2. USACE (1991b) provided allowable velocity criteria for nonscouring channel, which are consistent with the findings of the United States Department of Agriculture (USDA) Agricultural Handbook #667 (1987). At field assessment Sites 1 and 2, grass and vegetation provides an allowable velocity of 4 to 6 feet per second without scouring.

Uniform flow computations at field assessment Sites 1 and 2 show mean flow velocities for the 10-year flow event of 2.4 feet per second and 2.01 feet per second, respectively (see Flowmaster normal depth model results in Appendix B). For the higher boundary of the range of geomorphically significant flows, no scouring is expected at field assessment Sites 1 and 2 because of the heightened resiliency to shear stress provided by the established and maintained vegetation.

7.4 Rapid Stream Assessment

A Rapid Stream Assessment (RSA) was performed for the Study segment. This methodology was created by WEST Consultants (see Appendix D) and also used for stream classification in the San Bernardino County Stormwater Program. The *Channel Assessment and Classification* study was reviewed by the Santa Ana Regional Board (Appendix C of the Phase II Watershed Action Plan, May 2013). The Rapid Stream Risk Classification (RSRC) for Hydromodification Mapping assessed the study segments based on 6 criteria:

1. **Shear Ratio (SR) -** An indicator of channel's bed shear stress sensitivity to increased discharge; Aggradation of bed sediment was observed at each of the three field assessment sites. In addition, the channel was improved and is maintained to prevent from any scouring to occur at locations 1 and 2.

Table 3 - RSA Shear Ratio Results

Stream Name	Field Assessment Site	Slope	Ho	Q_o	SR	Aggradation	Engineered	Risk
San Jacinto River	1	0.0003	8.57	1658	1.30	Yes	Yes	Low
	2	0.0003	8.67	1658	1.23	Yes	Yes	Low
	3	0.0002	14.58	1658	1.15	Yes	No	Medium

Ho – Normal Depth based on bankfull discharge.
Qo – Bankfull Discharge (design discharge)
Risk – Indicates the channel potential to degradation based on shear ratio.

2. **Entrainment Ratio (ER)** - Represents the channel erosion potential;

As identified in Section 6.2, the presence of maintained vegetation at field assessment Sites 1 and 2 allows for high permissible flow velocities, which are higher than the mean flow velocity associated with the 10-year flow event. Similarly, Section 6.3 identifies that very fine gravel is found at field assessment Site 3, which allows for high permissible flow velocities.

Table 4 - RSA Entrainment Ration Results

Stream Name	Field Assessment Site	D50 (mm)	D50 (ft)	V (fps)	ER	Risk
San Jacinto River	1	1.5	0.00	2.4	0.03	Low
	2	2	0.01	2.01	0.01	Low
	3	6	0.02	3.36	0.02	Low

D50 – Median bed sediment size
V – Average velocity of flow within the channel
ER – Entrainment ratio

3. **Geotechnical Stability Number** - measures the lateral channel stability;

Samples of the soil composing the banks were tested for cohesiveness. However, both aggradation of bed sediment was observed at each of the three field assessment sites. In addition, at field assessment sites 1 and 2 the channel was improved and is maintained to prevent scouring.

Table 5 - RSA Geotechnical Stability Number (GSN) Results

Stream Name	Field Assessment Site	Ho	H_o/H_c (GSN)	Aggradation	Engineered	Risk
San Jacinto River	1	8.57	0.45	Yes	Yes	Low
	2	8.67	0.46	Yes	Yes	Low

	3	14.58	0.77	Yes	No	Low

Ho – Normal Depth based on bankfull discharge.
Hc – Critical Bank Height based on cohesion of the in-situ soil properties.
Risk – Measures the potential for bank failure. A low-risk classification indicates the channel banks are engineered to withstand erosive forces.

4. **Confinement Class Number** - measures the amount of room that exists for the channel to actively move lateral and is useful indicator of a channel's vulnerability to erosion;

At field assessment Sites 1 and 2, the improvements of the channel included the construction of a levee offering a 100-year flood protection to the community adjacent to the left bank (looking downstream). The curvature of the channel being rectilinear, it is not expected that the channel will migrate laterally and erode the improved right bank.

At field assessment Site 3, the river flows from an alluvial floodplain to a canyon of more pronounced topography. Because of the curvature of the stream, it is expected that the stream may slightly migrate laterally.

Table 6 - RSA Confinement Class Number Results

Stream Name	Field Assessment Site	W	B	W/B	Risk
San Jacinto River	1	200	17.7	11.30	Medium
	2	316	50	6.32	Medium
	3	217	21.4	10.14	Medium

W – Valley bottom width
B – Channel width

5. **Banks and Streambed Conditions** – identifies the ability of the banks and streambed to resist to erosive stresses

The analysis is described in Section 6.1 and the results are summarized below.

Table 7 - RSA Banks and Streambed Condition Results

Stream Name	Field Assessment Site	Bank Risk	Streambed Risk
San Jacinto River	1	Low	Low
	2	Low	Medium
	3	Low	Medium

Bank Risk - This criterion is based on detailed field observations. In general, the following factors that contribute to banks' resistance to erosion would classify as low-risk: bank stabilization in good condition, presence of bedrock, dense vegetation, highly consolidated bank material, no stratification, no signs of active erosion, toe in good condition. The opposite would classify as high-risk.

Streambed Risk - This criterion is based on detailed field observations to assess the streambed sedimentation/erosion characteristics. A low-risk classification is triggered by the following factors: not braided or sand bed, highly armored, erosion resistant bedrock, no active headcuts, small degradation (< 1 ft.), presence of downstream hard point in good condition (< 100 ft. away), no widening, no aggradation, no obvious sources of sediments from bank failures of upstream sources. The opposite classifies as high-risk.

The overall risks of future erosion determined by the Rapid Stream Assessment are summarized in Table 8. There is a low risk of future erosion at each of three field assessment sites. The low risk for future erosion is supported by channel geometry (large width, flat slope), the presence of dense and maintained vegetation, the presence of coarse bed sediment, and observed aggradation of the bed.

Table 8 - RSA Risk Results

STREAM NAME	FIELD ASSESSMENT SITE	CLASSIFICATION
San Jacinto River	1	Low
	2	Low
	3	Low

8 CONCLUSION

Based on the hydrology assessment and analysis of the 3.8 mile reach of the San Jacinto River upstream of Canyon Lake, it has been determined that the San Jacinto River is a natural resistant feature that exhibits the following characteristics:

- Drainage area higher than 100 square-miles and a 100-year peak discharge higher than 20,000 cfs.
- The natural hydrology and sediment loading of different watercourses within the SAR are significantly impacted by the upstream impoundments, which regulate downstream flow.
- Permittees participate in the National Flood Insurance Program and enforce a floodplain management ordinance to regulate development in mapped flood hazard areas.
- The low-gradient of this segment of the San Jacinto River are results in deposition of coarse-grained sediments.

Under the existing and future hydrologic conditions, there will be no scouring of the bed and bank of the stream at each of the three field assessment sites. The additional lines of evidence support that the San Jacinto River is not an HCOC:

- The river has the characteristic geomorphology of a large river, including a flat slope and a wide alluvial floodplain;
- A review of historical aerial photographs did not identify lateral migration of the streambed, even though historical urbanization has occurred;
- The production of bed sediment occurs in the San Jacinto Mountain, thus future development in the alluvial floodplain will not impact the production and conveyance of bed sediment to the downstream reaches;
- Field observations at the three field assessment sites did not identify erosion within the bed and banks of the channel. Deposition of sediment within the streambed indicated that the stream exhibits aggradation;
- Dense vegetation is present within the streambed, particularly within the low-flow channel. In addition, the 1.4-mile segment of improved channel exhibits permanent and maintained vegetation over its streambed and banks. The vegetation provides a higher resiliency to erosive forces.
- Bed sediment is composed of coarse sand and very fine gravel, which are typical of large rivers in alluvial floodplain environment. At field assessment site 3, the bed is predominantly composed of very fine gravel (D50 = 6mm), which provides a high resiliency to erosive forces;
- The rapid stream assessment concluded that the 3.8-mile segment has a low-risk for future erosion.

The lower San Jacinto River watershed has a very low-gradient which limits the discharge velocity along the channel and decreases the erosive energy that would be shown in steeper streams. The 52-year (1962-2014) historical aerial photographs evaluated show no significant change and the floodplain over the study reach is fairly consistent.

9 REFERENCES

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7. Stream Restoration Design, National Engineering Handbook Part 654, USDA, August 2007
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9. Stability of grass-lined open channels, Agricultural Handbook 667. U.S. Department of Agriculture, 1987
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12. Instantaneous Discharge Data, National Water Information System, U.S. Geological Survey (http://nwis.waterdata.usgs.gov/nwis)
13. Application for a Letter of Map Revision (LOMR) for a Portion of the San Jacinto River. Albert A. Webb Associates, November 2010
14. San Jacinto Wildlife Area. California Department of Fish and Wildlife, accessed December 2014 (http://www.dfg.ca.gov/lands/wa/region6/sanjacinto/maps.html)
15. 2013 Riverside County Progress Report. County of Riverside Transportation and Land Management Agency, accessed December 2014 (http://rctlma.org/Departments/Administrative-Services/Riverside-County-Center-for-Demographic-Research/Progress-Reports/Current-Progress-Report)

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section G of the WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table G.1on page 23 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ A. **On-site storm drain inlets**	☒ **Locations of inlets.**	☒ **Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.**	☒ **Maintain and periodically repaint or replace inlet markings.** ☒ **Provide stormwater pollution prevention information to new site owners, lessees, or operators.** ☒ **See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** ☒ **Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."**
☐ B. **Interior floor drains and elevator shaft sump pumps**		☐ **State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**
☐ C. **Interior parking garages**		☐ **State that parking garage floor drains will be plumbed to the sanitary sewer.**	☐ **Inspect and maintain drains to prevent blockages and overflow.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☐ D1. **Need for future indoor & structural pest control**		☐ **Note building design features that discourage entry of pests.**	☐ **Provide Integrated Pest Management information to owners, lessees, and operators.**
☒ D2. **Landscape/ Outdoor Pesticide Use**	☐ **Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained.** ☐ **Show self-retaining landscape areas, if any.** ☒ **Show stormwater treatment and hydrograph modification management BMPs. (See instructions in Chapter 3, Step 5 and guidance in Chapter 5.)**	**State that final landscape plans will accomplish all of the following.** ☐ **Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.** ☒ **Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.** ☒ **Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.** ☐ **Consider using pest-resistant plants, especially adjacent to hardscape.** **To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.**	☒ **Maintain landscaping using minimum or no pesticides.** ☒ **See applicable operational BMPs in "What you should know for…..Landscape and Gardening"** at http://rcflood.org/stormwater/**Error! Hyperlink reference not valid.** ☒ **Provide IPM information to new owners, lessees and operators.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ E. **Pools, spas, ponds, decorative fountains, and other water features.**	❑ **Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)**	**If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.**	❑ **See applicable operational BMPs in** "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at http://rcflood.org/stormwater/
❑ F. **Food service**	❑ **For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment.** ❑ **On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.**	❑ **Describe the location and features of the designated cleaning area.** ❑ **Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.**	❑ **See the brochure, "**The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://rcflood.org/stormwater/ **Provide this brochure to new site owners, lessees, and operators.**
❑ G. **Refuse areas**	❑ **Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas.** ❑ **If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area.** ❑ **Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.**	❑ **State how site refuse will be handled and provide supporting detail to what is shown on plans.** ❑ **State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.**	❑ **State how the following will be implemented:** **Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ H. **Industrial processes.**	❑ **Show process area.**	❑ **If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."**	❑ **See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com** See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ I. **Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)**	❑ **Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area.** ❑ **Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults.** ❑ **Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.**	**Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.** **Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for:** ▪ **Hazardous Waste Generation** ▪ **Hazardous Materials Release Response and Inventory** ▪ **California Accidental Release (CalARP)** ▪ **Aboveground Storage Tank** ▪ **Uniform Fire Code Article 80 Section 103(b) & (c) 1991** ▪ **Underground Storage Tank** **www.cchealth.org/groups/hazmat/**	❑ **See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ J. **Vehicle and Equipment Cleaning**	❑ **Show on drawings as appropriate:** **(1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses.** **(2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use).** **(3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer.** **(4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.**	❑ **If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.**	**Describe operational measures to implement the following (if applicable):** ❑ **Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system.** Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/ ❑ **Car dealerships and similar may rinse cars with water only.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ K. **Vehicle/Equipment Repair and Maintenance**	❑ **Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater.** ❑ **Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas.** ❑ **Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.**	❑ **State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area.** ❑ **State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.** ❑ **State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.**	**In the Stormwater Control Plan, note that all of the following restrictions apply to use the site:** ❑ **No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains.** ❑ **No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately.** ❑ **No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.** Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations". Brochure can be found at http://rcflood.org/stormwater/ Refer to Outdoor Cleaning Activities and Professional Mobile Service Providers for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at http://rcflood.org/stormwater/

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ L. **Fuel Dispensing Areas**	❑ **Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable.** ❑ **Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.**		❑ **The property owner shall dry sweep the fueling area routinely.** ❑ **See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

[6] **The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ M. **Loading Docks**	☒ **Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer.** ☐ **Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation.** ☐ **Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.**		☐ **Move loaded and unloaded items indoors as soon as possible.** ☒ **See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
❑ N. **Fire Sprinkler Test Water**		❑ **Provide a means to drain fire sprinkler test water to the sanitary sewer.**	❑ **See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com**
O. **Miscellaneous Drain or Wash Water or Other Sources** ❑ **Boiler drain lines** ❑ **Condensate drain lines** ❑ **Rooftop equipment** ❑ **Drainage sumps** ❑ **Roofing, gutters, and trim.** ❑ **Other sources**		❑ **Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system.** ❑ **Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.** ❑ **Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.** ❑ **Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water.** ❑ **Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff.** **Include controls for other sources as specified by local reviewer.**	

STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☒ P. **Plazas, sidewalks, and parking lots.**			☒ **Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.**

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

BMP Type	Inspection/Maintenance Required	Minimum Frequency of Activities
Irrigation	Inspect irrigation equipment. Check water sensors and adjust irrigation heads and timing.	Monthly or according to established maintenance schedule
Landscape Areas	Landscape maintenance will consist of trimming and replanting of vegetation, repair and maintenance of irrigation systems, and appropriate use of fertilizers and pesticides.	Monthly or according to established maintenance schedule
Proprietary Biotreatment (MWS)	Inspect for trash and debris in system inlet and outlet. Clean as necessary per manufacturer's recommendations. Inspect and record condition of plants. Replace media surface per manufacturer's recommendations. Cleanout unit per manufacturer's recommendations.	Prior to rainy season, immediately after rainy season, and after any storm events
Storm Drain (Detention System)	Inspect for structural issues, leaks, or damage.	Quarterly and after storm events
Trash Enclosure	Pick up trash on ground and place in receptacles. Close any lids that are left open. Make repairs to structural elements as necessary. Remove accumulations of trash.	Daily to inspect trash lids and dumpster areas. Monthly to inspect structural elements.

Irrigation Systems: Water conservation is to be maintained at all times per the approved irrigation plans. Monitoring of the irrigation system should be provided at least twice monthly or as necessary to ensure that appropriate watering levels are maintained as well as to verify that no piping or irrigation heads are leaking. Any debris, sediment, mineral and grit deposits should be removed from the irrigation system at regular intervals to provide consistent watering.

Landscaped Areas: Open space areas, including unpaved yards, shall be kept free of trash and debris. All trimming, pruning, and removal of fallen organic material from plants, shrubs, and trees are to be collected per an established landscape maintenance plan and disposed in the appropriate location or transported to a green-waste collection facility. The planting materials are to remain as indicated on the approved set of landscape planting plans. Additional actions should be taken to ensure that the surface flow paths, storm drain outlet and inlet in the area are cleared of debris or vegetation obstructions.

Biotreatment: The biotreatment system shall be inspected for erosion, dead vegetation, soggy soils, or standing water. The use of fertilizers and pesticides on the plants inside the Facility should be minimized. Keep adjacent landscape areas maintained, remove clippings from landscape maintenance activities, remove trash and debris, replace damaged grass and/or plants, and replace surface mulch/cobble as needed to maintain a 2-3 inch soil cover. Facilities should be inspected for ponding after storm events. See manufacturer's recommendations.

Storm Drain System: Inlets, outlets, cleanouts, manholes, and pipelines are to be inspected quarterly and after each storm event or according to an existing maintenance program. All parts of the system are to be periodically cleaned to ensure that the system works properly during any storm event. All hardscape, landscape, parking, and driveway areas shall be kept clean, sanitary and free from any accumulation of debris, sediments and waste materials that could enter the storm drain system.

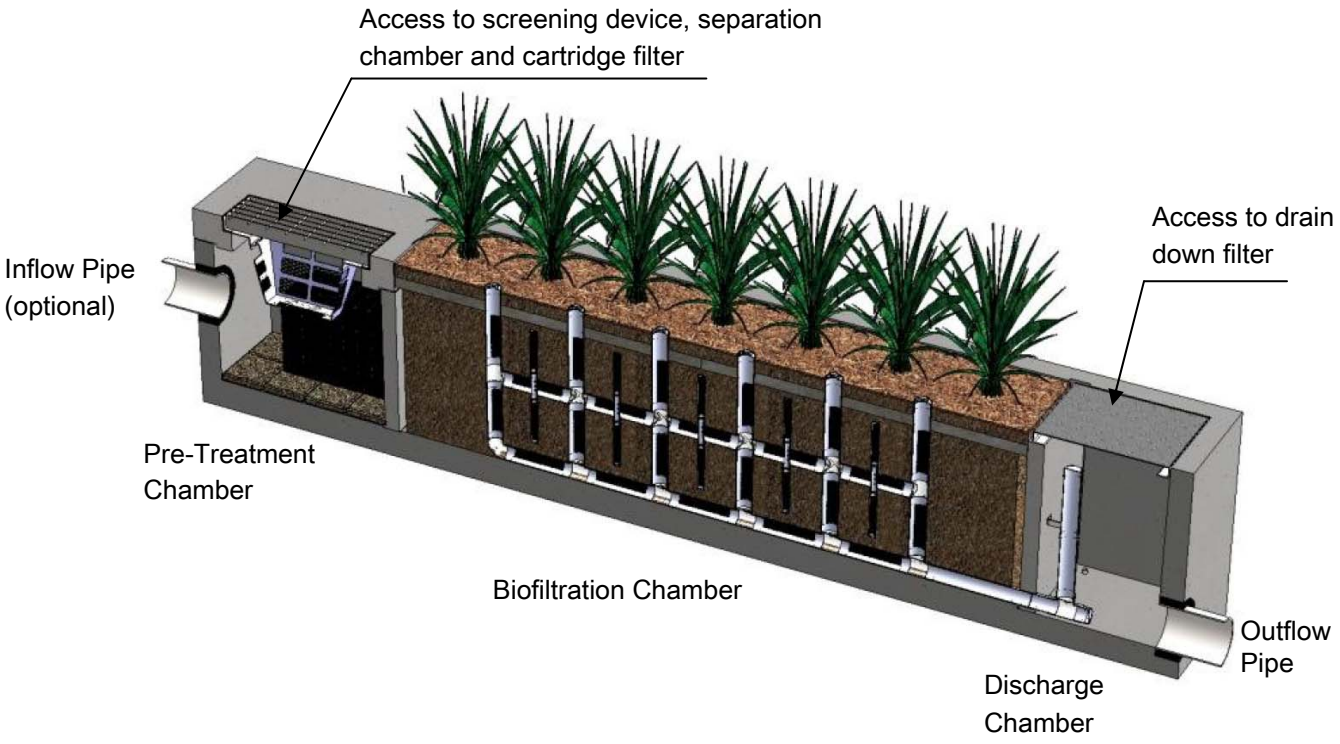
Trash Enclosure: Trash will be removed by the local solid waste management contractor on a weekly basis or as need to avoid overflow for proper disposal to a landfill. Recyclable materials and greenwastes to be processed offsite. The proposed trash enclosure shall be covered with a solid roof per MJPA requirements. And designed to not allow runon from adjoining areas. The trash enclosure is also designed to divert drainage from pavement around the area and walled off to prevent off-site transport of trash. Post signage on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
  - (*5 minute average service time*).
- Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
  - (*10 minute average service time*).
- Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
  - (*10-15 minute per cartridge average service time*).
- Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
  - (*5 minute average service time*).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
  - (*Service time varies*).

System Diagram



Maintenance Procedures

Screening Device

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.
2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck. The hose of the vacuum truck will not damage the screening device.
3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

Separation Chamber

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.
2. With a pressure washer spray down pollutants accumulated on walls and cartridge filters.
3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

Cartridge Filters

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.
2. Enter separation chamber.
3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.
4. Remove each of 4 to 8 media cages holding the media in place.
5. Spray down the cartridge filter to remove any accumulated pollutants.
6. Vacuum out old media and accumulated pollutants.
7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.
8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

Drain Down Filter

1. Remove hatch or manhole cover over discharge chamber and enter chamber.
2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.
3. Exit chamber and replace hatch or manhole cover.

Maintenance Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.

2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.

3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.

4. Entry into chambers may require confined space training based on state and local regulations.

5. No fertilizer shall be used in the Biofiltration Chamber.

6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may require irrigation.

Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It's mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.



Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.







Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.







Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.



Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.









Inspection Form



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Inspection Report
Modular Wetlands System

Project Name _____

Project Address _____ (city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): _____ Size (22', 14' or etc.): _____

Structural Integrity:	**Yes**	**No**	**Comments**
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
Working Condition:			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes, specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
Other Inspection Items:			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	**Yes**	**No**
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: _____

2972 San Luis Rey Road, Oceanside, CA 92058 P (760) 433-7640 F (760) 433-3176

Maintenance Report



Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com

Cleaning and Maintenance Report
Modular Wetlands System

Project Name _____

Project Address _____
(city) (Zip Code)

Owner / Management Company _____

Contact _____ Phone ( ) –

Inspector Name _____ Date ____/____/____ Time _____ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint ☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition _____ Additional Notes _____

For Office Use Only
(Reviewed By)
(Date)
Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat: Long:	MWS Catch Basins						
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:

2972 San Luis Rey Road, Oceanside, CA 92058 P. 760.433.7640 F. 760.433.3176

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

After the Storm

A Citizen's Guide to Understanding Stormwater



What is stormwater runoff?



Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?



Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution



Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.



- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Stormwater Pollution Solutions



Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.



Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.



Commercial

Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Construction



Agriculture

Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



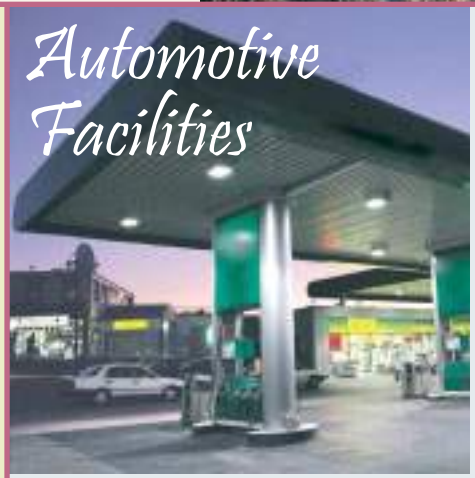
- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.



Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.



For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

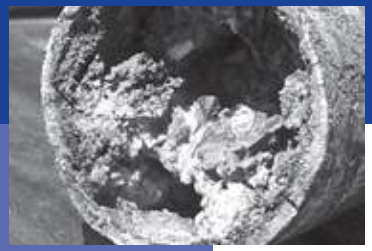
EPA United States Environmental Protection Agency

THE YEAR OF CLEAN WATER
Celebration & Recommitment

EPA 833-B-03-002

January 2003

Internet Address (URL) • HTTP://www.epa.gov
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Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. Fats, oils and grease from restaurants and food service facilities can cause sewer line blockages that may result in sewage overflow into your facility and into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways and should never contain washwater, trash, grease or other materials.

You would never dump oil and trash into the ocean, so don't let it enter the storm drains. Follow these tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

Report sewage spills and
discharges that are not
contained to your site to the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
at **1-877-89-SPILL** (1-877-897-7455)

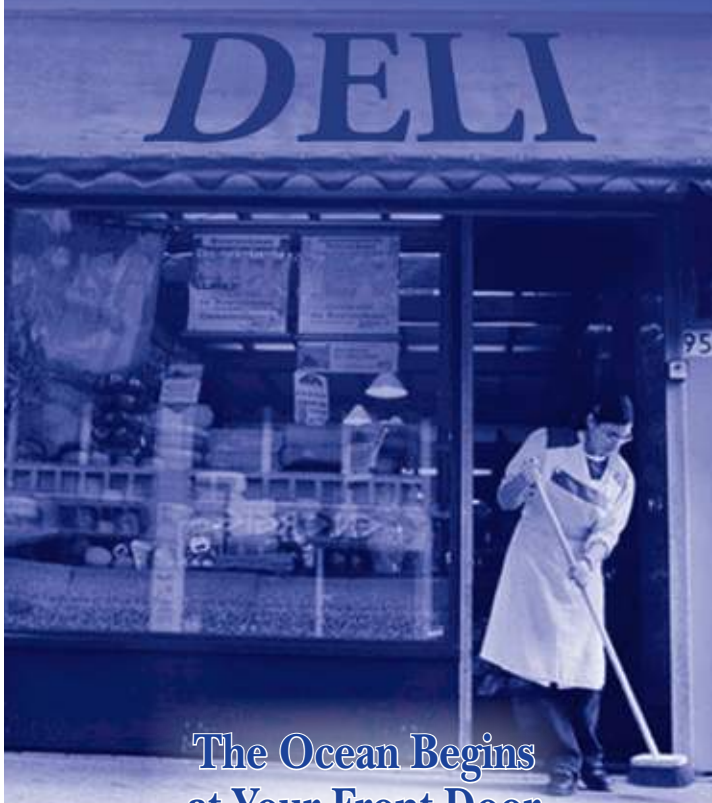
For emergencies, dial 911.

CALIFORNIA Restaurant ASSOCIATION SINCE 1906

Printed on Recycled Paper

Help Prevent Ocean Pollution:

Tips for the Food Service Industry



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Best Kitchen Practices

Food Waste Disposal

- Scrape food waste off of plates, utensils, pots, food preparation and cooking areas and dispose of it in the trash.
- Never put food waste down the drain. Food scraps often contain grease, which can clog sewer pipes and result in sewage backups and overflows.

Grease & Oil Disposal

- Never put oil or grease down the drain. Contain grease and oil by using covered grease storage containers or installing a grease interceptor.
- Never overfill your grease storage container or transport it without a cover.
- Grease control devices must be emptied and cleaned by permitted companies.
- Keep maintenance records on site.



- For a list of oil/grease recycling companies, contact the CIWMB at **www.ciwmb.ca.gov/foodwaste/render.htm** or contact your local sanitation district.

Minor Spill Cleanup

- Always use dry cleanup methods, such as a rag, damp mop or broom.
- Never hose a spill into the street, gutter or storm drain.



Major Spill Cleanup

- Have spill containment and clean-up kits readily available, and train all employees on how to use them.
- Immediately contain and clean the spill using dry methods.
- If the spill leaves your site, call **(714) 567-6363**.

Dumpster Cleanup

- Pick up all debris around the dumpster.
- Always keep the lid on the dumpster closed.



- Never pour liquids into the dumpster or hose it out.

Floor Mat Cleaning

- Sweep the floor mats regularly, discarding the debris into the trash.
- Hose off the mats in a mop sink, at a floor drain, or in an outdoor area that can contain the water.



- Never hose the mats in an area where the wastewater can flow to the street, gutter or storm drain.

Washwater Disposal

- Dispose of washwater in a mop sink or an area with a floor drain.
- Never dispose of washwater in the street, gutter or storm drain.

PROJECT Pollution PREVENTION

United States Environmental Protection Agency
20W-0002
July 1990

OW (WH-556)
OPPE (PM-222)

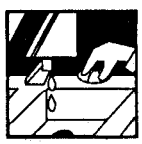
EPA

Preventing Pollution Through Efficient Water Use

EPA

For more information on what you and your community can do to use water more efficiently, contact:

U.S. Environmental Protection Agency
Office of Water
401 M Street, S.W.
Washington, D.C. 20460

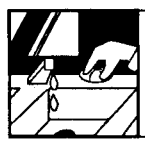


For more information on pollution prevention programs at U.S. EPA, contact:

U.S. Environmental Protection Agency
Office of Pollution Prevention
401 M Street, S.W.
Washington, D.C. 20460



How Efficient Water Use Helps Prevent Pollution



Other Reasons to Use Water Wisely



What Individuals Can Do



What Communities Can Do



What Communities Can Do

A water supplier or wastewater system operator (public or private) has cost-effective options to process and deliver water more efficiently. A community can do the same, and can foster ways to use water wisely.

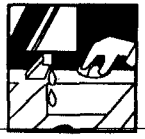
Not all of these steps are expensive. The best choices vary by region and by community; start by asking if these are appropriate where you live and work.

A Water Supplier or Wastewater Processor Can:

- ☞ Identify who uses water, and reduce unaccounted-for water use.
- ☞ Find and repair leaking pipes.
- ☞ Consider a new pricing scheme which encourages conservation.
- ☞ Reduce excess pressure in water lines.
- ☞ Explore the reuse of treated wastewater for uses other than drinking water.
- ☞ Charge hookup fees which encourage more efficient water use in new buildings.
- ☞ Build water efficiency into future demand projections, facility planning, and drought planning.

A Community Can:

- ☞ Adopt plumbing and building codes that require water-efficient equipment and practices.
- ☞ Adopt a water-efficient landscaping ordinance to reduce the water used for golf courses and commercial landscapes.
- ☞ Retrofit older buildings with water-efficient equipment, starting with public buildings.
- ☞ Reduce municipal water use for landscaping and other uses.
- ☞ Conduct a public education campaign.
- ☞ Require developers to build in water efficiency measures.



Other Reasons to Use Water Wisely

Preventing pollution is only one reason why using water efficiently makes sense. Here are a few more:

Money Saved

- Less water use results in fewer pumping and treatment costs.
- Saving money on water and wastewater operations frees money for meeting water quality, public health and water treatment goals.
- Water saved is also energy, and money, saved for you and your community.

Improved Reliability

- Water conservation provides a hedge against drought impacts.
- Improving water efficiency may be quicker and cheaper than developing a new supply.
- Reduced water use may extend the life of your water or wastewater facility.
- Reduced water use may increase the efficiency of wastewater treatment, and reduce overflows during storms.
- Communities which use water efficiently are better prepared to cope with effects of possible future climate change.



What Individuals Can Do

More efficient water use begins with individuals, in the home and place of work. Taking these and other steps, and encouraging others to do so, makes good economic as well as environmental sense.

In The Home

- Install a toilet dam or plastic bottle in your toilet tank.
- Install a water-efficient showerhead (2.5 gallons or less per minute).
- When you buy a new toilet, purchase a low flow model (1.6 gallons or less per flush).

Outdoors

- Water in the morning or evening, to minimize evaporation.
- Install a drip-irrigation watering system for valuable plants.
- Use drought-tolerant plants and grasses for landscaping, and reduce grass-covered areas.

At Work or School

- Adopt the same water-saving habits that are effective at home.
- Ask about installing water-efficient equipment and reducing outdoor water use.
- Encourage employers to explore the use of recycled "gray-water" or reclaimed wastewater.



How Efficient Water Use Helps Prevent Pollution

Using water more efficiently can help prevent pollution as well as protect and conserve our finite water resources. More efficient water use by you and your community has many other benefits.

Fewer Pollutants

- Using less water reduces the amount of wastewater discharged into our lakes, streams, rivers, and marine waters.
- The amount of pollutants wastewater carries can also be reduced, as treatment efficiency improves.
- Recycled process water can reduce pollutants from industry.
- More efficient irrigation can minimize runoff of agricultural pollutants and reduce the use of fertilizers and pesticides.

Protection of Aquatic Habitats

- Building fewer and smaller new water projects can help preserve wetlands, which naturally treat pollutants.
- Diverting less water preserves more streamflow to maintain a healthy aquatic environment.

Protection of Drinking Water Sources

- Less pumping of groundwater lowers the chance that pollutants will be drawn into a water supply well.
- With less water use, septic system performance can improve, reducing the risk of groundwater contamination.
- Highest quality water sources are preserved for drinking water by using treated wastewater for other uses.

Energy Conservation

- Efficient water use means less power needed to pump and treat water and wastewater.
- Less water use reduces the amount of energy required for heating hot water.
- Less energy demand results in fewer harmful by-products from power plants.



Preventing water pollution at your commercial/industrial site

Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many landscape and building maintenance activities can lead to water pollution if you're not careful. Paint, chemicals, plant clippings and other materials can be blown or washed into storm drains that flow to the ocean. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour soap or fertilizers into the ocean, so why would you let them enter the storm drains? Follow these easy tips to help prevent water pollution.

Some types of industrial facilities are required to obtain coverage under the State General Industrial Permit. For more information visit: **www.swrcb.ca.gov/stormwater/industrial.html**

For more information, please call the **Orange County Stormwater Program** at **1-877-89-SPILL** (1-877-897-7455) or visit **www.ocwatersheds.com**

To report a spill, call the **Orange County 24-Hour Water Pollution Problem Reporting Hotline** at **1-877-89-SPILL** (1-877-897-7455).

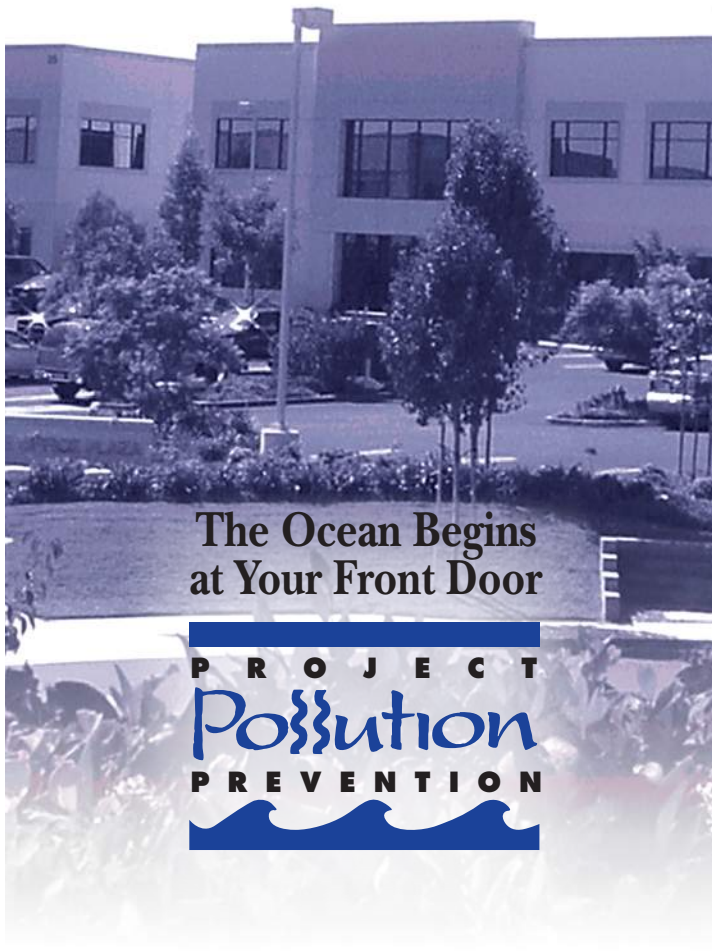
For emergencies, dial 911.

RECYCLE USED OIL

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Help Prevent Ocean Pollution:

Proper Maintenance Practices for Your Business



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Proper Maintenance Practices for your Business

Landscape Maintenance

- Compost grass clippings, leaves, sticks and other vegetation, or dispose of it at a permitted landfill or in green waste containers. Do not dispose of these materials in the street, gutter or storm drain.
- Irrigate slowly and inspect the system for leaks, overspraying and runoff. Adjust automatic timers to avoid overwatering.
- Follow label directions for the use and disposal of fertilizers and pesticides.
- Do not apply pesticides or fertilizers if rain is expected within 48 hours or if wind speeds are above 5 mph.
- Do not spray pesticides within 100 feet of waterways.
- Fertilizers should be worked into the soil rather than dumped onto the surface.
- If fertilizer is spilled on the pavement or sidewalk, sweep it up immediately and place it back in the container.

Building Maintenance

- Never allow washwater, sweepings or sediment to enter the storm drain.
- Sweep up dry spills and use cat litter, towels or similar materials to absorb wet spills. Dispose of it in the trash.
- If you wash your building, sidewalk or parking lot, you **must** contain the water. Use a shop vac to collect the water and contact your city or sanitation agency for proper disposal information. Do not let water enter the street, gutter or storm drain.
- Use drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of materials in the trash.
- Use a ground cloth or oversized tub for mixing paint and cleaning tools.
- Use a damp mop or broom to clean floors.
- Cover dumpsters to keep insects, animals, rainwater and sand from entering. Keep the area around the dumpster clear of trash and debris. Do not overfill the dumpster.
- Call your trash hauler to replace leaking dumpsters.
- Do not dump any toxic substance or liquid waste on the pavement, the ground, or near a storm drain. Even materials that seem harmless such as latex paint or biodegradable cleaners can damage the environment.

Never Dispose of Anything in the Storm Drain.

- Recycle paints, solvents and other materials. For more information about recycling and collection centers, visit **www.oclandfills.com**.
- Store materials indoors or under cover and away from storm drains.
- Use a construction and demolition recycling company to recycle lumber, paper, cardboard, metals, masonry, carpet, plastic, pipes, drywall, rocks, dirt, and green waste. For a listing of construction and demolition recycling locations in your area, visit **www.ciwmb.ca.gov/recycle.**
- Properly label materials. Familiarize employees with Material Safety Data Sheets.

PROJECT Pollution PREVENTION

EPA
United States
Environmental Protection
Agency

EPA 841-F-03-003

Protecting Water Quality *from* URBAN RUNOFF

Clean Water Is Everybody's Business

In urban and suburban areas, much of the land surface is covered by buildings and pavement, which do not allow rain and snowmelt to soak into the ground. Instead, most developed areas rely on storm drains to carry large amounts of runoff from roofs and paved areas to nearby waterways. The stormwater runoff carries pollutants such as oil, dirt, chemicals, and lawn fertilizers directly to streams and rivers, where they seriously harm water quality. To protect surface water quality and groundwater resources, development should be designed and built to minimize increases in runoff.

The most recent National Water Quality Inventory reports that runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries and the third-largest source of impairments to surveyed lakes.

Did you know that because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size?

How Urbanized Areas Affect Water Quality

Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grasslands traps rainwater and snowmelt and allows them to filter slowly into the ground. In contrast, impervious (nonporous) surfaces like roads, parking lots, and rooftops prevent rain and snowmelt from infiltrating, or soaking, into the ground. Most of the rainfall and snowmelt remains above the surface, where it runs off rapidly in unnaturally large amounts.

Storm sewer systems concentrate runoff into smooth, straight conduits. This runoff gathers speed and erosional power as it travels underground. When this runoff leaves the storm drains and empties into a stream, its excessive volume and power blast out streambanks, damaging streamside vegetation and wiping out aquatic habitat. These increased storm flows carry sediment loads from construction sites and other denuded surfaces and eroded streambanks. They often carry higher water temperatures from streets, roof tops, and parking lots, which are harmful to the health and reproduction of aquatic life.

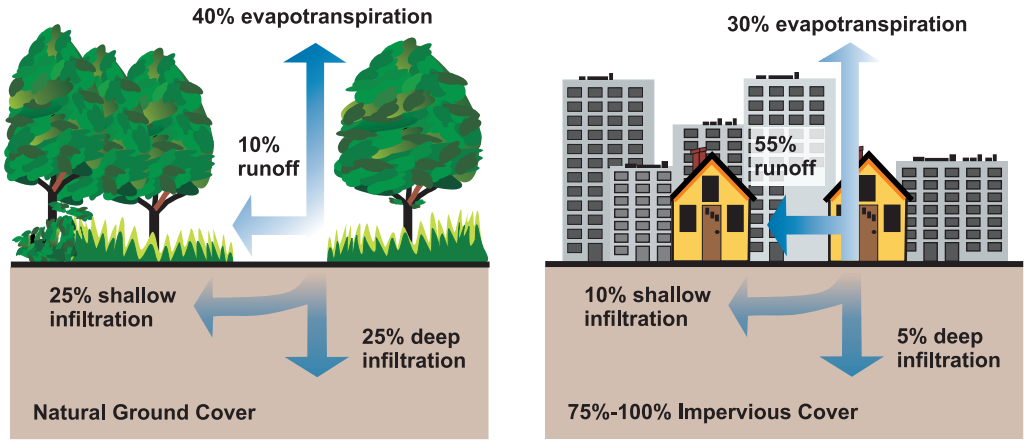
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot survive when these conditions prevail.

Increased Pollutant Loads

Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. The pollutants include:

- Sediment
- Oil, grease, and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria, and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles, and other sources
- Thermal pollution from dark impervious surfaces such as streets and rooftops

These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe and unpleasant.



Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface ruunoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

Managing Urban Runoff

What Homeowners Can Do

To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns. Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose. Instead of disposing of yard waste, they can use the materials to start a compost pile. And homeowners can learn to use Integrated Pest Management (IPM) to reduce dependence on harmful pesticides.

In addition, households can prevent polluted runoff by picking up after pets and using, storing, and disposing of chemicals properly. Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed. Drivers can also avoid impacts from car wash runoff (e.g., detergents, grime, etc.) by using car wash facilities that do not generate runoff. Households served by septic systems should have them professionally inspected and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.

Controlling Impacts from New Development

Developers and city planners should attempt to control the volume of runoff from new development by using low impact development, structural controls, and pollution prevention strategies. Low impact development includes measures that conserve natural areas (particularly sensitive hydrologic areas like riparian buffers and infiltrable soils); reduce development impacts; and reduce site runoff rates by maximizing surface roughness, infiltration opportunities, and flow paths.

Controlling Impacts from Existing Development

Controlling runoff from existing urban areas is often more costly than controlling runoff from new developments. Economic efficiencies are often realized through approaches that target "hot spots" of runoff pollution or have multiple benefits, such as high-efficiency street sweeping (which addresses aesthetics, road safety, and water quality). Urban planners and others responsible for managing urban and suburban areas can first identify and implement pollution prevention strategies and examine source control opportunities. They should seek out priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Local governments are encouraged to take lead roles in public education efforts through public signage, storm drain marking, pollution prevention outreach campaigns, and partnerships with citizen groups and businesses. Citizens can help prioritize the clean-up strategies, volunteer to become involved in restoration efforts, and mark storm drains with approved "don't dump" messages.



Related Publications

Turn Your Home into a Stormwater Pollution Solution!
www.epa.gov/nps

This web site links to an EPA homeowner's guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas
www.epa.gov/owow/nps/urbanmm

This technical guidance and reference document is useful to local, state, and tribal managers in implementing management programs for polluted runoff. Contains information on the best available, economically achievable means of reducing pollution of surface waters and groundwater from urban areas.

Onsite Wastewater Treatment System Resources
www.epa.gov/owm/onsite

This web site contains the latest brochures and other resources from EPA for managing onsite wastewater treatment systems (OWTS) such as conventional septic systems and alternative decentralized systems. These resources provide basic information to help individual homeowners, as well as detailed, up-to-date technical guidance of interest to local and state health departments.

Low Impact Development Center
www.lowimpactdevelopment.org

This center provides information on protecting the environment and water resources through integrated site design techniques that are intended to replicate preexisting hydrologic site conditions.

Stormwater Manager's Resource Center (SMRC)
www.stormwatercenter.net

Created and maintained by the Center for Watershed Protection, this resource center is designed specifically for stormwater practitioners, local government officials, and others that need technical assistance on stormwater management issues.

Strategies: Community Responses to Runoff Pollution
www.nrdc.org/water/pollution/storm/stoinx.asp

The Natural Resources Defense Council developed this interactive web document to explore some of the most effective strategies that communities are using around the nation to control urban runoff pollution. The document is also available in print form and as an interactive CD-ROM.

For More Information

U.S. Environmental Protection Agency
Nonpoint Source Control Branch (4503T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

www.epa.gov/nps

February 2003



Clean beaches and healthy creeks, rivers, bays and ocean are important to Orange County. However, many common activities can lead to water pollution if you're not careful. Fertilizers, pesticides and other chemicals that are left on yards or driveways can be blown or washed into storm drains that flow to the ocean. Overwatering lawns can also send materials into storm drains. Unlike water in sanitary sewers (from sinks and toilets), water in storm drains is not treated before entering our waterways.

You would never pour gardening products into the ocean, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution.

For more information,
please call the
Orange County Stormwater Program
at **1-877-89-SPILL** (1-877-897-7455)
or visit
www.ocwatersheds.com

UCCE Master Gardener Hotline:
(714) 708-1646

To report a spill,
call the
Orange County 24-Hour
Water Pollution Problem
Reporting Hotline
1-877-89-SPILL (1-877-897-7455)**.**

For emergencies, dial 911.

The tips contained in this brochure provide useful information to help prevent water pollution while landscaping or gardening. If you have other suggestions, please contact your city's stormwater representatives or call the Orange County Stormwater Program.

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Help Prevent Ocean Pollution:

Tips for Landscape & Gardening



The Ocean Begins at Your Front Door

PROJECT Pollution PREVENTION

Tips for Landscape & Gardening

Never allow gardening products or polluted water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.
- Plant native vegetation to reduce the amount of water, fertilizers, and pesticide applied to the landscape.



- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Use slow-release fertilizers to minimize leaching, and use organic fertilizers.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.



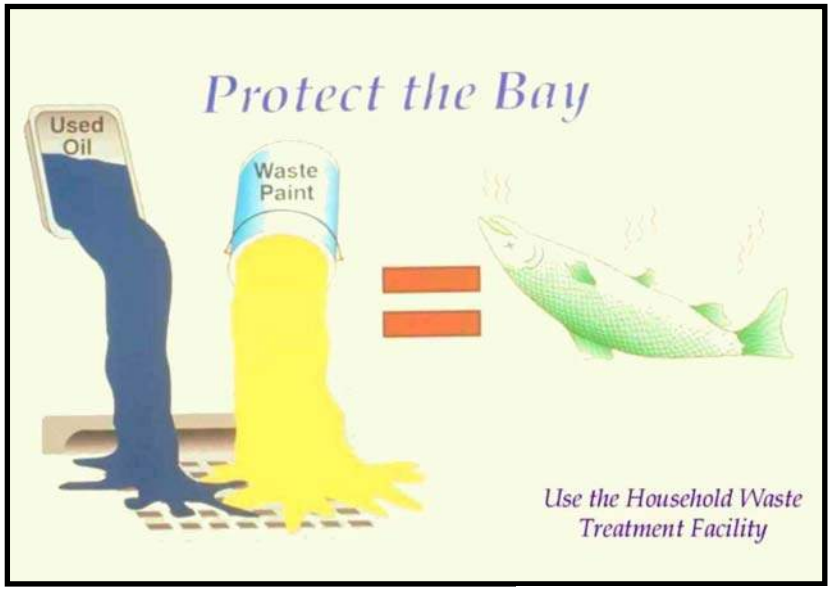
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting. For more information, visit **www.ipm.ucdavis.edu**.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Hazardous Waste Collection Center to be recycled. Locations are provided below.

Household Hazardous Waste Collection Centers

Anaheim:	1071 N. Blue Gum St.
Huntington Beach:	17121 Nichols St.
Irvine:	6411 Oak Canyon
San Juan Capistrano:	32250 La Pata Ave.

For more information, call (714) 834-6752 or visit www.oclandfills.com

Non-Stormwater Discharges SC-10



Graphic by: Margie Winter

Objectives

- Contain
- Educate
- Reduce/Minimize

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Non-stormwater discharges are those flows that do not consist entirely of stormwater. For municipalities non-stormwater discharges present themselves in two situations. One is from fixed facilities owned and/or operated by the municipality. The other situation is non-stormwater discharges that are discovered during the normal operation of a field program. Some non-stormwater discharges do not include pollutants and may be discharged to the storm drain. These include uncontaminated groundwater and natural springs. There are also some non-stormwater discharges that typically do not contain pollutants and may be discharged to the storm drain with conditions. These include car washing, and surface cleaning. However, there are certain non-stormwater discharges that pose environmental concern. These discharges may originate from illegal dumping or from internal floor drains, appliances, industrial processes, sinks, and toilets that are connected to the nearby storm drainage system. These discharges (which may include: process waste waters, cooling waters, wash waters, and sanitary wastewater) can carry substances (such as paint, oil, fuel and other automotive fluids, chemicals and other pollutants) into storm drains. The ultimate goal is to effectively eliminate non-stormwater discharges to the stormwater drainage system through implementation of measures to detect, correct, and enforce against illicit connections and illegal discharges.

Approach

The municipality must address non-stormwater discharges from its fixed facilities by assessing the types of non-stormwater discharges and implementing BMPs for the discharges determined to pose environmental concern. For field programs

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

the field staff must be trained to now what to look for regarding non-stormwater discharges and the procedures to follow in investigating the detected discharges.

Suggested Protocols

Fixed Facility

General

- Post "No Dumping" signs with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Landscaping and beautification efforts of hot spots might also discourage future dumping, as well as provide open space and increase property values.
- Lighting or barriers may also be needed to discourage future dumping.

Illicit Connections

- Locate discharges from the fixed facility drainage system to the municipal storm drain system through review of "as-built" piping schematics.
- Use techniques such as smoke testing, dye testing and television camera inspection (as noted below) to verify physical connections.
- Isolate problem areas and plug illicit discharge points.

Visual Inspection and Inventory

- Inventory and inspect each discharge point during dry weather.
- Keep in mind that drainage from a storm event can continue for several days following the end of a storm and groundwater may infiltrate the underground stormwater collection system. Also, non-stormwater discharges are often intermittent and may require periodic inspections.

Review Infield Piping

- Review the "as-built" piping schematic as a way to determine if there are any connections to the stormwater collection system.
- Inspect the path of floor drains in older buildings.

Smoke Testing

- Smoke testing of wastewater and stormwater collection systems is used to detect connections between the two systems.

- During dry weather the stormwater collection system is filled with smoke and then traced to sources. The appearance of smoke at the base of a toilet indicates that there may be a connection between the sanitary and the stormwater system.

Dye Testing

- A dye test can be performed by simply releasing a dye into either your sanitary or process wastewater system and examining the discharge points from the stormwater collection system for discoloration.

TV Inspection of Storm Sewer

- TV Cameras can be employed to visually identify illicit connections to the fixed facility storm drain system.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Clean up spills on paved surfaces with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.
- See fact sheet SC-11 Spill Prevention, Control, and Clean Up.

Field Program

General

- Develop clear protocols and lines of communication for effectively prohibiting non-stormwater discharges, especially ones that involve more than one jurisdiction and those that are not classified as hazardous, which are often not responded to as effectively as they need to be.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as “Dump No Waste Drains to Stream” stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- See SC-74 Stormwater Drainage System Maintenance for additional information.

Field Inspection

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- During routine field program maintenance field staff should look for evidence of illegal discharges or illicit connection:
  - Is there evidence of spills such as paints, discoloring, etc.
  - Are there any odors associated with the drainage system
  - Record locations of apparent illegal discharges/illicit connections and notify appropriate investigating agency.
- If trained, conduct field investigation of non-stormwater discharges to determine whether they pose a threat to water quality.

Recommended Complaint Investigation Equipment

- Field Screening Analysis
  - pH paper or meter
  - Commercial stormwater pollutant screening kit that can detect for reactive phosphorus, nitrate nitrogen, ammonium nitrogen, specific conductance, and turbidity
  - Sample jars
  - Sample collection pole
  - A tool to remove access hole covers
- Laboratory Analysis
  - Sample cooler
  - Ice
  - Sample jars and labels
  - Chain of custody forms.
- Documentation
  - Camera
  - Notebook
  - Pens
  - Notice of Violation forms

- Educational materials

Reporting

- A database is useful for defining and tracking the magnitude and location of the problem.
- Report prohibited non-stormwater discharges observed during the course of normal daily activities so they can be investigated, contained and cleaned up or eliminated.
- Document that non-stormwater discharges have been eliminated by recording tests performed, methods used, dates of testing, and any onsite drainage points observed.
- Maintain documentation of illicit connection and illegal dumping incidents, including significant conditionally exempt discharges that are not properly managed.

Enforcement

- Educate the responsible party if identified on the impacts of their actions, explain the stormwater requirements, and provide information regarding Best Management Practices (BMP), as appropriate. Initiate follow-up and/or enforcement procedures.
- If an illegal discharge is traced to a commercial, residential or industrial source, conduct the following activities or coordinate the following activities with the appropriate agency:
  - Contact the responsible party to discuss methods of eliminating the non-stormwater discharge, including disposal options, recycling, and possible discharge to the sanitary sewer (if within POTW limits).
  - Provide information regarding BMPs to the responsible party, where appropriate.
  - Begin enforcement procedures, if appropriate.
  - Continue inspection and follow-up activities until the illicit discharge activity has ceased.
- If an illegal discharge is traced to a commercial or industrial activity, coordinate information on the discharge with the jurisdiction's commercial and industrial facility inspection program.

Training

- Train technical staff to identify and document illegal dumping incidents.
- Well-trained employees can reduce human errors that lead to accidental releases or spills. The employee should have the tools and knowledge to immediately begin cleaning up a spill if one should occur. Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.
- Train employees to identify non-stormwater discharges and report them to the appropriate departments.
- Train staff who have the authority to conduct surveillance and inspections, and write citations for those caught illegally dumping.

- Train municipal staff responsible for surveillance and inspection in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).
  - OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and federal OSHA 29 CFR 1910.146).
  - Procedural training (field screening, sampling, smoke/dye testing, TV inspection).
- Educate the identified responsible party on the impacts of his or her actions.

Spill Response and Prevention

- See SC-11 Spill Prevention Control and Clean Up

Other Considerations

- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The cost of fees for dumping at a proper waste disposal facility are often more than the fine for an illegal dumping offense, thereby discouraging people from complying with the law. The absence of routine or affordable pickup service for trash and recyclables in some communities also encourages illegal dumping. A lack of understanding regarding applicable laws or the inadequacy of existing laws may also contribute to the problem.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Many facilities do not have accurate, up-to-date schematic drawings.
- Can be difficult to locate illicit connections especially if there is groundwater infiltration.

Requirements

Costs

- Eliminating illicit connections can be expensive especially if structural modifications are required such re-plumbing cross connections under an existing slab.
- Minor cost to train field crews regarding the identification of non-stormwater discharges. The primary cost is for a fully integrated program to identify and eliminate illicit connections and illegal dumping. However, by combining with other municipal programs (i.e. pretreatment program) cost may be lowered.
- Municipal cost for containment and disposal may be borne by the discharger.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

What constitutes a "non-stormwater" discharge?

- Non-stormwater discharges are discharges not made up entirely of stormwater and include water used directly in the manufacturing process (process wastewater), air conditioning condensate and coolant, non-contact cooling water, cooling equipment condensate, outdoor secondary containment water, vehicle and equipment wash water, landscape irrigation, sink and drinking fountain wastewater, sanitary wastes, or other wastewaters.

Permit Requirements

- Current municipal NPDES permits require municipalities to effectively prohibit non-stormwater discharges unless authorized by a separate NPDES permit or allowed in accordance with the current NPDES permit conditions. Typically the current permits allow certain non-stormwater discharges in the storm drain system as long as the discharges are not significant sources of pollutants. In this context the following non-stormwater discharges are typically allowed:
  - Diverted stream flows;
  - Rising found waters;
  - Uncontaminated ground water infiltration (as defined at 40 CFR 35.2005(20));
  - Uncontaminated pumped ground water;
  - Foundation drains;
  - Springs;
  - Water from crawl space pumps;
  - Footing drains;
  - Air conditioning condensation;
  - Flows from riparian habitats and wetlands;
  - Water line and hydrant flushing ;
  - Landscape irrigation;
  - Planned and unplanned discharges from potable water sources;
  - Irrigation water;
  - Individual residential car washing; and
  - Lawn watering.

Municipal facilities subject to industrial general permit requirements must include a certification that the stormwater collection system has been tested or evaluated for the presence of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Illegal Dumping

- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties

Outreach

One of the keys to success of reducing or eliminating illegal dumping is increasing the number of people on the street who are aware of the problem and who have the tools to at least identify the incident, if not correct it. There we a number of ways of accomplishing this:

- Train municipal staff from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report the incidents.
- Deputize municipal staff who may come into contact with illegal dumping with the authority to write illegal dumping tickets for offenders caught in the act (see below).
- Educate the public. As many as 3 out of 4 people do not understand that in most communities the storm drain does not go to the wastewater treatment plant. Unfortunately, with the heavy emphasis in recent years on public education about solid waste management, including recycling and household hazardous waste, the sewer system (both storm and sanitary) has been the likely recipient of cross-media transfers of waste.
- Provide the public with a mechanism for reporting incidents such as a hot line and/or door hanger (see below).
- Help areas where incidents occur more frequently set up environmental watch programs (like crime watch programs).
- Train volunteers to notice and report the presence and suspected source of an observed pollutant to the appropriate public agency.

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of non-stormwater discharges. The state's General Industrial Stormwater Permit requires that non-stormwater discharges be eliminated prior to implementation of the facility's SWPPP.

Storm Drain Stenciling

- Stencil storm drain inlets with a message to prohibit illegal dumpings, especially in areas with waste handling facilities.
- Encourage public reporting of improper waste disposal by a HOTLINE number stenciled onto the storm drain inlet.
- See Supplemental Information section of this fact sheet for further detail on stenciling program approach.

Oil Recycling

- Contract collection and hauling of used oil to a private licensed used oil hauler/recycler.
- Comply with all applicable state and federal regulations regarding storage, handling, and transport of petroleum products.
- Create procedures for collection such as; collection locations and schedule, acceptable containers, and maximum amounts accepted.
- The California Integrated Waste Management Board has a Recycling Hotline, (800) 553-2962, that provides information and recycling locations for used oil.

Household Hazardous Waste

- Provide household hazardous waste (HHW) collection facilities. Several types of collection approaches are available including permanent, periodic, or mobile centers, curbside collection, or a combination of these systems.

Training

- Train municipal employees and contractors in proper and consistent methods for waste disposal.
- Train municipal employees to recognize and report illegal dumping.
- Train employees and subcontractors in proper hazardous waste management.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Federal Regulations (RCRA, SARA, CERCLA) and state regulations exist regarding the disposal of hazardous waste.
- Municipalities are required to have a used oil recycling element and a HHW element within their integrated waste management plan.
- Significant liability issues are involved with the collection, handling, and disposal of HHW.

Examples

The City of Palo Alto has developed a public participation program for reporting dumping violations. When a concerned citizen or public employee encounters evidence of illegal dumping, a door hanger (similar in format to hotel "Do Not Disturb" signs) is placed on the front doors in the neighborhood. The door hanger notes that a violation has occurred in the neighborhood, informs the reader why illegal dumping is a problem, and notes that illegal dumping carries a significant financial penalty. Information is also provided on what citizens can do as well as contact numbers for more information or to report a violation.

The Port of Long Beach has a state of the art database incorporating storm drain infrastructure, potential pollutant sources, facility management practices, and a pollutant tracking system.

The State Department of Fish and Game has a hotline for reporting violations called CalTIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).

The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Stormwater Pollution Control Manual - http://dnr.metrokc.gov/wlr/dss/spcm.htm

Orange County Stormwater Program,
http://www.ocwatersheds.com/stormwater/swp_introduction.asp

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program
(http://www.projectcleanwater.org)

Santa Clara Valley Urban Runoff Pollution Prevention Program
http://www.scvurppp-w2k.com/pdf%20documents/PS_ICID.PDF

Spill Prevention, Control & Cleanup SC-11



Photo Credit: Geoff Brosseau

Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Description

Many activities that occur at an industrial or commercial site have the potential to cause accidental or illegal spills. Preparation for accidental or illegal spills, with proper training and reporting systems implemented, can minimize the discharge of pollutants to the environment.

Spills and leaks are one of the largest contributors of stormwater pollutants. Spill prevention and control plans are applicable to any site at which hazardous materials are stored or used. An effective plan should have spill prevention and response procedures that identify potential spill areas, specify material handling procedures, describe spill response procedures, and provide spill clean-up equipment. The plan should take steps to identify and characterize potential spills, eliminate and reduce spill potential, respond to spills when they occur in an effort to prevent pollutants from entering the stormwater drainage system, and train personnel to prevent and control future spills.

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Approach

Pollution Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- Develop a Spill Prevention Control and Countermeasure (SPCC) Plan. The plan should include:

- Description of the facility, owner and address, activities and chemicals present
- Facility map
- Notification and evacuation procedures
- Cleanup instructions
- Identification of responsible departments
- Identify key spill response personnel

- Recycle, reclaim, or reuse materials whenever possible. This will reduce the amount of process materials that are brought into the facility.

Suggested Protocols (including equipment needs)

Spill Prevention

- Develop procedures to prevent/mitigate spills to storm drain systems. Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures.

- If consistent illegal dumping is observed at the facility:
  - Post "No Dumping" signs with a phone number for reporting illegal dumping and disposal. Signs should also indicate fines and penalties applicable for illegal dumping.
  - Landscaping and beautification efforts may also discourage illegal dumping.
  - Bright lighting and/or entrance barriers may also be needed to discourage illegal dumping.

- Store and contain liquid materials in such a manner that if the tank is ruptured, the contents will not discharge, flow, or be washed into the storm drainage system, surface waters, or groundwater.

- If the liquid is oil, gas, or other material that separates from and floats on water, install a spill control device (such as a tee section) in the catch basins that collects runoff from the storage tank area.

- Routine maintenance:
  - Place drip pans or absorbent materials beneath all mounted taps, and at all potential drip and spill locations during filling and unloading of tanks. Any collected liquids or soiled absorbent materials must be reused/recycled or properly disposed.
  - Store and maintain appropriate spill cleanup materials in a location known to all near the tank storage area; and ensure that employees are familiar with the site's spill control plan and/or proper spill cleanup procedures.
  - Sweep and clean the storage area monthly if it is paved, *do not hose down the area to a storm drain.*

  - Check tanks (and any containment sumps) daily for leaks and spills. Replace tanks that are leaking, corroded, or otherwise deteriorating with tanks in good condition. Collect all spilled liquids and properly dispose of them.

- Label all containers according to their contents (e.g., solvent, gasoline).
- Label hazardous substances regarding the potential hazard (corrosive, radioactive, flammable, explosive, poisonous).
- Prominently display required labels on transported hazardous and toxic materials (per US DOT regulations).
- Identify key spill response personnel.

Spill Control and Cleanup Activities

- Follow the Spill Prevention Control and Countermeasure Plan.
- Clean up leaks and spills immediately.
- Place a stockpile of spill cleanup materials where it will be readily accessible (e.g., near storage and maintenance areas).
- On paved surfaces, clean up spills with as little water as possible. Use a rag for small spills, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to a certified laundry (rags) or disposed of as hazardous waste. Physical methods for the cleanup of dry chemicals include the use of brooms, shovels, sweepers, or plows.
- Never hose down or bury dry material spills. Sweep up the material and dispose of properly.
- Chemical cleanups of material can be achieved with the use of adsorbents, gels, and foams. Use adsorbent materials on small spills rather than hosing down the spill. Remove the adsorbent materials promptly and dispose of properly.
- For larger spills, a private spill cleanup company or Hazmat team may be necessary.

Reporting

- Report spills that pose an immediate threat to human health or the environment to the Regional Water Quality Control Board.
- Federal regulations require that any oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hour).
- Report spills to local agencies, such as the fire department; they can assist in cleanup.
- Establish a system for tracking incidents. The system should be designed to identify the following:

  - Types and quantities (in some cases) of wastes

  - Patterns in time of occurrence (time of day/night, month, or year)

- Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)

- Responsible parties

Training

- Educate employees about spill prevention and cleanup.

- Well-trained employees can reduce human errors that lead to accidental releases or spills:

  - The employee should have the tools and knowledge to immediately begin cleaning up a spill should one occur.

  - Employees should be familiar with the Spill Prevention Control and Countermeasure Plan.

- Employees should be educated about aboveground storage tank requirements. Employees responsible for aboveground storage tanks and liquid transfers should be thoroughly familiar with the Spill Prevention Control and Countermeasure Plan and the plan should be readily available.

- Train employees to recognize and report illegal dumping incidents.

Other Considerations (Limitations and Regulations)

- A Spill Prevention Control and Countermeasure Plan (SPCC) is required for facilities that are subject to the oil pollution regulations specified in Part 112 of Title 40 of the Code of Federal Regulations or if they have a storage capacity of 10,000 gallons or more of petroleum. (Health and Safety Code 6.67)

- State regulations also exist for storage of hazardous materials (Health & Safety Code Chapter 6.95), including the preparation of area and business plans for emergency response to the releases or threatened releases.

- Consider requiring smaller secondary containment areas (less than 200 sq. ft.) to be connected to the sanitary sewer, prohibiting any hard connections to the storm drain.

Requirements

Costs (including capital and operation & maintenance)

- Will vary depending on the size of the facility and the necessary controls.

- Prevention of leaks and spills is inexpensive. Treatment and/or disposal of contaminated soil or water can be quite expensive.

Maintenance (including administrative and staffing)

- This BMP has no major administrative or staffing requirements. However, extra time is needed to properly handle and dispose of spills, which results in increased labor costs.

Supplemental Information

Further Detail of the BMP

Reporting

Record keeping and internal reporting represent good operating practices because they can increase the efficiency of the facility and the effectiveness of BMPs. A good record keeping system helps the facility minimize incident recurrence, correctly respond with appropriate cleanup activities, and comply with legal requirements. A record keeping and reporting system should be set up for documenting spills, leaks, and other discharges, including discharges of hazardous substances in reportable quantities. Incident records describe the quality and quantity of non-stormwater discharges to the storm sewer. These records should contain the following information:

- Date and time of the incident
- Weather conditions
- Duration of the spill/leak/discharge
- Cause of the spill/leak/discharge
- Response procedures implemented
- Persons notified
- Environmental problems associated with the spill/leak/discharge

Separate record keeping systems should be established to document housekeeping and preventive maintenance inspections, and training activities. All housekeeping and preventive maintenance inspections should be documented. Inspection documentation should contain the following information:

- The date and time the inspection was performed
- Name of the inspector
- Items inspected
- Problems noted
- Corrective action required
- Date corrective action was taken

Other means to document and record inspection results are field notes, timed and dated photographs, videotapes, and drawings and maps.

Aboveground Tank Leak and Spill Control

Accidental releases of materials from aboveground liquid storage tanks present the potential for contaminating stormwater with many different pollutants. Materials spilled, leaked, or lost from

tanks may accumulate in soils or on impervious surfaces and be carried away by stormwater runoff.

The most common causes of unintentional releases are:

- Installation problems
- Failure of piping systems (pipes, pumps, flanges, couplings, hoses, and valves)
- External corrosion and structural failure
- Spills and overfills due to operator error
- Leaks during pumping of liquids or gases from truck or rail car to a storage tank or vice versa

Storage of reactive, ignitable, or flammable liquids should comply with the Uniform Fire Code and the National Electric Code. Practices listed below should be employed to enhance the code requirements:

- Tanks should be placed in a designated area.
- Tanks located in areas where firearms are discharged should be encapsulated in concrete or the equivalent.
- Designated areas should be impervious and paved with Portland cement concrete, free of cracks and gaps, in order to contain leaks and spills.
- Liquid materials should be stored in UL approved double walled tanks or surrounded by a curb or dike to provide the volume to contain 10 percent of the volume of all of the containers or 110 percent of the volume of the largest container, whichever is greater. The area inside the curb should slope to a drain.
- For used oil or dangerous waste, a dead-end sump should be installed in the drain.
- All other liquids should be drained to the sanitary sewer if available. The drain must have a positive control such as a lock, valve, or plug to prevent release of contaminated liquids.
- Accumulated stormwater in petroleum storage areas should be passed through an oil/water separator.

Maintenance is critical to preventing leaks and spills. Conduct routine inspections and:

- Check for external corrosion and structural failure.
- Check for spills and overfills due to operator error.
- Check for failure of piping system (pipes, pumps, flanger, coupling, hoses, and valves).
- Check for leaks or spills during pumping of liquids or gases from truck or rail car to a storage facility or vice versa.

- Visually inspect new tank or container installation for loose fittings, poor welding, and improper or poorly fitted gaskets.
- Inspect tank foundations, connections, coatings, and tank walls and piping system. Look for corrosion, leaks, cracks, scratches, and other physical damage that may weaken the tank or container system.
- Frequently relocate accumulated stormwater during the wet season.
- Periodically conduct integrity testing by a qualified professional.

Vehicle Leak and Spill Control

Major spills on roadways and other public areas are generally handled by highly trained Hazmat teams from local fire departments or environmental health departments. The measures listed below pertain to leaks and smaller spills at vehicle maintenance shops.

In addition to implementing the spill prevention, control, and clean up practices above, use the following measures related to specific activities:

Vehicle and Equipment Maintenance

- Perform all vehicle fluid removal or changing inside or under cover to prevent the run-on of stormwater and the runoff of spills.
- Regularly inspect vehicles and equipment for leaks, and repair immediately.
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Immediately drain all fluids from wrecked vehicles.
- Store wrecked vehicles or damaged equipment under cover.
- Place drip pans or absorbent materials under heavy equipment when not in use.
- Use adsorbent materials on small spills rather than hosing down the spill.
- Remove the adsorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around.
- Oil filters disposed of in trashcans or dumpsters can leak oil and contaminate stormwater. Place the oil filter in a funnel over a waste oil recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask your oil supplier or recycler about recycling oil filters.

- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- Design the fueling area to prevent the run-on of stormwater and the runoff of spills:
  - Cover fueling area if possible.
  - Use a perimeter drain or slope pavement inward with drainage to a sump.
  - Pave fueling area with concrete rather than asphalt.
- If dead-end sump is not used to collect spills, install an oil/water separator.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Discourage "topping-off' of fuel tanks.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Use adsorbent materials on small spills and general cleaning rather than hosing down the area. Remove the adsorbent materials promptly.
- Carry out all Federal and State requirements regarding underground storage tanks, or install above ground tanks.
- Do not use mobile fueling of mobile industrial equipment around the facility; rather, transport the equipment to designated fueling areas.
- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Train employees in proper fueling and cleanup procedures.

Industrial Spill Prevention Response

For the purposes of developing a spill prevention and response program to meet the stormwater regulations, facility managers should use information provided in this fact sheet and the spill prevention/response portions of the fact sheets in this handbook, for specific activities. The program should:

- Integrate with existing emergency response/hazardous materials programs (e.g., Fire Department)
- Develop procedures to prevent/mitigate spills to storm drain systems
- Identify responsible departments
- Develop and standardize reporting procedures, containment, storage, and disposal activities, documentation, and follow-up procedures
- Address spills at municipal facilities, as well as public areas

- Provide training concerning spill prevention, response and cleanup to all appropriate personnel

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Stormwater Managers Resource Center http://www.stormwatercenter.net/

Building & Grounds Maintenance SC-41



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, and abnormal pH. Utilizing the following protocols will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Pollution Prevention

- Switch to non-toxic chemicals for maintenance when possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

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Suggested Protocols

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a waste water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.
- If soaps or detergents are not used, and the surrounding area is paved, wash water runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in he catch basin to trap the particles in wash water runoff.
- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement. Ensure that this practice does not kill grass.

Landscaping Activities

- Do not apply any chemicals (insecticide, herbicide, or fertilizer) directly to surface waters, unless the application is approved and permitted by the state.
- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures on exposed soils.
- Check irrigation schedules so pesticides will not be washed away and to minimize non-stormwater discharge.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.
- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.
- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.
- Clean paint brushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and solids must be collected and disposed of before removing the containment device(s) at the end of the work day.
- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. In which case you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover with secondary containment during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water; do not put it in the storm drain, pour over landscaped areas.
- Use hand or mechanical weeding where practical.

Fertilizer and Pesticide Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Follow manufacturers' recommendations and label directions. Pesticides must never be applied if precipitation is occuring or predicted. Do not apply insecticides within 100 feet of surface waters such as lakes, ponds, wetlands, and streams.
- Use less toxic pesticides that will do the job, whenever possible. Avoid use of copper-based pesticides if possible.
- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.

- Apply pesticides only when wind speeds are low.
- Work fertilizers into the soil rather than dumping or broadcasting them onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the nature of the staff.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, and implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Alternative pest/weed controls may not be available, suitable, or effective in many cases.

Requirements

Costs

- Overall costs should be low in comparison to other BMPs.

Maintenance

- Sweep paved areas regularly to collect loose particles, and wipe up spills with rags and other absorbent material immediately, do not hose down the area to a storm drain.

Supplemental Information

Further Detail of the BMP

Fire Sprinkler Line Flushing

Building fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping but it is subject to rusting and results in lower quality water. Initially the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time, typically a year, between flushes and may accumulate iron, manganese, lead, copper, nickel and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

King County - ftp://dnr.metrokc.gov/wlr/dss/spcm/Chapter%203.PDF

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Mobile Cleaners Pilot Program: Final Report. 1997. Bay Area Stormwater Management Agencies Association (BASSMA) http://www.basmaa.org/

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basmaa.org/

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) -
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Building Repair and Construction SC-42



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Recycle

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	✓
Bacteria	
Oil and Grease	✓
Organics	✓

Description

Modifications are common particularly at large industrial sites. The activity may vary from minor and normal building repair to major remodeling, or the construction of new facilities. These activities can generate pollutants including solvents, paints, paint and varnish removers, finishing residues, spent thinners, soap cleaners, kerosene, asphalt and concrete materials, adhesive residues, and old asbestos installation. Protocols in this fact sheet are intended to prevent or reduce the discharge of pollutants to stormwater from building repair, remodeling, and construction by using soil erosion controls, enclosing or covering building material storage areas, using good housekeeping practices, using safer alternative products, and training employees.

Approach

Pollution Prevention

- Recycle residual paints, solvents, lumber, and other materials to the maximum extent practical.
- Buy recycled products to the maximum extent practical.
- Inform on-site contractors of company policy on these matters and include appropriate provisions in their contract to ensure certain proper housekeeping and disposal practices are implemented.

CASQA California Stormwater Quality Association

- Make sure that nearby storm drains are well marked to minimize the chance of inadvertent disposal of residual paints and other liquids.

Suggested Protocols

Repair & Remodeling

- Follow BMPs identified in Construction BMP Handbook.
- Maintain good housekeeping practices while work is underway.
- Keep the work site clean and orderly. Remove debris in a timely fashion. Sweep the area.
- Cover materials of particular concern that must be left outside, particularly during the rainy season.
- Do not dump waste liquids down the storm drain.
- Dispose of wash water, sweepings, and sediments properly.
- Store materials properly that are normally used in repair and remodeling such as paints and solvents.
- Sweep out the gutter or wash the gutter and trap the particles at the outlet of the downspout if when repairing roofs, small particles have accumulated in the gutter. A sock or geofabric placed over the outlet may effectively trap the materials. If the downspout is tight lined, place a temporary plug at the first convenient point in the storm drain and pump out the water with a vactor truck, and clean the catch basin sump where you placed the plug.
- Properly store and dispose waste materials generated from construction activities. See Construction BMP Handbook.
- Clean the storm drain system in the immediate vicinity of the construction activity after it is completed.

Painting

- Enclose painting operations consistent with local air quality regulations and OSHA.
- Local air pollution regulations may, in many areas of the state, specify painting procedures which if properly carried out are usually sufficient to protect water quality.
- Develop paint handling procedures for proper use, storage, and disposal of paints.
- Transport paint and materials to and from job sites in containers with secure lids and tied down to the transport vehicle.
- Test and inspect spray equipment prior to starting to paint. Tighten all hoses and connections and do not overfill paint containers.
- Mix paint indoors before using so that any spill will not be exposed to rain. Do so even during dry weather because cleanup of a spill will never be 100% effective.
- Transfer and load paint and hot thermoplastic away from storm drain inlets.

- Do not transfer or load paint near storm drain inlets.
- Plug nearby storm drain inlets prior to starting painting and remove plugs when job is complete when there is significant risk of a spill reaching storm drains.
- Cover nearby storm drain inlets prior to starting work if sand blasting is used to remove paint.
- Use a ground cloth to collect the chips if painting requires scraping or sand blasting of the existing surface. Dispose the residue properly.
- Cover or enclose painting operations properly to avoid drift.
- Clean the application equipment in a sink that is connected to the sanitary sewer if using water based paints.
- Capture all cleanup-water and dispose of properly.
- Dispose of paints containing lead or tributyl tin and considered a hazardous waste properly.
- Store leftover paints if they are to be kept for the next job properly, or dispose properly.
- Recycle paint when possible. Dispose of paint at an appropriate household hazardous waste facility.

Training

Proper education of off-site contractors is often overlooked. The conscientious efforts of well trained employees can be lost by unknowing off-site contractors, so make sure they are well informed about what they are expected to do.

Spill Response and Prevention

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Clean up spills immediately.
- Excavate and remove the contaminated (stained) soil if a spill occurs on dirt.

Limitations

- This BMP is for minor construction only. The State's General Construction Activity Stormwater Permit has more requirements for larger projects. The companion "Construction Best Management Practice Handbook" contains specific guidance and best management practices for larger-scale projects.
- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Be certain that actions to help stormwater quality are consistent with Cal- and Fed-OSHA and air quality regulations.

SC-42 Building Repair and Construction

Requirements

Costs

These BMPs are generally low to modest in cost.

Maintenance

N/A

Supplemental Information

Further Detail of the BMP

Soil/Erosion Control

If the work involves exposing large areas of soil, employ the appropriate soil erosion and control techniques. See the Construction Best Management Practice Handbook. If old buildings are being torn down and not replaced in the near future, stabilize the site using measures described in SC-40 Contaminated or Erodible Areas.

If a building is to be placed over an open area with a storm drainage system, make sure the storm inlets within the building are covered or removed, or the storm line is connected to the sanitary sewer. If because of the remodeling a new drainage system is to be installed or the existing system is to be modified, consider installing catch basins as they serve as effective "in-line" treatment devices. See Treatment Control Fact Sheet TC-20 Wet Pond/Basin in Section 5 of the New Development and Redevelopment Handbook regarding design criteria. Include in the catch basin a "turn-down" elbow or similar device to trap floatables.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net/

Parking/Storage Area Maintenance SC-43



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Description

Parking lots and storage areas can contribute a number of substances, such as trash, suspended solids, hydrocarbons, oil and grease, and heavy metals that can enter receiving waters through stormwater runoff or non-stormwater discharges. The following protocols are intended to prevent or reduce the discharge of pollutants from parking/storage areas and include using good housekeeping practices, following appropriate cleaning BMPs, and training employees.

Approach

Pollution Prevention

- Encourage alternative designs and maintenance strategies for impervious parking lots. (See New Development and Redevelopment BMP Handbook).
- Keep accurate maintenance logs to evaluate BMP implementation.

Suggested Protocols

General

- Keep the parking and storage areas clean and orderly. Remove debris in a timely fashion.
- Allow sheet runoff to flow into biofilters (vegetated strip and swale) and/or infiltration devices.
- Utilize sand filters or oleophilic collectors for oily waste in low concentrations.

- Arrange rooftop drains to prevent drainage directly onto paved surfaces.
- Design lot to include semi-permeable hardscape.

Controlling Litter

- Post "No Littering" signs and enforce anti-litter laws.
- Provide an adequate number of litter receptacles.
- Clean out and cover litter receptacles frequently to prevent spillage.
- Provide trash receptacles in parking lots to discourage litter.
- Routinely sweep, shovel and dispose of litter in the trash.

Surface cleaning

- Use dry cleaning methods (e.g. sweeping or vacuuming) to prevent the discharge of pollutants into the stormwater conveyance system.
- Establish frequency of public parking lot sweeping based on usage and field observations of waste accumulation.
- Sweep all parking lots at least once before the onset of the wet season.
- If water is used follow the procedures below:
  - Block the storm drain or contain runoff.
  - Wash water should be collected and pumped to the sanitary sewer or discharged to a pervious surface, do not allow wash water to enter storm drains.
  - Dispose of parking lot sweeping debris and dirt at a landfill.
- When cleaning heavy oily deposits:
  - Use absorbent materials on oily spots prior to sweeping or washing.
  - Dispose of used absorbents appropriately.

Surface Repair

- Pre-heat, transfer or load hot bituminous material away from storm drain inlets.
- Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff.
- Cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc., where applicable. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal.

- Use only as much water as necessary for dust control, to avoid runoff.
- Catch drips from paving equipment that is not in use with pans or absorbent material placed under the machines. Dispose of collected material and absorbents properly.

Inspection

- Have designated personnel conduct inspections of the parking facilities and stormwater conveyance systems associated with them on a regular basis.
- Inspect cleaning equipment/sweepers for leaks on a regular basis.

Training

- Provide regular training to field employees and/or contractors regarding cleaning of paved areas and proper operation of equipment.
- Train employees and contractors in proper techniques for spill containment and cleanup.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup.
- Keep your Spill Prevention Control and countermeasure (SPCC) plan up-to-date, nad implement accordingly.
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Limitations related to sweeping activities at large parking facilities may include high equipment costs, the need for sweeper operator training, and the inability of current sweeper technology to remove oil and grease.

Requirements

Costs

Cleaning/sweeping costs can be quite large, construction and maintenance of stormwater structural controls can be quite expensive as well.

Maintenance

- Sweep parking lot to minimize cleaning with water.
- Clean out oil/water/sand separators regularly, especially after heavy storms.
- Clean parking facilities on a regular basis to prevent accumulated wastes and pollutants from being discharged into conveyance systems during rainy conditions.

SC-43 Parking/Storage Area Maintenance

Supplemental Information

Further Detail of the BMP

Surface Repair

Apply concrete, asphalt, and seal coat during dry weather to prevent contamination form contacting stormwater runoff. Where applicable, cover and seal nearby storm drain inlets (with waterproof material or mesh) and manholes before applying seal coat, slurry seal, etc. Leave covers in place until job is complete and until all water from emulsified oil sealants has drained or evaporated. Clean any debris from these covered manholes and drains for proper disposal. Use only as much water as necessary for dust control, to avoid runoff.

References and Resources

http://www.stormwatercenter.net/

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality control Board. July 1998 (Revised February 2002 by the California Coastal Commission).

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Pollution from Surface Cleaning Folder. 1996. Bay Area Stormwater Management Agencies Association (BASMAA) http://www.basma.org

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP)
http://www.projectcleanwater.org/pdf/Model%20Program%20Municipal%20Facilities.pdf

Drainage System Maintenance SC-44



Objectives

- Cover
- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff and stormwater that may contain certain pollutants. The protocols in this fact sheet are intended to reduce pollutants reaching receiving waters through proper conveyance system operation and maintenance.

Targeted Constituents

Sediment	✓
Nutrients	
Trash	✓
Metals	
Bacteria	✓
Oil and Grease	
Organics	

Approach

Pollution Prevention

Maintain catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis to remove pollutants, reduce high pollutant concentrations during the first flush of storms, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Suggested Protocols

Catch Basins/Inlet Structures

- Staff should regularly inspect facilities to ensure compliance with the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC34 Waste Handling and Disposal).

- Clean catch basins, storm drain inlets, and other conveyance structures before the wet season to remove sediments and debris accumulated during the summer.
- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes if necessary with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed. Do not dewater near a storm drain or stream.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect and pump flushed effluent to the sanitary sewer for treatment whenever possible.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge to reach the storm drain system when cleaning a storm drain pump station or other facility.
- Conduct routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.

Open Channel

- Modify storm channel characteristics to improve channel hydraulics, increase pollutant removals, and enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a Steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies (SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS.

Illicit Connections and Discharges

- Look for evidence of illegal discharges or illicit connections during routine maintenance of conveyance system and drainage structures:
  - Is there evidence of spills such as paints, discoloring, etc?

- Are there any odors associated with the drainage system?
- Record locations of apparent illegal discharges/illicit connections?
- Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of upgradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
- Eliminate the discharge once the origin of flow is established.

- Stencil or demarcate storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Inspect and clean up hot spots and other storm drainage areas regularly where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Allow only properly trained individuals to handle hazardous materials/wastes.
- Have staff involved in detection and removal of illicit connections trained in the following:
  - OSHA-required Health and Safety Training (29 CFR 1910.120) plus annual refresher training (as needed).

- OSHA Confined Space Entry training (Cal-OSHA Confined Space, Title 8 and Federal OSHA 29 CFR 1910.146).

- Procedural training (field screening, sampling, smoke/dye testing, TV inspection).

Spill Response and Prevention

- Investigate all reports of spills, leaks, and/or illegal dumping promptly.
- Clean up all spills and leaks using "dry" methods (with absorbent materials and/or rags) or dig up, remove, and properly dispose of contaminated soil.
- Refer to fact sheet SC-11 Spill Prevention, Control, and Cleanup.

Other Considerations (Limitations and Regulations)

- Clean-up activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and prohibition against disposal of flushed effluent to sanitary sewer in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Local municipal codes may include sections prohibiting discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget.
- The elimination of illegal dumping is dependent on the availability, convenience, and cost of alternative means of disposal. The primary cost is for staff time. Cost depends on how aggressively a program is implemented. Other cost considerations for an illegal dumping program include:

  - Purchase and installation of signs.

  - Rental of vehicle(s) to haul illegally-disposed items and material to landfills.

  - Rental of heavy equipment to remove larger items (e.g., car bodies) from channels.

  - Purchase of landfill space to dispose of illegally-dumped items and material.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.
- Teams of at least two people plus administrative personnel are required to identify illicit discharges, depending on the complexity of the storm sewer system.
- Arrangements must be made for proper disposal of collected wastes.
- Technical staff are required to detect and investigate illegal dumping violations.

Supplemental Information

Further Detail of the BMP

Storm Drain Flushing

Flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in storm drainage systems. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as an open channel, another point where flushing will be initiated, or the sanitary sewer and the treatment facilities, thus preventing resuspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. Deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, thereby releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce impacts of stormwater pollution, a second inflatable device placed well downstream may be used to recollect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to recollect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75% for organics and 55-65% for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm sewer flushing.

References and Resources

California's Nonpoint Source Program Plan http://www.swrcb.ca.gov/nps/index.html

Clark County Storm Water Pollution Control Manual
http://www.co.clark.wa.us/pubworks/bmpman.pdf

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

King County Storm Water Pollution Control Manual http://dnr.metrokc.gov/wlr/dss/spcm.htm

Oregon Association of Clean Water Agencies. Oregon Municipal Stormwater Toolbox for Maintenance Practices. June 1998.

Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp.org

The Storm Water Managers Resource Center http://www.stormwatercenter.net

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line:
http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Site Design & Landscape Planning SD-10



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- ☑ Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Each project site possesses unique topographic, hydrologic, and vegetative features, some of which are more suitable for development than others. Integrating and incorporating appropriate landscape planning methodologies into the project design is the most effective action that can be done to minimize surface and groundwater contamination from stormwater.

Approach

Landscape planning should couple consideration of land suitability for urban uses with consideration of community goals and projected growth. Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for site design and landscapes planning should conform to applicable standards and specifications of agencies with jurisdiction and be consistent with applicable General Plan and Local Area Plan policies.

Designing New Installations

Begin the development of a plan for the landscape unit with attention to the following general principles:

- Formulate the plan on the basis of clearly articulated community goals. Carefully identify conflicts and choices between retaining and protecting desired resources and community growth.
- Map and assess land suitability for urban uses. Include the following landscape features in the assessment: wooded land, open unwooded land, steep slopes, erosion-prone soils, foundation suitability, soil suitability for waste disposal, aquifers, aquifer recharge areas, wetlands, floodplains, surface waters, agricultural lands, and various categories of urban land use. When appropriate, the assessment can highlight outstanding local or regional resources that the community determines should be protected (e.g., a scenic area, recreational area, threatened species habitat, farmland, fish run). Mapping and assessment should recognize not only these resources but also additional areas needed for their sustenance.

Project plan designs should conserve natural areas to the extent possible, maximize natural water storage and infiltration opportunities, and protect slopes and channels.

Conserve Natural Areas during Landscape Planning

If applicable, the following items are required and must be implemented in the site layout during the subdivision design and approval process, consistent with applicable General Plan and Local Area Plan policies:

- Cluster development on least-sensitive portions of a site while leaving the remaining land in a natural undisturbed condition.
- Limit clearing and grading of native vegetation at a site to the minimum amount needed to build lots, allow access, and provide fire protection.
- Maximize trees and other vegetation at each site by planting additional vegetation, clustering tree areas, and promoting the use of native and/or drought tolerant plants.
- Promote natural vegetation by using parking lot islands and other landscaped areas.
- Preserve riparian areas and wetlands.

Maximize Natural Water Storage and Infiltration Opportunities Within the Landscape Unit

- Promote the conservation of forest cover. Building on land that is already deforested affects basin hydrology to a lesser extent than converting forested land. Loss of forest cover reduces interception storage, detention in the organic forest floor layer, and water losses by evapotranspiration, resulting in large peak runoff increases and either their negative effects or the expense of countering them with structural solutions.
- Maintain natural storage reservoirs and drainage corridors, including depressions, areas of permeable soils, swales, and intermittent streams. Develop and implement policies and

regulations to discourage the clearing, filling, and channelization of these features. Utilize them in drainage networks in preference to pipes, culverts, and engineered ditches.

- Evaluating infiltration opportunities by referring to the stormwater management manual for the jurisdiction and pay particular attention to the selection criteria for avoiding groundwater contamination, poor soils, and hydrogeological conditions that cause these facilities to fail. If necessary, locate developments with large amounts of impervious surfaces or a potential to produce relatively contaminated runoff away from groundwater recharge areas.

Protection of Slopes and Channels during Landscape Design

- Convey runoff safely from the tops of slopes.
- Avoid disturbing steep or unstable slopes.
- Avoid disturbing natural channels.
- Stabilize disturbed slopes as quickly as possible.
- Vegetate slopes with native or drought tolerant vegetation.
- Control and treat flows in landscaping and/or other controls prior to reaching existing natural drainage systems.
- Stabilize temporary and permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel.
- Install energy dissipaters, such as riprap, at the outlets of new storm drains, culverts, conduits, or channels that enter unlined channels in accordance with applicable specifications to minimize erosion. Energy dissipaters shall be installed in such a way as to minimize impacts to receiving waters.
- Line on-site conveyance channels where appropriate, to reduce erosion caused by increased flow velocity due to increases in tributary impervious area. The first choice for linings should be grass or some other vegetative surface, since these materials not only reduce runoff velocities, but also provide water quality benefits from filtration and infiltration. If velocities in the channel are high enough to erode grass or other vegetative linings, riprap, concrete, soil cement, or geo-grid stabilization are other alternatives.
- Consider other design principles that are comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define “redevelopment” in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of “ redevelopment” must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under “designing new installations” above should be followed.

Redevelopment may present significant opportunity to add features which had not previously been implemented. Examples include incorporation of depressions, areas of permeable soils, and swales in newly redeveloped areas. While some site constraints may exist due to the status of already existing infrastructure, opportunities should not be missed to maximize infiltration, slow runoff, reduce impervious areas, disconnect directly connected impervious areas.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Stormwater Management Manual for Western Washington, Washington State Department of Ecology, August 2001.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Roof Runoff Controls SD-11



Rain Garden

Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Various roof runoff controls are available to address stormwater that drains off rooftops. The objective is to reduce the total volume and rate of runoff from individual lots, and retain the pollutants on site that may be picked up from roofing materials and atmospheric deposition. Roof runoff controls consist of directing the roof runoff away from paved areas and mitigating flow to the storm drain system through one of several general approaches: cisterns or rain barrels; dry wells or infiltration trenches; pop-up emitters, and foundation planting. The first three approaches require the roof runoff to be contained in a gutter and downspout system. Foundation planting provides a vegetated strip under the drip line of the roof.

Approach

Design of individual lots for single-family homes as well as lots for higher density residential and commercial structures should consider site design provisions for containing and infiltrating roof runoff or directing roof runoff to vegetative swales or buffer areas. Retained water can be reused for watering gardens, lawns, and trees. Benefits to the environment include reduced demand for potable water used for irrigation, improved stormwater quality, increased groundwater recharge, decreased runoff volume and peak flows, and decreased flooding potential.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment.

Design Considerations

Designing New Installations

Cisterns or Rain Barrels

One method of addressing roof runoff is to direct roof downspouts to cisterns or rain barrels. A cistern is an above ground storage vessel with either a manually operated valve or a permanently open outlet. Roof runoff is temporarily stored and then released for irrigation or infiltration between storms. The number of rain

barrels needed is a function of the rooftop area. Some low impact developers recommend that every house have at least 2 rain barrels, with a minimum storage capacity of 1000 liters. Roof barrels serve several purposes including mitigating the first flush from the roof which has a high volume, amount of contaminants, and thermal load. Several types of rain barrels are commercially available. Consideration must be given to selecting rain barrels that are vector proof and childproof. In addition, some barrels are designed with a bypass valve that filters out grit and other contaminants and routes overflow to a soak-away pit or rain garden.

If the cistern has an operable valve, the valve can be closed to store stormwater for irrigation or infiltration between storms. This system requires continual monitoring by the resident or grounds crews, but provides greater flexibility in water storage and metering. If a cistern is provided with an operable valve and water is stored inside for long periods, the cistern must be covered to prevent mosquitoes from breeding.

A cistern system with a permanently open outlet can also provide for metering stormwater runoff. If the cistern outlet is significantly smaller than the size of the downspout inlet (say ¼ to ½ inch diameter), runoff will build up inside the cistern during storms, and will empty out slowly after peak intensities subside. This is a feasible way to mitigate the peak flow increases caused by rooftop impervious land coverage, especially for the frequent, small storms.

Dry wells and Infiltration Trenches

Roof downspouts can be directed to dry wells or infiltration trenches. A dry well is constructed by excavating a hole in the ground and filling it with an open graded aggregate, and allowing the water to fill the dry well and infiltrate after the storm event. An underground connection from the downspout conveys water into the dry well, allowing it to be stored in the voids. To minimize sedimentation from lateral soil movement, the sides and top of the stone storage matrix can be wrapped in a permeable filter fabric, though the bottom may remain open. A perforated observation pipe can be inserted vertically into the dry well to allow for inspection and maintenance.

In practice, dry wells receiving runoff from single roof downspouts have been successful over long periods because they contain very little sediment. They must be sized according to the amount of rooftop runoff received, but are typically 4 to 5 feet square, and 2 to 3 feet deep, with a minimum of 1-foot soil cover over the top (maximum depth of 10 feet).

To protect the foundation, dry wells must be set away from the building at least 10 feet. They must be installed in solids that accommodate infiltration. In poorly drained soils, dry wells have very limited feasibility.

Infiltration trenches function in a similar manner and would be particularly effective for larger roof areas. An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. These are described under Treatment Controls.

Pop-up Drainage Emitter

Roof downspouts can be directed to an underground pipe that daylights some distance from the building foundation, releasing the roof runoff through a pop-up emitter. Similar to a pop-up irrigation head, the emitter only opens when there is flow from the roof. The emitter remains flush to the ground during dry periods, for ease of lawn or landscape maintenance.

Foundation Planting

Landscape planting can be provided around the base to allow increased opportunities for stormwater infiltration and protect the soil from erosion caused by concentrated sheet flow coming off the roof. Foundation plantings can reduce the physical impact of water on the soil and provide a subsurface matrix of roots that encourage infiltration. These plantings must be sturdy enough to tolerate the heavy runoff sheet flows, and periodic soil saturation.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Supplemental Information

Examples

- City of Ottawa's Water Links Surface –Water Quality Protection Program
- City of Toronto Downspout Disconnection Program
- City of Boston, MA, Rain Barrel Demonstration Program

Other Resources

Hager, Marty Catherine, Stormwater, "Low-Impact Development", January/February 2003. www.stormh2o.com

Low Impact Urban Design Tools, Low Impact Development Design Center, Beltsville, MD. www.lid-stormwater.net

Start at the Source, Bay Area Stormwater Management Agencies Association, 1999 Edition

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

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- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include “NO DUMPING

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Maintenance Bays & Docks SD-31



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Several measures can be taken to prevent operations at maintenance bays and loading docks from contributing a variety of toxic compounds, oil and grease, heavy metals, nutrients, suspended solids, and other pollutants to the stormwater conveyance system.

Approach

In designs for maintenance bays and loading docks, containment is encouraged. Preventative measures include overflow containment structures and dead-end sumps. However, in the case of loading docks from grocery stores and warehouse/distribution centers, engineered infiltration systems may be considered.

Suitable Applications

Appropriate applications include commercial and industrial areas planned for development or redevelopment.

Design Considerations

Design requirements for vehicle maintenance and repair are governed by Building and Fire Codes, and by current local agency ordinances, and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code requirements.

Designing New Installations

Designs of maintenance bays should consider the following:

- Repair/maintenance bays and vehicle parts with fluids should be indoors; or designed to preclude urban run-on and runoff.
- Repair/maintenance floor areas should be paved with Portland cement concrete (or equivalent smooth impervious surface).

- Repair/maintenance bays should be designed to capture all wash water leaks and spills. Provide impermeable berms, drop inlets, trench catch basins, or overflow containment structures around repair bays to prevent spilled materials and wash-down waters form entering the storm drain system. Connect drains to a sump for collection and disposal. Direct connection of the repair/maintenance bays to the storm drain system is prohibited. If required by local jurisdiction, obtain an Industrial Waste Discharge Permit.
- Other features may be comparable and equally effective.

The following designs of loading/unloading dock areas should be considered:

- Loading dock areas should be covered, or drainage should be designed to preclude urban run-on and runoff.
- Direct connections into storm drains from depressed loading docks (truck wells) are prohibited.
- Below-grade loading docks from grocery stores and warehouse/distribution centers of fresh food items should drain through water quality inlets, or to an engineered infiltration system, or an equally effective alternative. Pre-treatment may also be required.
- Other features may be comparable and equally effective.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Stormwater and non-stormwater will accumulate in containment areas and sumps with impervious surfaces. Contaminated accumulated water must be disposed of in accordance with applicable laws and cannot be discharged directly to the storm drain or sanitary sewer system without the appropriate permit.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Trash Storage Areas SD-32

Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- ☑ Contain Pollutants
- Collect and Convey

Description

Trash storage areas are areas where a trash receptacle (s) are located for use as a repository for solid wastes. Stormwater runoff from areas where trash is stored or disposed of can be polluted. In addition, loose trash and debris can be easily transported by water or wind into nearby storm drain inlets, channels, and/or creeks. Waste handling operations that may be sources of stormwater pollution include dumpsters, litter control, and waste piles.

Approach

This fact sheet contains details on the specific measures required to prevent or reduce pollutants in stormwater runoff associated with trash storage and handling. Preventative measures including enclosures, containment structures, and impervious pavements to mitigate spills, should be used to reduce the likelihood of contamination.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Design requirements for waste handling areas are governed by Building and Fire Codes, and by current local agency ordinances and zoning requirements. The design criteria described in this fact sheet are meant to enhance and be consistent with these code and ordinance requirements. Hazardous waste should be handled in accordance with legal requirements established in Title 22, California Code of Regulation.

Wastes from commercial and industrial sites are typically hauled by either public or commercial carriers that may have design or access requirements for waste storage areas. The design criteria in this fact sheet are recommendations and are not intended to be in conflict with requirements established by the waste hauler. The waste hauler should be contacted prior to the design of your site trash collection areas. Conflicts or issues should be discussed with the local agency.

Designing New Installations

Trash storage areas should be designed to consider the following structural or treatment control BMPs:

- Design trash container areas so that drainage from adjoining roofs and pavement is diverted around the area(s) to avoid run-on. This might include berming or grading the waste handling area to prevent run-on of stormwater.
- Make sure trash container areas are screened or walled to prevent off-site transport of trash.

- Use lined bins or dumpsters to reduce leaking of liquid waste.
- Provide roofs, awnings, or attached lids on all trash containers to minimize direct precipitation and prevent rainfall from entering containers.
- Pave trash storage areas with an impervious surface to mitigate spills.
- Do not locate storm drains in immediate vicinity of the trash storage area.
- Post signs on all dumpsters informing users that hazardous materials are not to be disposed of therein.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Additional Information

Maintenance Considerations

The integrity of structural elements that are subject to damage (i.e., screens, covers, and signs) must be maintained by the owner/operator. Maintenance agreements between the local agency and the owner/operator may be required. Some agencies will require maintenance deed restrictions to be recorded of the property title. If required by the local agency, maintenance agreements or deed restrictions must be executed by the owner/operator before improvement plans are approved.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Water Supply Assessment

K-4 Industrial Project

September 19, 2018

Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518

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Introduction

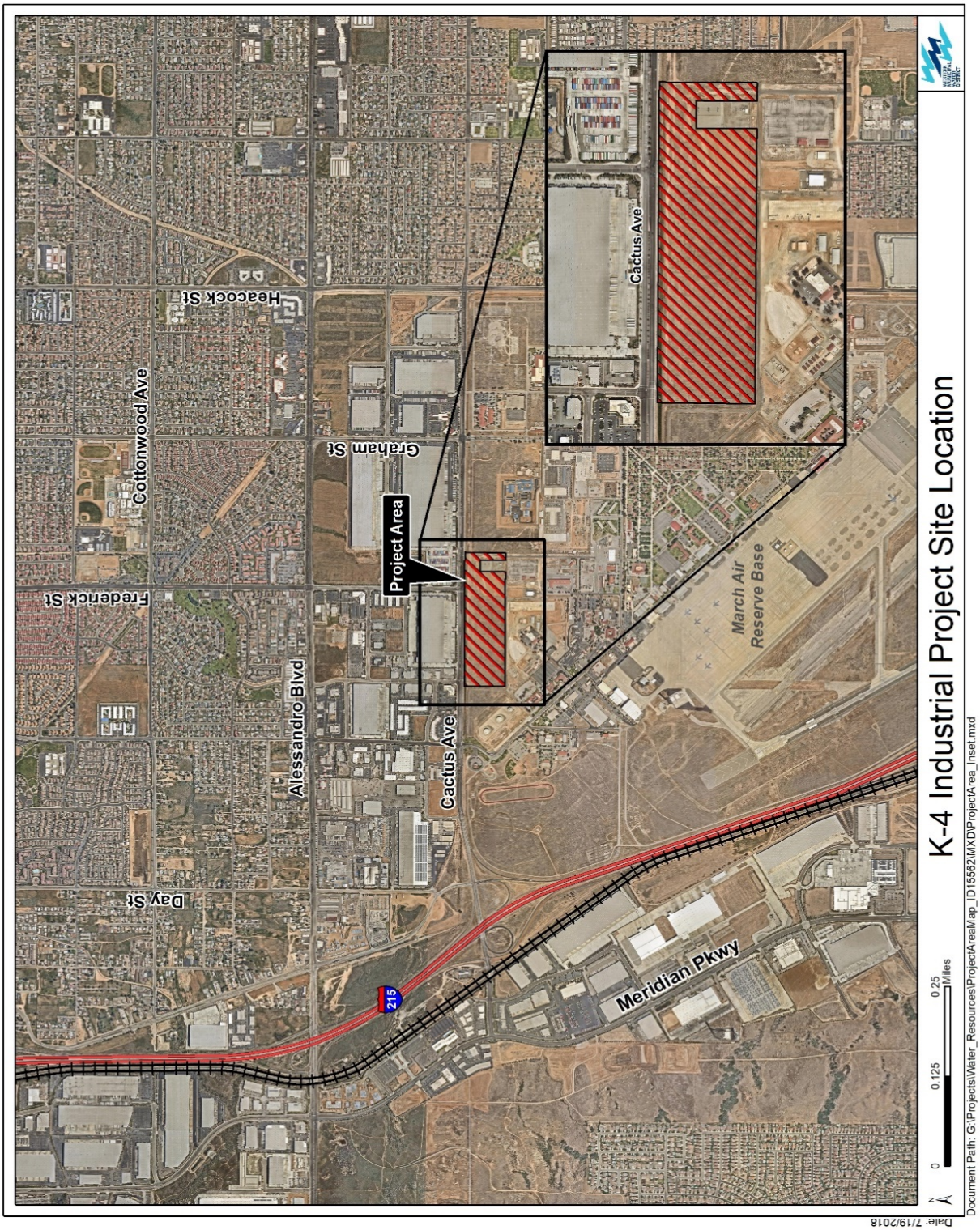
The purpose of this water supply assessment ("WSA") is to evaluate whether the total projected water supplies available to Western Municipal Water District ("Western") during normal, single-dry, and multiple-dry years over the next 20-year period are sufficient to meet the projected demands of the proposed K-4 Industrial ("Project"), in addition to Western's existing and planned future uses, including agricultural and manufacturing. This WSA has been prepared in accordance with the requirements of Water Code section 10910 *et seq.*, commonly referred to as California Senate Bill 610 ("SB 610").

Proposed Project – K-4 Industrial

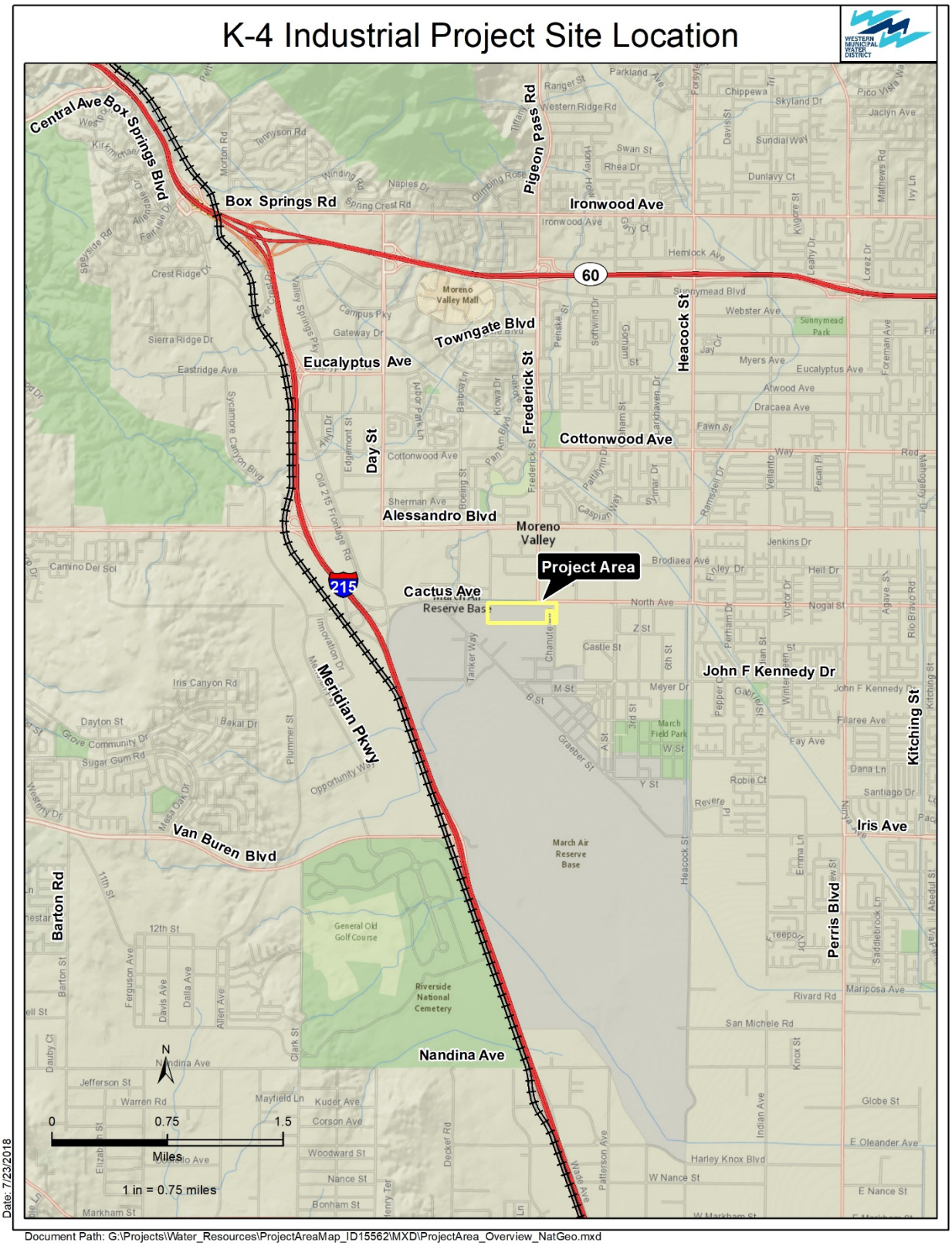
The Project is an approximately 35.4-acre site with a 718,000 square-foot building located in the March Joint Powers Authority ("JPA") jurisdiction in unincorporated Riverside County. The Project site is located on the south side of Cactus Avenue and extends from where Veterans Way terminates at Cactus Avenue on the west to where Frederick Street terminates at Cactus Avenue on the east. Interstate 215 (I-215) is located approximately 0.8 mile west of the Project site. The Project site is comprised of five parcels designated as Assessor's Parcel Numbers ("APNs") 297-150-006-8, 297-150-007-9, 297-150-038-7, 297-160-005-8, and 297-200-004-0. A total of 289 automobile parking stalls and 317 truck trailers parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Once constructed, the Project site would be used up to 7 days per week and 24 hours per day. The anticipated water use is 12 acre-feet per year ("AFY") which includes the estimated water demand of 130,312 square feet of landscaping and approximately 750 employees.

Additionally, the Project will include improvements to the draining ditch that runs along the south side of Cactus Avenue, commencing one parcel to the west of the Project site, then along the Project frontage, and further to the east ending at Heacock Avenue. The current drainage ditch will be undergrounded in a box culvert. This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District and the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District as part of its Master Plan.

Project Location Map



Project Area Map



Water Supply Assessment Statute

Senate Bill 610

SB 610 requires the preparation of a WSA for certain projects that are subject to review under the California Environmental Quality Act ("CEQA") and that meet any of the following criteria:[1]

1. A residential development of more than 500 units,
2. A business/shopping center with more than 1,000 employees or 500,000 square feet of floor space,
3. A commercial office building with more than 1,000 employees or 250,000 square feet of floor space,
4. A hotel/motel with more than 500 rooms,
5. An industrial/manufacturing/processing plant or industrial park with more than 1,000 employees, encompassing more than 650,000 square feet of floor space, or occupying more than 40 acres of land (provided; however, that until January 1, 2017, a photovoltaic or wind energy generation facility is not a project that requires a WSA if the facility would demand no more than 75 acre-feet ("AF") of water annually),
6. A mixed-use development project that includes one or more of the projects specified in subsections 1. through 5., above,
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project, or
8. For a public water system with 5,000 or fewer connections, a project that will increase the number of connections by 10 percent or more.

As an industrial park occupying more than 40 acres of land and encompassing more than 650,000 square feet of floor space, the proposed Project meets the criteria in Water Code section 10912 (a)(5), and thus requires preparation of a WSA. Under SB 610, at the time the local/lead agency determines a "project" (as defined by Water Code section 10912) is subject to review under CEQA, the agency must identify the public water system that will provide water service to the project and request the water provider to prepare a WSA for the project.[2]

Generally, the WSA must include an analysis of whether the total projected water supplies available to the water provider over the next 20-year period during normal, single-dry, and multiple-dry years, are sufficient to meet the projected water demand associated with the proposed project, in addition to the water provider's other existing and planned future uses.[3] Additional analysis is required if the water supplies identified to serve the project include groundwater. Here, to ensure a comprehensive discussion regarding Western's overall water supply availability and reliability, this WSA includes a detailed analysis of the groundwater supplies available to Western, as further set forth below.

[1] California Water Code § 10912(a)-(b)
[2] California Water Code § 10910(b)
[3] California Water Code § 10910(c)

Upon the water provider's adoption of the WSA, the WSA must be forwarded to the lead agency and incorporated into the CEQA document being prepared for the project. The lead agency must then determine, based on the entire record, whether the total projected water supplies available to the water provider over the next 20-year projection during normal, single-dry, and multiple-dry years will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses.[4]

Western Municipal Water District

Western was formed by the voters in 1954, primarily to bring supplemental water to western Riverside County. Today, Western serves eight wholesale customers and approximately 24,000 retail customers. Western's water supply portfolio consists mainly of imported supplies from the Colorado River and the State Water Project ("SWP") but also includes recycled water and supplemental water obtained from the cities of Corona and Riverside, and other local projects. Western's general district consists of a 527-square mile area of western Riverside County and an estimated population of more than 860,000.

As a member agency of the Metropolitan Water District of Southern California ("MWD"), Western provides supplemental water on a wholesale basis to the cities of Corona, Norco, and Riverside and the water agencies of Box Springs Mutual Water Company, Eagle Valley Mutual Water Company, Elsinore Valley Municipal Water District ("EVMWD"), Temescal Valley Water District, and Rancho California Water District. Western serves retail customers in the unincorporated areas of El Sobrante, Eagle Valley, Temescal Creek, Woodcrest, Lake Mathews, and March Air Reserve Base.

Retail Service Area

Western's retail service area covers about 104 square miles and provides water to an estimated population of 95,000, via approximately 24,000 service connections. Western purchases water from MWD comprised of Colorado River and SWP supplies to serve its wholesale and retail customers. Most of the water purchased by Western is imported from the SWP with about 20 percent from the Colorado River. As set forth below, Western also obtains water through several local water supply projects and agreements.

Western's main retail service area is within the County of Riverside. Based on the total number of domestic customers, Western's retail service area experienced an annual average growth of approximately 5.8 percent between 2001 and 2010. Western's growth rate was influenced by the undeveloped land in its retail service area compared to historically urban areas. This annual average growth rate then attenuated to approximately 1.14 percent between 2010 and 2015.[5] The Southern California Association of Governments ("SCAG") projected the annual growth rate for regional population will be only 0.7 percent through the year 2040.[6] Western's 2015 Urban

[4] California Water Code § 10911(b)-(c)
[5] 2015 Urban Water Management Plan, Western Municipal Water District
[6] Regional Transportation Plan, 2016–2040 Sustainable Communities Strategy Report Chapter 3 "Challenges in a Changing Region," Average Annual Population Growth Rate, Page 47, Southern California Association of Governments, December 2015

Water Management Plan projected the annual population growth rate within Western's service area at an average of 1.4 percent through the year 2040.

The WSA Process

In accordance with the requirements of SB 610, this WSA evaluates:

1. The total projected water supplies available to Western during normal, single-dry, and multiple-dry water years during a 20-year projection, and

2. Whether Western's total projected supplies are sufficient to meet the projected water demand associated with the proposed Project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

SB 610 provides: "If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the Urban Water Management Plan in preparing the elements of the assessment..."[7] The Urban Water Management Planning Act, Water Code section 10610 *et seq.*, requires water providers to perform various planning analyses with the goal of ensuring overall long-term water supply sufficiency and reliability within their service areas. For instance, Urban Water Management Plans ("UWMP") must include a water supply reliability assessment, including a detailed evaluation of the supplies necessary to meet demands over at least a 20-year period in average, single-year, and multi-year drought conditions. Urban water providers must also prepare a water shortage contingency plan that documents the stages of actions needed to address up to a 50 percent reduction in an agency's water supplies. Water shortage contingency plans must also identify actions to be taken in the event of a catastrophic interruption in water supplies and describe mandatory prohibitions against specific water use practices during water shortages. All such elements are included in Western's 2015 UWMP.

Western, as a member agency of MWD, closely coordinated the preparation of its 2015 UWMP and analyses with MWD's 2015 Regional Urban Water Management Plan ("RUWMP"), MWD's 2015 Integrated Resources Plan ("IRP"), and related analyses. Western's 2015 UWMP, MWD's 2015 RUWMP, and MWD's 2015 IRP are the most recent local and regional water supply analyses prepared and adopted pursuant to the Urban Water Management Planning Act. Thus, as authorized by SB 610, certain information and analyses from those and other documents were utilized in preparing this WSA. In addition, and as further discussed below, information and analyses from MWD's 2015 RUWMP and 2015 IRP were used, in part, to address and analyze recent legal, regulatory, and environmental conditions having the potential to affect the availability and reliability of imported water supplies from MWD.

The projected water demands associated with the proposed Project were not specifically accounted for in Western's 2015 UWMP; however, the overall projected demands for the land use were accounted for by population growth. Therefore, in preparing this WSA, projected and adjusted demand information for Western's service area has been reviewed and presented in

[7] California Water Code § 10910(c)(2)

relation to Western's 2015 UWMP and MWD's 2015 RUWMP to evaluate the sufficiency of Western's total projected water supplies to serve the proposed Project in addition to Western's existing and planned future uses. This WSA also identifies conservation and water-budgeted tiered rates as a means of reducing demand in Western's retail area.

Among other data and analyses, the following documentation was utilized in the preparation of this WSA:

Western Municipal Water District

- 2015 Urban Water Management Plan
- Updated Integrated Regional Water Management Plan Report, May 2008
- Drought Allocation Plan and Water Conservation and Supply Shortage for the Western Municipal Water District, April 15, 2015
- Western Municipal Water District Ordinance 384, February 18, 2015
- Western Municipal Water District Ordinance 385, May 20, 2015
- Western Municipal Water District Resolution 2910, May 20, 2015

Metropolitan Water District of Southern California

- 2015 Integrated Water Resources Plan
- 2015 Regional Urban Water Management Plan

California Department of Water Resources

- State Water Project Final Delivery Capability Report, July 2015

Water Supply

Under normal water year conditions, Western's retail service area relies on imported water supplies from MWD. However, as discussed in greater detail below, Western has developed various local supplies that can be used for potable and non-potable purposes during normal, off-season, extraordinary, or emergency conditions.

Imported Water Supplies – Metropolitan Water District of Southern California

Below are the imported water supplies that Western has received from MWD for the last five years.

Total Western Calendar Year Imported Water from MWD (AF)				
2013	**2014**	**2015**	**2016**	**2017**
75,697	81,895	58,269	65,320	70,535

MWD is a legislatively created agency charged with regional water supply management for large portions of Southern California. MWD holds contractual rights to receive SWP and Colorado River water supplies, and has developed various other water supply programs and projects to augment its overall portfolio. From that perspective, MWD has developed comprehensive and highly specialized modeling techniques to evaluate short, intermediate, and long-term

availability and reliability of its total projected supplies used to serve and supplement the needs of its 26 member agencies, including Western.

MWD's mission statement is "[T]o provide its service area with adequate and reliable supplies of high quality water to meet present and future needs in an environmentally and economically responsible way."[8] To fulfill this mission, MWD takes a coordinated approach to regional planning through its IRP. The first IRP was developed in 1996. MWD and its member agencies worked cooperatively to compile and analyze water demand and supply data, then applied that information in developing a diverse water supply portfolio. The 1996 plan stated that MWD and its member agencies would meet all full-service water demands without interruption through 2020. The IRP also set targets for conservation, development of local supplies, imported water supplies, groundwater banking, and water transfers.

MWD has updated its IRP several times. The most recently updated 2015 IRP was adopted on January 12, 2016. The 2015 IRP Update identifies various strategies to ensure water supply reliability including:

1. Diversified portfolio of actions calling for stabilization and maintenance of imported supplies,
2. Meeting future growth through increased water conservation and sustaining and developing new local supplies,
3. Pursuing a comprehensive transfer and exchange strategy, and
4. Building storage in wet and normal years to manage risks and drought.

MWD's IRP process used the MWD-MAIN Water Forecasting System to calculate demand projections among the MWD member agencies. The model incorporates demographic and economic data (and, thus, projected demand) obtained from regional planning agencies. Supply reliability was evaluated through another computer model developed by MWD known as the Integrated Resources Planning Simulation Model ("IRPSIM"). This model uses historical hydrologic data from 1922 to 2012 to generate water shortage/surplus estimates over a 25-year planning horizon.

The 2015 IRP Update provides a roadmap for maintaining regional water supply reliability over the next 25 years and beyond and addresses many of the key factors affecting SWP and Colorado River supplies. In addition, the update incorporated those factors into its forecasts, analyses, and future planning actions to ensure an adequate and reliable water supply for its member agencies.

The 2015 IRP Update presents a three-component approach:

1. A core resources strategy represents baseline efforts to manage water supply and demand conditions and to stabilize MWD's traditional imports from the Colorado River and northern California through the Sacramento-San Joaquin Delta. This strategy is based on known factors, including detailed planning assumptions about future demographic scenarios, water supply yields, and a range of observed historical weather patterns. Under

[8] http://www.mwdh2o.com/WhoWeAre/Mission

this strategy, MWD and its member agencies will advance water use efficiency through conservation and recycling, and with further local development such as groundwater recovery and seawater desalination.

2. A cost-effective "supply buffer" will enable the region to adapt to future circumstances and foreseeable challenges. The buffer helps protect the region from possible shortages caused by conditions that exceed the core resources strategy, starting with increased conservation and water-use efficiency on a region-wide basis.

3. Foundational actions guide the region in determining alternative supply options for long-range planning. If future changed conditions, such as climate change or the availability of resources, exceed what is covered by MWD's core resources and supply buffer, these alternatives would provide a greater contribution to water reliability than MWD's imported water sources or any other single supply. These actions, including feasibility studies, research, and regulatory review would provide the foundation to develop alternative resources, if needed.[9]

The 2015 IRP Update builds upon the adaptive management strategy established in the 2010 IRP, and continues to refine that strategy to ensure water supply reliability throughout MWD's service area. This strategy includes a diversified portfolio of actions that calls for stabilizing and maintaining imported water supplies; meeting future growth through increased water conservation, and sustaining and developing new local supplies; pursuing a comprehensive transfer and exchange strategy; building storage in wet and normal years to manage risks and drought; and preparing for uncertainty with future water supply actions. Among other water supply strategies, the 2015 IRP Update includes the following reliability targets for the SWP, Colorado River Aqueduct, local water supplies, and conservation:

1. Maintain Colorado River Supplies. The 2015 IRP Update goal for Colorado River Aqueduct ("CRA") supplies is to maintain current levels of water supplies from existing programs, while also developing flexibility through dry-year programs and storage. In order to accomplish this goal, the 2015 IRP Update targets development of sufficient base supply programs to ensure that a minimum of 900,000 AF of diversions are available when needed and to ensure access to 1.2 million AF of supplies in dry years through flexible programs and storage.

2. Stabilize SWP Supplies. The goal for SWP supplies is to adaptively manage flow and export regulations in the near term and to achieve a long-term Delta solution that addresses ecosystem and water reliability challenges. Achieving this goal will require continued participation and a successful outcome in the California WaterFix and the California EcoRestore efforts. This approach targets an average of 980,000 AF of SWP supplies in the near term and 1.2 million AF on average starting in 2030 when a long-term Delta solution is estimated to be in place.

3. Achieve Additional Conservation Savings. Conservation is crucial to the 2015 IRP Update strategy. While Metropolitan and its member agencies continue to work toward

[9] 2015 Integrated Water Resources Plan Update, Press Release, January 12, 2016.

achieving water savings consistent with 20x2020 goals, the 2015 IRP Update seeks further savings though increased emphasis on outdoor water use efficiency, largely through enhanced regional compliance with the state's Model Water Efficient Landscape Ordinance. Metropolitan would work with its member agencies to develop a combination of incentive, education/outreach, and other programs in support of this approach. The 2015 IRP Update target for conservation would result in approximately 485,000 AF of new water savings by 2040.

4. Develop Additional Local Water Supplies. Local supplies are a key to providing water supply reliability into the future. Over half of the region's water supplies come from locally developed sources. The 2015 IRP Update goal for local water supplies is primarily to maintain existing and under-construction supply sources. The 2015 IRP Update target for local supplies totals 2.2 million AF in 2016; this target grows to a total of 2.4 million AF by 2040. In comparison, local supplies produced a total of about 1.94 million AF in calendar year 2014. Over the next 25 years, up to 460,000 AF of additional local supplies would be developed.

Imported Water Supplies – Determination of MWD available supplies

MWD Regional Urban Water Management Plan

With respect to imported supply, MWD's 2015 Regional Urban Water Management Plan has evaluated projected near, intermediate, and long-term water supply availability and reliability using historic hydrology. The year 1977 was identified as the single driest and 1990–1992 was used for the three-year dry period. MWD's water supply estimates are provided below in Table 2-4 for the single driest year, Table 2-5 for multi-year dry period, and Table 2-6 for the average year hydrology.

Table 2-4
Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	693,000	774,000	852,000	956,000	992,000
California Aqueduct[2]	691,000	712,000	723,000	749,000	749,000
Colorado River Aqueduct					
Total Supply Available[3]	1,451,000	1,457,000	1,456,000	1,455,000	1,454,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,584,000**	**2,686,000**	**2,775,000**	**2,905,000**	**2,941,000**
Demands					
Total Demands on Metropolitan	1,731,000	1,784,000	1,826,000	1,878,000	1,919,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,005,000**	**2,066,000**	**2,108,000**	**2,160,000**	**2,201,000**
Surplus	**579,000**	**620,000**	**667,000**	**745,000**	**740,000**
Programs Under Development					
In-Region Supplies and Programs	43,000	80,000	118,000	160,000	200,000
California Aqueduct	20,000	20,000	198,000	198,000	198,000
Colorado River Aqueduct					
Total Supply Available[3]	155,000	125,000	75,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**63,000**	**100,000**	**316,000**	**358,000**	**398,000**
Potential Surplus	**642,000**	**720,000**	**983,000**	**1,103,000**	**1,138,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

SDCWA – San Diego County Water Authority
MAF – Million Acre-Feet
CRA – Colorado River Aqueduct

Table 2-5
Multiple Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1990-1992 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	239,000	272,000	303,000	346,000	364,000
California Aqueduct[2]	664,000	682,000	687,000	696,000	696,000
Colorado River Aqueduct					
Total Supply Available[3]	1,403,000	1,691,000	1,690,000	1,689,000	1,605,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,103,000**	**2,154,000**	**2,190,000**	**2,242,000**	**2,260,000**
Demands					
Total Demands on Metropolitan	1,727,000	1,836,000	1,889,000	1,934,000	1,976,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,001,000**	**2,118,000**	**2,171,000**	**2,216,000**	**2,258,000**
Surplus	**102,000**	**36,000**	**19,000**	**26,000**	**2,000**
Programs Under Development					
In-Region Supplies and Programs	36,000	73,000	110,000	151,000	192,000
California Aqueduct	7,000	7,000	94,000	94,000	94,000
Colorado River Aqueduct					
Total Supply Available[3]	80,000	75,000	50,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**43,000**	**80,000**	**204,000**	**245,000**	**286,000**
Potential Surplus	**145,000**	**116,000**	**223,000**	**271,000**	**288,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.

[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.

[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 2-6
Average Year
Supply Capability[1] and Projected Demands
Average of 1922-2012 Hydrologies
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	693,000	774,000	852,000	956,000	992,000
California Aqueduct[2]	1,555,000	1,576,000	1,606,000	1,632,000	1,632,000
Colorado River Aqueduct					
Total Supply Available[3]	1,468,000	1,488,000	1,484,000	1,471,000	1,460,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**3,448,000**	**3,550,000**	**3,658,000**	**3,788,000**	**3,824,000**
Demands					
Total Demands on Metropolitan	1,586,000	1,636,000	1,677,000	1,726,000	1,765,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**1,860,000**	**1,918,000**	**1,959,000**	**2,008,000**	**2,047,000**
Surplus	**1,588,000**	**1,632,000**	**1,699,000**	**1,780,000**	**1,777,000**
Programs Under Development					
In-Region Supplies and Programs	43,000	80,000	118,000	160,000	200,000
California Aqueduct	20,000	20,000	268,000	268,000	268,000
Colorado River Aqueduct					
Total Supply Available[3]	5,000	25,000	25,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**63,000**	**100,000**	**386,000**	**428,000**	**468,000**
Potential Surplus	**1,651,000**	**1,732,000**	**2,085,000**	**2,208,000**	**2,245,000**

[1] Represents Supply Capability for resource programs under listed year type.

[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.

[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.

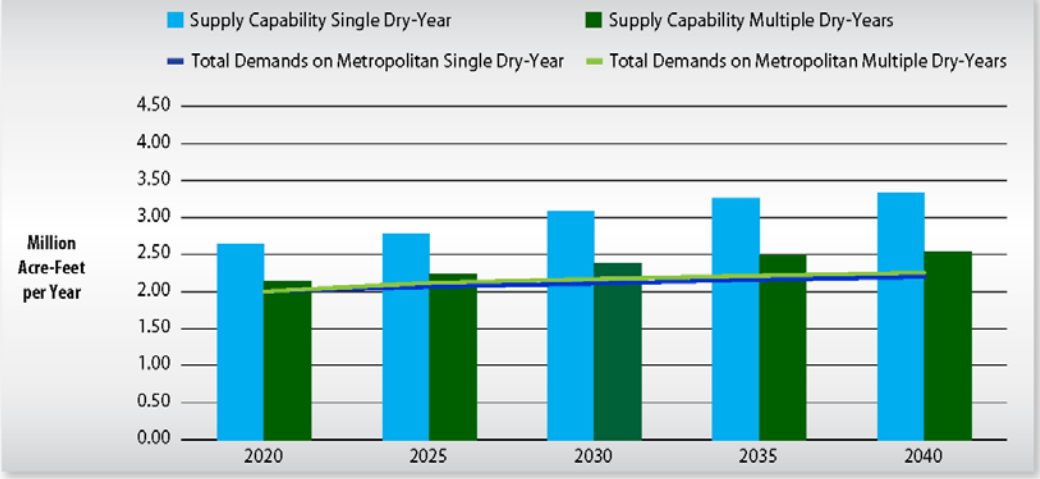
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.

[5] Total demands are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Based on these tables and the supporting analyses and information in its most recent 2015 RUWMP, MWD has concluded that:

1. MWD has supply capabilities that would be sufficient to meet expected demands from 2020 through 2040 under single dry-year and multiple dry-year conditions, as presented in Figure ES-1 (2015 RUWMP, pp. ES-5 through ES-6).

Figure ES -1 Supply Capabilities under Single Dry-Year and Multiple Dry-Year Hydrologies



Note:
1. Supply capabilities are derived using the simulated median storage level going into each of five-year increments based on the balances of supplies and demands. Under the median storage condition, there is an estimated 50 percent probability that storage levels would be higher than the assumption used, and a 50 percent probability that storage levels would be lower than the assumption used.
2. Under some conditions, Metropolitan may choose to implement the WSAP in order to preserve storage reserves for a future year, instead of using the full supply capability. This can result in impacts at the retail level even under conditions where there may be adequate supply capabilities to meet firm demands.
3. All storage capability figures shown in the 2015 UWMP reflect actual storage program conveyance constraints.

2. MWD has comprehensive plans for stages of actions it would undertake to address up to 50 percent reduction in its water supplies and a catastrophic interruption in water supplies through its Water Surplus and Drought Management and Water Supply Allocation Plans. MWD also developed an Emergency Storage Requirement to prepare for potential interruption in water supplies resulting from catastrophic occurrences within the southern California region, including, but not limited to, seismic events along the San Andreas Fault. In addition, MWD is working with the State to implement a comprehensive improvement plan to address catastrophic occurrences that could occur outside of the southern California region, such as a maximum probable seismic event in the Delta that would cause levee failure and disruption of SWP deliveries.

3. MWD has plans for supply implementation and continued development of a diversified resource portfolio including Colorado River and SWP supplies, Central Valley transfers, local resource projects, and in-region storage that enables MWD to meet the water supply needs of its member agencies, including Western.

Importantly, MWD's conclusions and water supply capabilities have been developed to specifically account for several critical factors, as further discussed in this WSA:

Water Demand Growth: Despite the recent residential development slowdown, population growth in the southern California region has continued to increase overall water demands, and MWD has accounted for that growth.

State Water Supply: Recent regulatory issues, court decisions, and climate conditions have imposed restrictions on the amount and timing of deliveries from the SWP.

Colorado River Supplies: The Colorado River Basin has experienced a multi-year drought and ongoing legal and regulatory factors continue to have potential effects on California's use of Colorado River supplies.

To address these and other factors, MWD notes that it continues to evaluate and develop resource alternatives to provide a reliable and high quality water supply, while exploring ways to reduce demands through water conservation and efficiency programs and allocating supplies among its member agencies when necessary through its WSAP. MWD's recent adoption of its 2015 IRP Update is an example of its ongoing water supply planning efforts. Also discussed herein, various statewide, regional, and local measures are being enacted to change historic water use practices, increase conservation, and reduce per capita water demands.

State Water Project Deliveries

Various legal, regulatory, climatic, and environmental factors have the potential to affect the availability and reliability of SWP supplies. As further discussed below, the California Department of Water Resources ("DWR") specifically accounts for these and other factors in evaluating the projected delivery capability of SWP supplies to MWD and other State contractors.

DWR Final 2015 SWP Delivery Capability Report

DWR continues to evaluate the issues affecting SWP exports from the Delta and how those issues may affect the long-term availability and reliability of SWP deliveries to water agencies that hold SWP contracts. As indicated above, DWR has released its Final 2015 SWP Delivery Capability Report. According to the 2015 Final Report, the average delivery of contractual SWP Table A supply is projected to be 62 percent under current conditions. Within that long-term average, SWP Table A deliveries can range from 11 percent (single dry-year) to 98 percent (single wet-year) of contractual amounts under current conditions, under current conditions, contractual amounts are projected to range from 28 to 33 percent during multiple-dry year periods, and from 76 to 95 percent during multiple wet periods.[10] The 2015 Final Report also presents the following findings:

The average annual delivery of Table A water estimated for the 2015 Report is 2,553,000 AF per year (an increase of 1 percent from the 2013 Report).

[10] DWR 2015 Final Report at 26-27, Tables 6-3, 6-4.

The estimated maximum Table A deliveries for the 2015 Final Report is 4,055,000 AF, which is higher by 1.5 percent than 2013 Report. The 2015 Final Report also shows 74 percent likelihood (79 percent with the 2013 Report) that more than 2,000,000 AF/year of Table A water will be delivered under the current estimates.

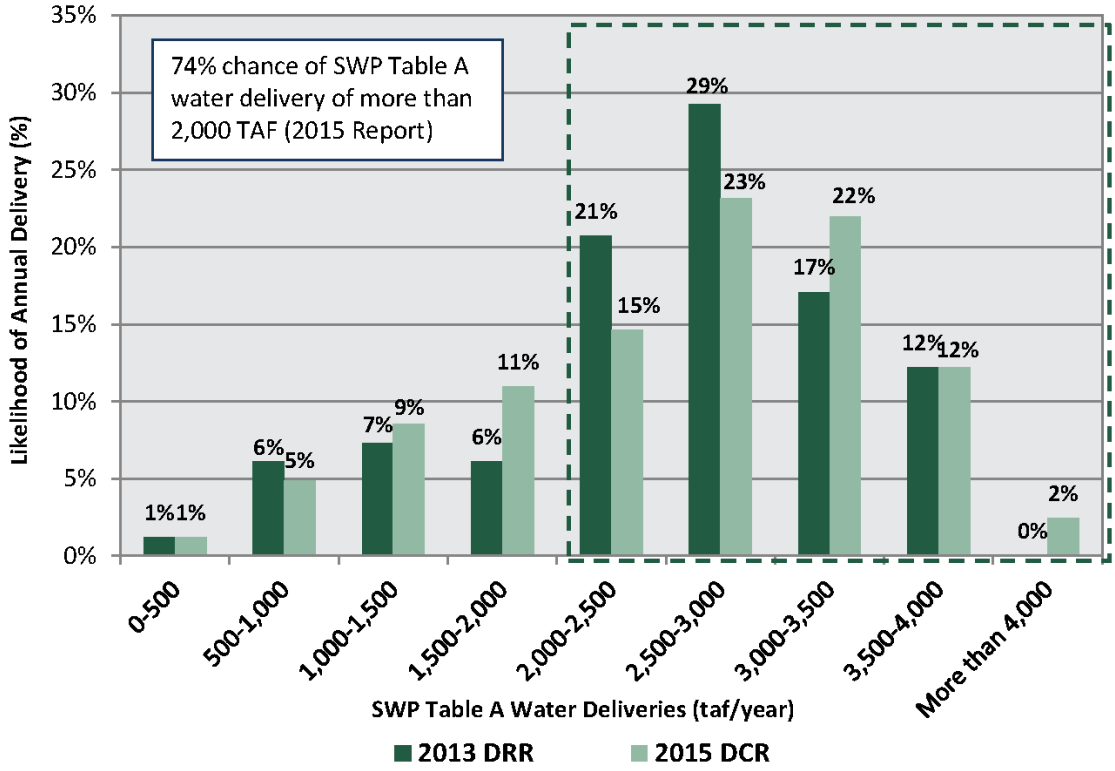


Figure 6-2. Estimated Likelihood of SWP Table A Water Deliveries, by Increments of 500 taf (Existing Conditions)

taf = trillion acre-feet

To ensure a conservative analysis, DWR's 2015 Final Report expressly assumes and accounts for the institutional, environmental, regulatory, and legal factors affecting SWP supplies, including but not limited to: water quality constraints, fishery protections, other D-1641 requirements, and the operational limitations imposed by the FWS and NMFS BiOps that are discussed above. The 2015 Final Report also considers the potential effects of Delta levee failures and evaluates the potential impacts on Delta water supplies associated with continued land subsidence, earthquakes, and flood events.[11] Notably, the 2015 Final Report assumes that all of these restrictions and limitations will remain in place over the next 20-year period and that no actions to improve the Delta will occur, even though numerous legal proceedings, various Delta restoration processes, and new legal and legislative requirements and efforts for Delta improvements are currently underway (i.e., Bay Delta Conservation Plan, Delta Vision, Delta Plan). Finally, DWR's long-term SWP delivery reliability analyses incorporate assumptions intended to account for potential supply shortfalls related to climate change.[12] These and other

[11] See, e.g., DWR 2015 Final Report, Section 4, pp. 13–16.
[12] See, e.g., DWR 2015 Report, Section 6 pp. 21–30.

factors result in DWR presenting a conservative projection of SWP delivery reliability in its 2015 Final Report.

DWR's 2015 Final Report demonstrates the projected long-term average delivery amounts of contractual SWP Table A supplies are essentially the same as those projected in the 2013 Final Report. As noted, the projections developed by DWR are predicated on several conservative assumptions, which make the projections useful from a long-range water supply planning perspective. While various factors could lead DWR to increase its delivery projections, the 2015 Final Report remains the best available information concerning the long-term delivery reliability of SWP supplies.

Colorado River Water Deliveries

The CRA, which is owned and operated by MWD, transports water from the Colorado River approximately 242 miles to its terminus at Lake Mathews in Riverside County. After deducting for conveyance losses and considering maintenance requirements, up to 1.2 million AF of water a year may be conveyed through the CRA to MWD's member agencies, subject to availability of Colorado River water for delivery to MWD. Similar to SWP supplies discussed above, various legal, regulatory, climatic and environmental factors have the potential to affect the availability and reliability of Colorado River supplies.

Western Municipal Water District – Local Water Supplies and Water Supply Projects

Below is a summary of water supplies that Western received from the Bunker Hill Basin for the last five years.

Total Western Calendar Year Imported Water from Bunker Hill Basin (AF)				
2013	**2014**	**2015**	**2016**	**2017**
5,438	4,194	7,150	8,505	8,182

To reduce its dependency on imported water, Western has aggressively sought to develop and/or expand local sources of supply for use under both non-emergency and emergency conditions. Western's Water Resources staff have evaluated a number of projects under the following criteria:

- Reliability – Meet system demands and ensure supply reliability under droughts and emergency conditions.
- Water Quality – Provide a safe and high quality water supply that meets or exceeds safe drinking quality regulations, and supports the development of recycled water and conjunctive use.
- Cost – Provide reliable and high quality water supply at a cost-effective price.
- Ability to Implement – Prioritize projects that have the greatest chance for successful implementation.
- Flexibility – Prioritize projects that have the greatest potential for operational flexibility.
- Environment – Consider the environmental impacts when developing and utilizing future water supplies.

Using these criteria, a number of water supply projects have been identified:

I. Interconnections
    A. City of Riverside
        1. Existing Mockingbird Canyon Pump Station
        2. Existing Whitegates Interconnection
        3. Proposed Campbell Interconnection
    B. City of Corona
        1. Emergency 4 cubic-feet-per-second (CFS) connection at the end of Reach F
II. Arlington Desalter Expansion
III. Chino Desalter Expansion
IV. Banking Programs (Storage of SWP in San Bernardino Basin Area ("SBBA") and wheeled to Western via City of Riverside conveyance facilities)
V. Riverside North Aquifer Storage and Recovery Project

Many of the new local water supplies identified below will be implemented through a variety of instruments including: (1) Cooperative Agreement with the City of Riverside for Water Production and Conveyance, (2) Reciprocal Use Agreement between Western, the City of Riverside, and EVMWD, and (3) Agreement regarding the Corona-Western Promenade Connection. While these resources will become part of Western's total water supply portfolio used to meet overall water demands of Western's Riverside Retail service area, they are not identified as specific sources that will supply the proposed Project. Rather, these local sources offset the overall demand on Western's imported supplies, thus, increasing system-wide water supply availability and reliability.

Interconnections

Meeks & Daley Asset Exchange Agreement – Pursuant to various agreements, Western has access to up to 4,208 AF annually of groundwater from the Bunker Hill Basin and the Colton and Riverside Basins. A "Cooperative Wheeling Agreement" (Cooperative Agreement for Water Production and Conveyance between the City of Riverside and Western) was finalized in February 2009. With this agreement, Western is able to convey groundwater obtained from EVMWD's groundwater rights (referred to as Meeks & Daley water), which is delivered via Riverside Public Utilities via the existing Mockingbird Canyon Pump Station and Whitegates Reservoir. Presently, Western does not itself extract groundwater from the Bunker Hill Basin. To the extent it utilizes native groundwater produced from the Bunker Hill Basin, it uses up to 4,208 AFY of Meeks & Daley water rights and water it purchases on an off-season basis from the City of Riverside, which has an adjudicated right of 53,918 AF per year, including new conservation allocation. This agreement can be canceled with a year's notice. Thus, although Western uses this agreement to utilize less expensive water, Western does not account for this supply as a firm source of water. In preparation of the 2015 Urban Water Management Plan (UWMP), EVMWD requested that Western remove the Meeks & Daley water from Western's UWMP as EVMWD intends to utilize this supply for its own customers.

City of Corona (Promenade Interconnection) – the City of Corona Promenade Avenue Connection is a two-way interconnection located in Promenade Avenue easterly of McKinley Street, in the city of Corona, that will provide multiple benefits to a number of regional water purveyors.

1) Western will have the capability of furnishing water to Corona from Western's Arlington Desalter using Western's 30-inch diameter, 930 hydraulic grade line ("HGL"), while Corona will have the ability to receive water into its 30-inch diameter, 905 HGL Zone 2 pipeline.
2) Corona will have the capability of furnishing water to Western from Corona's 24-inch diameter, 1060 HGL Zone 3 pipeline and Western will have the ability to receive the water into its 30-inch diameter, 930 HGL Arlington Desalter Pipeline.
3) Corona will realize water quality benefits by receiving Western's Arlington Desalter water with a total dissolved solids ("TDS") of 350 milligrams per liter ("mg/L") in lieu of Colorado River water with a TDS range of 600–700 mg/L.
4) Both parties will realize water supply reliability benefits when other water supply facilities are out of service for planned or unplanned maintenance.

This project is fully operable and can provide 400 AFY.

Bunker Hill Basin Coordinated Use Agreement

The Bunker Hill Basin has been adjudicated since 1969. Its safe yield, as determined by the Western-SBVMWD Watermaster, is 232,100 AF per year. Total groundwater storage capacity for the Basin is approximately 5,976,000 AF. Recharge to the Bunker Hill Basin historically has resulted from infiltration of runoff from the San Gabriel and San Bernardino Mountains. The Bunker Hill Basin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water, and water spread in streambeds and spreading grounds.

Western, SBVMWD, and MWD have executed a coordinated-use agreement that allows Western to purchase surplus SWP supplies and store them in the San Bernardino/Bunker Hill Basin Area. The agreement allows Western to purchase up to 15,000 AF in any given year. The water is stored and retrieved as needed to meet demands. Western currently has 6,000 AF stored under this agreement. This project is fully approved and being implemented. All associated documents and agreements are on file with Western.

Arlington Basin Recharge

The Arlington Groundwater Basin is a shallow, alluvial-filled valley located in western Riverside County within the limits of the city of Riverside. Total groundwater storage in the Arlington Basin is less than 80,000 AF. The quality of groundwater in Arlington Basin is generally poor, with TDS concentrations of approximately 1,000 mg/L and nitrate-nitrogen concentrations of approximately 20 mg/L. Without treatment, this water is not usable as a drinking water resource. The Arlington Desalter, owned and operated by Western, is a reverse-osmosis groundwater

treatment facility located within the Arlington Basin that is supplied by five nearby production wells. The Arlington Desalter treats this groundwater so that it can be used as a potable resource.

Western has a contractual obligation to deliver up to 4,400 AFY of Arlington Desalter water to the City of Norco. Any additional production from the facility combined with other resources from the Chino Desalter can be available to Western's Riverside Retail customers once the La Sierra Pipeline (discussed below) is constructed. This will provide up to 2,800 AFY of additional supplies above current operation of the Arlington Desalter. To avoid the chance of Arlington Basin overdraft, Western is planning a project to stabilize the Arlington Basin, the "Arlington Basin Recharge Project." This project will recharge the Arlington Basin with storm runoff, urban runoff, and recycled water in the future using surface ponds. This project will increase the plant capacity by 1,800 AFY and allow the plant to operate at its permitted capacity of up to 7.25 million gallons per day ("MGD") and production to about 7,200 AF annually.

The estimated cost for the Arlington Recharge Project is approximately $10 million, which will be reduced by funding for construction costs from three agencies: (1) $1 million from Riverside County Flood Control and Water Conservation District, (2) $1 million from Santa Ana Watershed Project Authority awarded through Proposition 84, Round 1, and (3) $1 million of a federal WaterSMART grant. The net cost of the project, including grant commitments, is approximately $7 million.

La Sierra Pipeline and Sterling Pump Station Project

The La Sierra pipeline will convey potable water from the Arlington Desalter to Western's retail service area in the city of Riverside. The project includes construction of an approximately 4.5-mile pipeline and two pump stations. The La Sierra Pipeline project will provide additional conveyance facilities within Western's retail area, thus, improving the reliability of Western's water supply to its customers and reducing the potential effect of water supply allocations by MWD, as discussed above. The pipeline includes three reaches: Reach 1 starts from the Sterling Pump Station to its turnout at the intersection of Pierce Street and Indiana Avenue; Reach 2 starts from the Arlington Desalter Turnout to La Sierra Turnout; and Reach 3 starts at La Sierra Turnout to La Sierra Tank and Mills Gravity Pipeline ("MGL"). A pump station will be located near the Arlington Desalter, pumping water from approximately a HGL of 720′ to the MGL at a variable HGL of 1,600′ to 1,650′. Water would then flow by gravity back through the MGL to the Mockingbird Pump Station which would be required to lift water to Western's 1650 pressure zone, a total lift of approximately 136′. The total cost of the La Sierra Pipeline is estimated at $25 million.

Chino II Desalter Expansion

Western, in coordination with the City of Ontario and Jurupa Community Services District, is expanding the Chino II Desalter from a capacity of 10.5 MGD to 20.5 MGD, resulting in additional annual production capability of 10,500 AF. Western's portion of the additional supply is 3,534 AF annually. The project includes treatment, conveyance, and well facilities that will be constructed in the Chino Basin. A programmatic EIR for this project was completed in 2002, with a subsequent EIR for the expansion project completed in 2008. This water will be utilized to

meet, in part, the 4,400 AFY obligation Western has to provide the City of Norco desalted water (see discussion above under Arlington Desalter) thereby allowing a like amount of water produced at Arlington Desalter to be used by Riverside Retail once the La Sierra Pipeline and Sterling Pump Station are constructed.

The Chino Basin was adjudicated in 1978, and groundwater storage and production within the Chino Basin is managed and reported by the Chino Basin Watermaster pursuant to the Judgment. In 2000, the various groundwater-producing entities entered into the court-approved "Peace Agreement," and then in 2007 the parties entered the court-approved "Peace II Agreement," which together formalized and fostered a new level of cooperation in groundwater management. These agreements paved the way for the implementation of the Optimum Basin Management Plan ("OBMP"), by which the Watermaster develops and enacts comprehensive programs for groundwater monitoring, salt management and desalter production, groundwater recharge, recycled water use and groundwater storage and recovery.

The safe yield of a groundwater basin has been defined as the amount of water that can be withdrawn annually without producing an undesirable results. Withdrawal in excess of safe yield is termed overdraft. The Judgment established the safe yield of the Chino Basin in the amount of 140,000 AFY; however, Watermaster may determine that the operating safe yield can be higher or lower from year-to-year depending on factors including favorable precipitation and management efforts that maximize the beneficial use of the groundwater basin. These management efforts, which ensure the long-term sufficiency of groundwater from the Chino Basin, including dry years.

The Chino Basin Watermaster began a Safe Yield redetermination process in 2013. Watermaster has primarily indicated the Safe Yield may be determined to be less than 140,000 AFY in the future; however, impacts on Judgment parties' share of Safe Yield and Operating Safe Yield from year-to-year will depend on Chino Basin management projects and programs that may enable future Safe Yield production to remain in the range of 130,000–140,000 AFY. The process is ongoing and anticipated to be completed by 2019.

Riverside Wheeling and Purchase Agreement

The City of Riverside's ability to deliver Meeks & Daley and other waters is seasonally limited due to capacity constraints when demands are at their peak. On an annual basis, all this water can be moved during the eight non-peak periods of the year. To address the seasonality issue, the City of Riverside and Western are collaborating on projects. Western has recently completed construction of improvements to its Mockingbird Pump Station to increase reliability of water deliveries from the City of Riverside at this location, which is the major delivery point. Western is also in the planning stages on the construction of a new Campbell Pump Station that will allow Western a third robust interconnection with the City of Riverside. Western purchased a property for the Campbell Pump Station in the city of Riverside. The City of Riverside has identified two projects within their distribution system in which Western may want to participate by oversizing certain major transmission pipelines to accommodate firm delivery capability throughout the year. Participation in these future projects will be dependent on timing and cost.

In 2013, Western started purchasing water from Riverside Highland Water Company ("RHWC"), which is produced by the City of Riverside and wheeled through its conveyance system for delivery to Western. In 2015, Western and RHWC signed one-year lease agreement allowing Western to purchase 1,500 AF unused water from RHWC. The basis of this agreement is that RHWC has groundwater rights in the SBBA in excess of its demands and is willing to lease those rights, on an annual basis, to Western until such time that RHWC's demands increase. Total water purchased from RHWC for year 2015 was 1,500 AF. Western and RHWC are currently developing a longer term agreement for up to 1,500 AFY, which is anticipated to be completed in 2018.

This water is not considered a firm source of supply because of RHWC's future demands and because the arrangement is subject to available capacity in the City of Riverside's conveyance system.

The following table provides estimates of the potential yield from Western's water supply projects described above and expected operational dates:

	Western – Local Water Supply Project Yields (AF/year)						
Project	**Projected Date of Operation**	**2018**	**2020**	**2025**	**2030**	**2035**	**2040**
Meeks & Daley Asset Exchange Agreement	Operable	4,208					
Non-potable Water Purchase – Riverside Public Utilities	Operable	2,000	2,000	2,000			
Riverside Highland Water Company (RHWC)	Operable	1,000					
Bunker Hill Basin Coordinated Use Agreement	Operable		A total 6,000 AF is currently in storage (more may be added as replenishment water is available).				
Arlington Desalter	2018		2,800	2,800	2,800	2,800	2,800
Chino Desalter II Expansion	2017		3,534	3,534	3,534	3,534	3,534
Riverside Wheeling and Purchase Agreement	2017	2,000	2,000	2,000	2,000	2,000	2,000

Recycled Water Program

Western provides wastewater service to the unincorporated Riverside County areas north and east of Lake Mathews within its retail water service boundaries. This area is served by the Western Water Recycling Facility ("WWRF"), which is currently a three-MGD (3.0) wastewater treatment facility producing tertiary treated recycled water.

Treated water from the facility is provided to the Riverside National Cemetery and General Archie Old Golf Course as well as parks, schools, groves, and nurseries, representing a set of customers who previously were dependent on MWD supplies. With conversion of the distribution system from a non-potable system (when delivering raw MWD non-potable CRA

water) to a recycled water system, those customers now have a new local and reliable supply which offsets demands for imported potable water supplies.

The following table provides projected WWRF recycled water production and uses:

Western Water Recycling Facility Projected Recycled Water Production and Use			
Year	**Plant Design Capacity (AFY)**	**Expected Effluent (AFY)**	**Recycled (AFY)**
2015	3,360	1,304	1,109
2020	3,360	1,600	1,600
2025	5,600	1,900	1,900
2030	5,600	2,100	2,100
2035	5,600	2,400	2,400
2040	5,600	2,700	2,700

Water Use Efficiency

Given the factors affecting imported water supplies, there is increasing focus on water conservation—or water use efficiency—at the state, regional, and local levels.

On November 10, 2009, the state Legislature passed Senate Bill 7 ("SBX7-7"), more commonly referred to as "20 x 2020". This law seeks to achieve a 20 percent reduction in urban per capita water use across California by 2020. This law codifies a similar reduction referenced in the Governor's 2009 Executive Order.

In addition to creating methodologies to define specific water-use reduction targets, SBX7-7 includes reporting requirements for all retail urban water suppliers. It is intended to promote urban conservation standards consistent with the California Urban Water Conservation Council's ("CUWCC") Best Management Practices.

In 2011, Western implemented a water budget-based rate structure. The structure provides every customer with an individualized water allocation based on efficient indoor and outdoor practices. Monthly water bills now provide a regular signal of efficient water use. In an effort to assist customers to remain within their water budget, Western offers a portfolio of water use efficiency/customer support programs.

Examples of the programs currently offered by Western include:

- *Free irrigation efficiency evaluations* – Western contracts with irrigation professionals to evaluate irrigation systems and provide a written report to the customer highlighting opportunities to increase water use efficiency.
- *Rebate Programs* – Numerous rebates are available to retail customers for high-efficiency clothes washers, smart irrigation controllers, and high-efficiency sprinkler

nozzles. The SoCal WaterSmart program (www.socalwatersmart.com) is administered by MWD. Western adds additional funding to some of the water-saving devices.

Western's Water Conservation and Management Measures

Retail Measures

In response to the recent regulatory actions requiring enhanced water conservation, Western's Board of Directors adopted Resolution 2958 on June 1, 2016, implementing Water Shortage Stage 3(b) of Western's Retail Customer Water Supply Shortage Contingency Program ("Program") as provided in Western's Ordinance 384. The Program establishes five (5) stages of water conservation and supply shortage response measures which may be implemented. Stage One establishes permanent water use standards intended to alter behavior related to efficiency for non-shortage conditions. Stages Two through Five further establish levels of shortage response actions to be implemented during times of water supply shortage. Stage 3(b) provides conservation and supply shortage measures, such as:

- Tier 4 water rates in Western's water budget rate structure have been removed, and all water use 125 percent above a customer's water budget will be charged the applicable Tier 5 water rate.
- All construction water used for moisture conditioning soil and dust control shall be non-potable or recycled water unless the source of supply is more than 1,000 feet from the site.
- Irrigation with potable water for ornamental turf or grass in public street medians or parkways is prohibited.

Water budgeted tiered rates are intended to promote the efficient use of water and provide customers with economic signals as their water use increases. Essentially, the rate structure is based upon providing customers with the water they need at a lower rate, while inefficient use is penalized with higher rates. Western's budgeted tiered rate system has demonstrated the ability to result in reductions in water consumption. Implementation of the measures outlined in Stage 3(b), plus additional measures defined in Resolution 2958, are designed to maximize water conservation and reduce retail water demands throughout Western's retail service area.

Wholesale Measures

As discussed above, Western also updated its Drought Allocation Plan ("DAP") in May 2015 to provide Western's wholesale customers with a means for potentially allocating limited imported water supplies from MWD under shortage conditions. The updated 2015 DAP is consistent with the allocation methodology adopted as part of MWD's WSAP and provides a range of potential imported water shortage scenarios. The goal of the 2015 DAP is to equitably share potential water shortage allocations by MWD between Western and its wholesale agencies, and to avoid proposed MWD penalty rates in scenarios where its WSAP is implemented.

The updated 2015 DAP would be used to allocate water for municipal and industrial ("M&I") purposes among Western's wholesale water customers:

- City of Corona
- City of Norco
- City of Riverside
- Eagle Valley Mutual Water Company
- Elsinore Valley Municipal Water District
- Temescal Valley Water District
- Rancho California Water District
- Western Municipal Water District Retail Customers (including Box Springs Mutual Water Company)

The 2015 DAP[13] was prepared with the input and support from Western's wholesale customers. Recognizing the importance of wholesale customer involvement, Western created a Drought Allocation Plan Workgroup, made up of staff from Western and its wholesale customers. The DAP allocates supply to wholesale agencies based on:

- demand during the base period using data for the two most recent non-allocation years;
- base period local supplies;
- base period gallons per capita daily; and
- adjustments for growth.

Long Term Conservation Legislation

On May 31, 2018 Governor Jerry Brown signed into law Senate Bill 606 (Hertzberg) and Assembly Bill 1668 (Friedman). These bills require urban water providers in California to set permanent water use targets by 2022. Western and other agencies throughout the State are working with the State Water Resources Control Board and the Department of Water and Power to develop the long term urban efficiency standards.

Western Riverside Retail Demand

Western tracks retail water usage by customer types including residential, commercial, industrial, institutional, and agricultural accounts. Tracking is done by user code and reports can be generated to determine the number of accounts and quantities of water consumed. The number of future residential and commercial/industrial customers is expected to increase at the same rate as the estimated population growth.

Although population in Western's retail service grew tremendously during the early 2000s, the recent economic slowdown has substantially curtailed this trend. Data from the SCAG *2015 Regional Transportation Plan* suggests that future growth in the Inland Empire will be over the next 25 years less than one percent per year. As discussed above, for water supply planning purposes, Western's 2015 UWMP has projected the annual population growth rate within Western's service area at an average of 1.4 percent through the year 2040.

[13] Drought Allocation Plan for the Western Municipal Water District of Riverside County, Adopted May 20, 2015.

Agricultural land use is expected to continue decreasing with continued urbanization within the retail service area. The following table summarizes water demands for Western's retail service area from 2013–2017.

Total Western Calendar Year Retail Demands (AF)				
2013	**2014**	**2015**	**2016**	**2017**
24,258	24,237	23,357	21,772	22,240

Project Demand

According to information submitted by the lead agency, Riverside County Planning Department, and the Project proponent, the projected water demand for the proposed Project is approximately 12 AFY.

Water Supply Analysis

In addition to the foregoing, the following analyses and figures provide a detailed assessment of whether the total projected water supplies available to Western during normal, single-dry, and multiple-dry years over the next 20-year period are sufficient to meet the projected water demand associated with the proposed Project, in addition to existing and planned future uses. As a conservative measure, this WSA specifically analyzes how Western would address potential shortfalls in the availability and reliability of imported water supplies in demonstrating that sufficient water supplies are available to Western to serve the proposed Project according to the standards set forth by SB 610.

With respect to analyzing total projected water supplies available in normal, single-dry and multiple-dry years, this WSA addresses potential water supply reductions under MWD's WSAP, which presents drier conditions than have existed under historic "single-dry" and "multiple-dry" scenarios. MWD's 2015 RUWMP identified 1977 as the single-dry year and 1990–1992 as the multiple-dry year scenarios. These years were selected based on delivery conditions for the SWP only because it is MWD's largest and most variable water supply. In 1977, SWP deliveries to MWD were approximately one-third of 1976 and 1978 deliveries. Nevertheless, MWD delivered more water in 1977 than either 1976 or 1978 (due to increased Colorado River supplies). During the early 1990's multiple-dry year period, SWP deliveries ranged from approximately 78 percent to 94 percent of average 1985–1999 deliveries. Total MWD (i.e., SWP plus Colorado River) deliveries during this same period averaged 94.82 percent of "normal" Although MWD requested voluntary conservation during this three-year period, there were no delivery cutbacks or drought allocations.

The water supply and demand data used for scenarios below (normal, single-dry, and multiple-dry years) are derived from Western's 2015 UWMP. Through Western's WUEMP implementation, Western has already implemented most of the conservation elements including Free Irrigation Efficiency Evaluations, Smart Yard, Turf Replacement, and Rebate programs throughout the retail service area, especially in the single-family residence outdoor watering arena. Water conservation is included in all the scenarios illustrated in the following Tables.

Normal Year

Table 1 illustrates Western's water supply and demand projections under normal conditions, where no types of imported water supply reductions are being implemented by MWD. This scenario also assumes additional local water supplies being available from the WWRF for future demands.

Table 1: Western Municipal Water District Water Supply Portfolio
Normal Year with Future Projects that Western Controls

Normal Year Hydrology K-4 Industrial Project		2020	2025	2030	2035	2040
Western Full-Service Demand[1]		30,814	33,714	36,415	39,170	41,704
Loss Due to Drought Allocation (Normal Year – 0% reduction)						
Annual Allocation from MWD		**30,814**	**33,714**	**36,415**	**39,170**	**41,704**
Supplemental Water Supply Projects	***Projected Operation***					
Meeks & Daley Asset Exchange Agreement[2]	Operable					
Riverside Highland Water Company (RHWC)[3]	Operable					
Riverside Wheeling and Purchase Agreement[4]	Operable	2,000	2,000	2,000	2,000	2,000
Arlington/Corona Exchange	Operable					
Arlington Desalter Expansion (Arlington Basin Recharge)	2018	2,800	2,800	2,800	2,800	2,800
Chino Desalter II Expansion/La Sierra Pipeline	2017	3,534	3,534	3,534	3,534	3,534
Western Water Recycling Facility	Operable	1,600	1,900	2,100	2,400	2,700
Net supplemental water supply		**9,934**	**10,234**	**10,434**	**10,734**	**11,034**
Total water supply (supplemental & MWD water)		**40,748**	**43,948**	**46,849**	**49,904**	**52,738**
Total water demand approved for projects since Western's 2015 UWMP, excluding this project		2,194	2,194	2,194	2,194	2,194
Total water supply less approved projects since Western's 2015 UWMP		38,554	41,754	44,655	47,710	50,544
Total water supply less Western's demand		7,740	8,040	8,240	8,540	8,840
K-4 Industrial Project water demand		12	12	12	12	12
(Shortfall)/Surplus		**7,728**	**8,028**	**8,228**	**8,528**	**8,828**

(1) Based on Western's 2015 Urban Water Management Plan projections for 2020, 2025, 2030, 2035, and 2040. (2) Up to 4,208 AFY of groundwater is available from the SBBA and the Colton and Riverside Basins pursuant to agreements with Riverside and EVMWD. (3) Western and RHWC periodically enter into agreements to purchase water. This water is not considered a firm supply because of RHWC's future demands and Riverside's ability to wheel it through its conveyance system. (4) Riverside and Western have a long-term wheeling and purchase agreement for the purchase and delivery of 2,000 AFY. In addition, Western currently stores 6,000 AF in the Bunker Hill Basin. This water is wheeled through the city of Riverside. (5) Western is planning to increase groundwater production from the San Bernardino Basin Area and deliver it through existing interconnections at Mockingbird and Whitegates and a future intertie with the Riverside Campbell Reservoir up to 10,000 AFY combined.

The total annual demand for the proposed Project is estimated at 12 AFY. Table 1 demonstrates that Western will have sufficient supplies in a normal year scenario to serve the projected demands associated with the proposed Project over the 20-year projection, in addition to Western's existing and planned future uses.

Single-Dry Year

Table 2, below, illustrates Western's supply and demand projections under single-dry year conditions, which for conservative purposes in this analysis are represented by a ten percent reduction in imported water supplies pursuant to a potential MWD water supply allocation. This scenario assumes additional local water supplies would only be used from the WWRF for future demands.

Table 2: Western Municipal Water District Water Supply Portfolio
Near-Term Shortage/Single-Dry Year Scenario (10%)
with Future Projects that Western Controls

Single-Dry Year Hydrology K-4 Industrial Project		2020	2025	2030	2035	2040
Western Full-Service Demand[1]		30,814	33,714	36,415	39,170	41,704
Loss Due to Drought Allocation (10% reduction)		3,081	3,371	3,642	3,917	4,170
Annual Allocation from MWD		**27,733**	**30,343**	**32,774**	**35,253**	**37,534**
Supplemental Water Supply Projects	***Projected Operation***					
Meeks & Daley Asset Exchange Agreement[2]	Operable					
Riverside Highland Water Company (RHWC)[3]	Operable					
Riverside Wheeling and Purchase Agreement[4]	Operable	2,000	2,000	2,000	2,000	2,000
Arlington/Corona Exchange	Operable					
Arlington Desalter Expansion (Arlington Basin Recharge)	2018	2,800	2,800	2,800	2,800	2,800
Coordinated Agreement with the City of Riverside[5]	2020					
Chino Desalter II Expansion/La Sierra Pipeline	2017	3,534	3,534	3,534	3,534	3,534
Western Water Recycling Facility	Operable	1,600	1,900	2,100	2,400	2,700
Net supplemental water supply		**9,934**	**10,234**	**10,434**	**10,734**	**11,034**
Total water supply (supplemental & MWD water)		**37,667**	**40,577**	**43,208**	**45,987**	**48,568**
Total water demand approved for projects since Western's 2015 UWMP, excluding this project		2,194	2,194	2,194	2,194	2,194
Total water supply less approved project since Western's 2015 UWMP		35,473	38,383	41,014	43,793	46,374
Water supply less Western's demand		4,659	4,669	4,599	4,623	4,670
K-4 Industrial Project water demand		12	12	12	12	12
(Shortfall)/Surplus		**4,647**	**4,657**	**4,587**	**4,611**	**4,658**

(1) Based on Western's 2015 Urban Water Management Plan projections for 2020, 2025, 2030, 2035, and 2040. (2) Up to 4,208 AFY of groundwater is available from the SBBA and the Colton and Riverside Basins pursuant to agreements with Riverside and EVMWD. (3) Western and RHWC periodically enter into agreements to purchase water. This water is not considered a firm supply because of RHWC's future demands and Riverside's ability to wheel it through its conveyance system. (4) Riverside and Western have a long-term wheeling and purchase agreement for the purchase and delivery of 2,000 AFY. In addition, Western currently stores 6,000 AF in the Bunker Hill Basin. This water is wheeled through the city of Riverside. (5) Western is planning to increase groundwater production from the San Bernardino Basin Area and deliver it through existing interconnections at Mockingbird and Whitegates and a future intertie with the Riverside Campbell Reservoir up to 10,000 AFY combined.

As noted above, the total annual demand for the proposed Project is estimated at 12 AFY. Table 2 demonstrates that Western will have sufficient supplies in a single-dry year scenario to serve the projected demands associated with the proposed Project over the 20-year projection, in additional to Western's existing and planned future uses.

Multiple-Dry Year

The following tables, Tables 3-1 through 3-2, illustrate Western's water supply and demand projections under multiple-dry year conditions, which for purposes of this analysis are conservatively represented by a 20 percent reduction in imported water supplies pursuant to a potential MWD water supply allocation, and where Western implements alternative supply projects.

Table 3-1 includes only supply projects Western has developed and can control such as the Arlington Desalter Expansion and Chino Desalter Expansion. Western is planning to increase water production from the Arlington Desalter up to 7,200 AFY. This project includes construction of an artificial recharge basin and a new production well. This project is anticipated to be on line in 2018. Western has a contractual obligation to deliver up to 4,400 AFY of Arlington Desalter water to the city of Norco. This project will provide up to 2,800 AFY of additional supplies above current operation of the Arlington Desalter. Any additional production from the facility combined with other resources from the Chino Desalter can be available to Western's Riverside Retail customers once the La Sierra Pipeline is constructed.

As discussed above, Western is a member of the Chino Desalter Authority ("CDA"). The CDA is a collaborative effort among its members and other water users in the Chino Basin with the goal of maintaining water yield and water quality. Upon completion of the Chino Desalter Expansion, Western will receive 3,534 AFY. This will be allocated to the City of Norco, and thus free up 3,534 AFY of the Arlington Desalter water that was previously delivered to Norco. This 3,534 AFY will be delivered to Western's Riverside Retail System via the La Sierra Pipeline.

Because those water supplies will be from adjudicated and highly managed groundwater basins (Arlington and Chino), the amounts are categorized as reliable sources in normal, single-dry year, and multiple-dry year conditions.

Table 3-1: Western Municipal Water District Water Supply Portfolio Intermediate and Long-Term Shortage/Multiple-Dry Year Scenario (20%) with Future Projects Western Controls

Multiple-Dry Years Hydrology K-4 Industrial Project		2020	2025	2030	2035	2040
Western Full-Service Demand[1]		30,814	33,714	36,415	39,170	41,704
Loss Due to Drought Allocation (20% reduction)		6,163	6,743	7,283	7,834	8,341
Annual Allocation from MWD		**24,651**	**26,971**	**29,132**	**31,336**	**33,363**
Supplemental Water Supply Projects	***Projected Operation***					
Meeks & Daley Asset Exchange Agreement[2]	Operable					
Riverside Highland Water Company (RHWC)[3]	Operable					
Riverside Wheeling and Purchase Agreement[4]	Operable	2,000	2,000	2,000	2,000	2,000
Arlington/Corona Exchange	Operable					
Arlington Desalter Expansion (Arlington Basin Recharge)	2018	2,800	2,800	2,800	2,800	2,800
Coordinated Agreement with the City of Riverside[5]	2020					
Chino Desalter II Expansion/La Sierra Pipeline	2017	3,534	3,534	3,534	3,534	3,534
Western Water Recycling Facility	Operable	1,600	1,900	2,100	2,400	2,700
Net supplemental water supply		**9,934**	**10,234**	**10,434**	**10,734**	**11,034**
Total water supply (supplemental & MWD water)		**34,585**	**37,205**	**39,566**	**42,070**	**44,397**
Total water demand approved for projects since Western's 2015 UWMP, excluding this project		2,194	2,194	2,194	2,194	2,194
Total water supply less approved project since Western's 2015 UWMP		32,391	35,011	37,372	39,876	42,203
Water supply less Western's demand		1,577	1,297	957	706	499
K-4 Industrial Project water demand		12	12	12	12	12
(Shortfall)/Surplus		**1,565**	**1,285**	**945**	**694**	**487**

(1) Based on Western's 2015 Urban Water Management Plan projections for 2020, 2025, 2030, 2035, and 2040. (2) Up to 4,208 AFY of groundwater is available from the SBBA and the Colton and Riverside Basins pursuant to agreements with Riverside and EVMWD. (3) Western and RHWC periodically enter into agreements to purchase water. This water is not considered a firm supply because of RHWC's future demands and Riverside's ability to wheel it through its conveyance system. (4) Riverside and Western have a long-term wheeling and purchase agreement for the purchase and delivery of 2,000 AFY. In addition, Western currently stores 6,000 AF in the Bunker Hill Basin. This water is wheeled through the city of Riverside. (5) Western is planning to increase groundwater production from the San Bernardino Basin Area and deliver it through existing interconnections at Mockingbird and Whitegates and a future intertie with the Riverside Campbell Reservoir up to 10,000 AFY combined.

As noted above, the total annual demand for the proposed Project is estimated at 12 AFY. Table 3-1 demonstrates that Western will have sufficient supplies in a multiple-dry year scenario to serve the projected demands associated with the proposed Project over the 20-year projection, in additional to Western's existing and planned future uses.

Table 3-2 identifies potential supply projects including the Arlington Desalter Expansion, the Chino Desalter Expansion, and Bunker Hill groundwater to be delivered through the Riverside conveyance system.

Table 3-2: Western Municipal Water District Water Supply Portfolio Intermediate and Long-Term Shortage/Multiple-Dry Year Scenario (20%) with All Future Groundwater Supplies Projects from Bunker Hill and Riverside Basins

Multiple-Dry Years Hydrology K-4 Industrial Project		2020	2025	2030	2035	2040
Western Full-Service Demand[1]		30,814	33,714	36,415	39,170	41,704
Loss Due to Drought Allocation (20% reduction)		6,163	6,743	7,283	7,834	8,341
Annual Allocation from MWD		**24,651**	**26,971**	**29,132**	**31,336**	**33,363**
Supplemental Water Supply Projects	***Projected Operation***					
Meeks & Daley Asset Exchange Agreement[2]	Operable					
Riverside Highland Water Company (RHWC)[3]	Operable	1,000	1,000	1,000	1,000	1,000
Riverside Wheeling and Purchase Agreement[4]	Operable	2,000	2,000	2,000	2,000	2,000
Arlington/Corona Exchange	Operable	400	400	400	400	400
Arlington Desalter Expansion (Arlington Basin Recharge)	2018	2,800	2,800	2,800	2,800	2,800
Coordinated Agreement with the City of Riverside[5]	2020	2,292	2,292	2,292	2,292	2,292
Chino Desalter II Expansion/La Sierra Pipeline	2017	3,534	3,534	3,534	3,534	3,534
Western Water Recycling Facility	Operable	1,600	1,900	2,100	2,400	2,700
Net supplemental water supply		**13,626**	**13,926**	**14,126**	**14,426**	**14,726**
Total water supply (supplemental & MWD water)		**38,277**	**40,897**	**43,258**	**45,762**	**48,089**
Total water demand approved for projects since Western's 2015 UWMP, excluding this project		2,194	2,194	2,194	2,194	2,194
Total water supply less approved project since Western's 2015 UWMP		36,083	38,703	41,064	43,568	45,895
Water supply less Western's demand		5,269	4,989	4,649	4,398	4,191
K-4 Industrial Project water demand		12	12	12	12	12
(Shortfall)/Surplus		**5,257**	**4,977**	**4,637**	**4,386**	**4,179**

(1) Based on Western's 2015 Urban Water Management Plan projections for 2020, 2025, 2030, 2035, and 2040. (2) Up to 4,208 AFY of groundwater is available from the SBBA and the Colton and Riverside Basins pursuant to agreements with Riverside and EVMWD. (3) Western and RHWC periodically enter into agreements to purchase water. This water is not considered a firm supply because of RHWC's future demands and Riverside's ability to wheel it through its conveyance system. (4) Riverside and Western have a long-term wheeling and purchase agreement for the purchase and delivery of 2,000 AFY. In addition, Western currently stores 6,000 AF in the Bunker Hill Basin. This water is wheeled through the city of Riverside. (5) Western is planning to increase groundwater production from the San Bernardino Basin Area and deliver it through existing interconnections at Mockingbird and Whitegates and a future intertie with the Riverside Campbell Reservoir up to 10,000 AFY combined.

Table 3-2 further demonstrates that Western has sufficient supplies in multiple-dry year scenarios to serve the projected demands (12 AFY) associated with the proposed Project, in addition to existing and planned future uses over the 20-year projection.

Conditions of Approval

As with all projects within the Western retail service area, the proposed K-4 Industrial may be conditioned to construct on-site and off-site water facilities needed near the project area. Water service also is contingent upon prompt payment of all applicable fees and charges as specified in Western's Rules and Regulations Governing Water Service and Water Users, Water Rate Schedules, Cost Recovery Charges, and Connection and Added Facilities Charges and Fees.

Landscape plans are required to ensure compliance with applicable requirements. In Western's area, those requirements may include, but are not limited to, landscape ordinances of the County of Riverside (Water Efficient Landscape Requirements Ordinance No. 859), and the City of Riverside (Municipal Code 19.570), as those authorities may be amended from time to time. The applicant/developer will be required to plan and install water efficient devices and landscaping in accordance with applicable ordinances and requirements.

As noted in this WSA, the projected water demands associated with the proposed Project (12 AFY) fall within the overall projected increase in residential water demand within Western's Riverside Retail Area as set forth in Western's 2015 UWMP. Notwithstanding, nothing in this WSA is intended to create a right or entitlement to water service or any specific level of water service, nor does this WSA impose, expand, or limit any duty concerning the obligation of Western to provide service to its existing customers or to any future potential customers. (Water Code section 10914.) Nor does anything in this WSA prevent or otherwise interfere with Western's discretionary authority to declare a water shortage emergency in accordance with Water Code section 350 *et seq*. and to take any and all related and other actions authorized by law. Western retains complete discretion to adopt and implement rules, regulations, policies and procedures within its authority that may apply to the proposed Project, to develop a specific plan of service for the proposed Project, and to coordinate land use decisions and water supply planning to ensure a sufficient and reliable water supply for Western's existing and planned future uses.

This WSA is not a commitment to serve the proposed Project, but a review of Western's total projected water supplies based on information presently available. This WSA and the analyses and conclusions herein are conditioned on MWD's ability to continue to supply imported water to meet Western's requirements, including the requirements for the proposed Project. The proposed Project is subject to any special or additional requirements imposed by MWD or Western on water deliveries, including increased and/or varying pricing structure.

Conclusion

The projected water demand associated with the proposed Project is 12 AF per year, which represents about 0.05 percent of Western's total demand of Calendar Year 2015. Based on the information and analyses contained in this WSA, Western concludes that the total projected water supplies available to Western during normal, single-dry and multiple-dry years throughout the next 20-year period are sufficient to meet the projected water demands of the proposed Project in addition to Western's existing and planned future uses, including agricultural and manufacturing uses.

K4 Parcel

NOISE IMPACT ANALYSIS

MARCH JOINT POWERS AUTHORITY

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
I-215	Interstate 215
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
MARB/IPA	March Air Reserve Base/Inland Port Airport
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	K4 Parcel
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures for the proposed K4 Parcel development ("Project"). The Project site is located on the south side of Cactus Avenue between Veterans Way and Frederick Street within the jurisdiction of the March Joint Powers Authority. The Project is proposed to consist of the development of the approximately 35.4-acre site with 718,000 square foot building and a seven-acre drainage channel (Cactus Avenue Channel) bordering the parcel to the north (south side of Cactus Avenue). This study has been prepared to satisfy the March Joint Powers Authority noise standards and thresholds of significance based on guidance in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the off-site traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on 19 roadway segments surrounding the Project site were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts found in the *K4 Parcel Traffic Impact Analysis* prepared by Urban Crossroads, Inc. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Opening Year 2023, and Horizon Year 2040 traffic conditions. The analysis shows that the Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the expected noise sources from the K4 Parcel site, this analysis estimates the Project-related stationary-source noise levels at nearby sensitive receiver locations. The normal activities associated with the proposed K4 Parcel are anticipated to include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. The operational noise analysis shows that the Project-related stationary-source noise levels due to the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements will satisfy the March Joint Powers Authority 55 dBA L_{eq} any time and City of Moreno Valley 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level standards at the nearby receiver locations. Further, since the Project-related operational noise levels will satisfy the more restrictive 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards, they will also comply with the 90 dBA L_{eq} 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code.

In addition, this analysis demonstrates that the Project will contribute *less than significant* operational noise level contributions to the existing ambient noise environment during the daytime and nighttime hours at all of the sensitive receiver locations. Therefore, the operational noise level impacts associated with the proposed 24-hour seven days per week Project activities,

such as the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, will be *less than significant*.

OPERATIONAL VIBRATION ANALYSIS

The operation of the Project site will include heavy trucks transiting on site to and from the loading dock areas. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement conditions. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, will be below the Federal Transit Administration (FTA) vibration threshold of 80 VdB at nearby sensitive receiver locations. Since truck deliveries transiting on site will be travelling at very low speeds it is expected that delivery truck vibration impacts at nearby receiver locations will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction-related noise impacts are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site when certain activities occur at the Project site boundary. Using sample reference noise levels to represent the planned construction activities of the K4 Parcel site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations. The Project-related short-term construction noise levels, from both on-site Project construction activities and off-site Cactus Avenue channel construction activities, are shown to satisfy City of Moreno Valley Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level thresholds used in this analysis to assess Project construction noise levels. Moreover, temporarr noise level increases due to Project construction at noise-sensitive receiver locations are shown to range from 0.0 to 0.2 dBA L_{eq} and will remain below the Caltrans 12 dBA L_{eq} threshold.Therefore, based on the results of this analysis, all receiver locations will experience *less than significant* impacts due to Project construction noise levels.

CONSTRUCTION VIBRATION ANALYSIS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The analysis shows that the unmitigated Project-construction vibration levels will remain below the Federal Transit Administration (FTA) 80 VdB threshold at all receiver locations, and are therefore, considered a *less than significant* impact. Further, vibration levels at the site of the closest receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter.

CONSTRUCTION NOISE AND VIBRATION BEST PRACTICES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce noise and vibration levels produced by the construction equipment to the nearby receiver locations:

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards (March JPA General Plan Noise Element, Policy 2e). (3) The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction.
- The construction contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

SUMMARY OF SIGNIFICANCE FINDINGS

The results of this K4 Parcel Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report. Table ES-1 shows the findings of significance for each potential noise and/or vibration impact before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Operational Vibration		*Less Than Significant*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

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1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed K4 Parcel ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed K4 Parcel site is located on the south side of Cactus Avenue between Veterans Way and Frederick Street within the jurisdiction of the March Joint Powers Authority, as shown on Exhibit 1-A. Existing uses in the Project study area include office and commercial uses to the northwest, existing office and industrial uses to the north, vacant and March Air Reserve Base (MARB) uses to the east, and existing MARB facilities to the south. The March Air Reserve Base/Inland Port Airport (MARB/IPA) runway is located approximately 0.7 miles southwest of the Project site, and Interstate 215 (I-215) is located roughly 0.6 miles west of the Project site.

1.2 PROJECT DESCRIPTION

The proposed Project involves the development of the approximately 35.4-acre site with 718,000 square foot building, as shown on Exhibit 1-B. Additionally, the Project would include implementing regional improvements to the seven-acre Cactus Avenue Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. This portion of the Project is being proposed by Riverside County Flood Control and Water Conservation District as part of the District's Master Plan and is being discussed with the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert is being permitted by the Riverside County Flood Control District and Water Conservation District ("District") and it would either be constructed contemporaneously with the Project or built separately depending on permitting and timing. The channel would function as part of the District's Master Plan and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan.

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements. This noise analysis is intended to describe noise level impacts associated with the expected typical warehouse and distribution storage activities at the Project

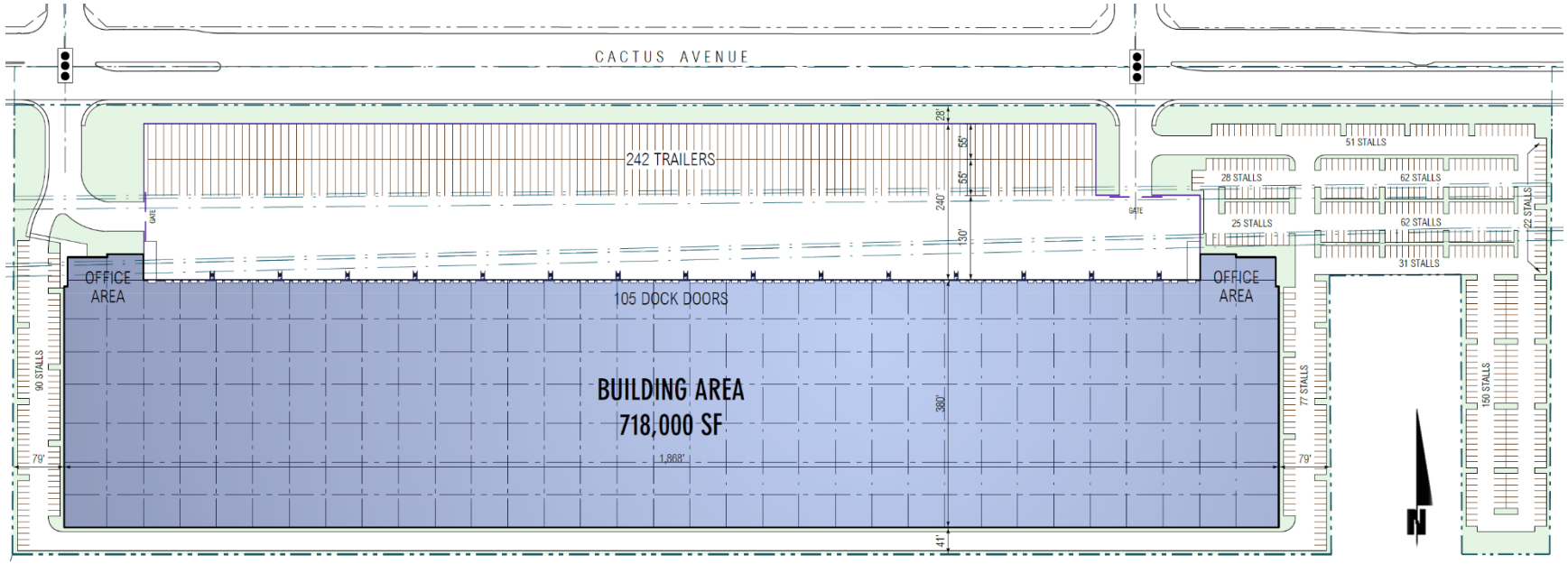
site. At the time of this analysis, no cold storage was planned at the Project site, and therefore is not analyzed in this report. Further, the off-site channel associated with Project construction is not anticipated to include operational noise sources requiring analysis, and as such, is not included in the Project operational noise sources analyzed herein.

According to the *K4 Parcel Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 5,873 trip-ends per day (actual vehicles). (2) The Project trip generation includes 517 truck trip-ends per day from the Project site. This noise study relies on the actual Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

EXHIBIT 1-A: LOCATION MAP



EXHIBIT 1-B: SITE PLAN



2 FUNDAMENTALS

Noise has been simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA

at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the "average" noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Day-Night Average Noise Level (LDN) and the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The LDN and CNEL are weighted averages of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The LDN time of day corrections include the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. The CNEL time of day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., in addition to the corrections for the LDN. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. LDN and CNEL do not represent the actual sound level heard at any particular time, but rather represent the total sound exposure.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (4)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been

expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (6)

2.3.3 ATMOSPHERIC EFFECTS

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (4)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (6)

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for a particular observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to any and all of these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (7)

2.7 COMMUNITY RESPONSE TO NOISE

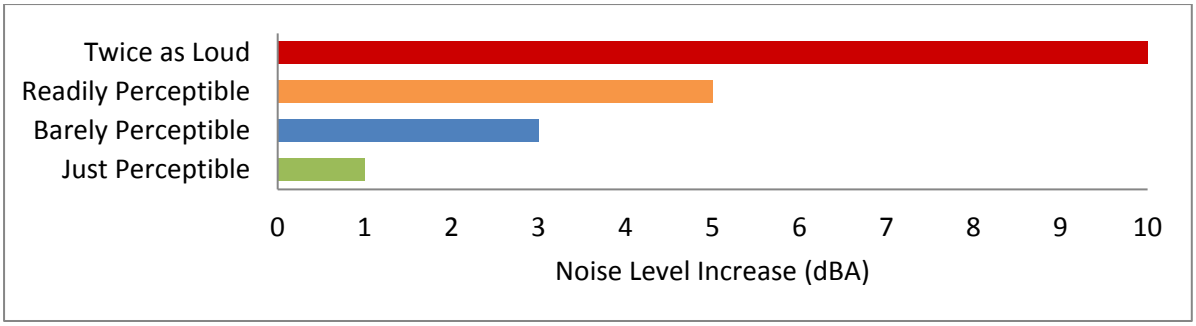
Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon each individual's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8)

Despite this variability in behavior on an individual level, the population as a whole can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



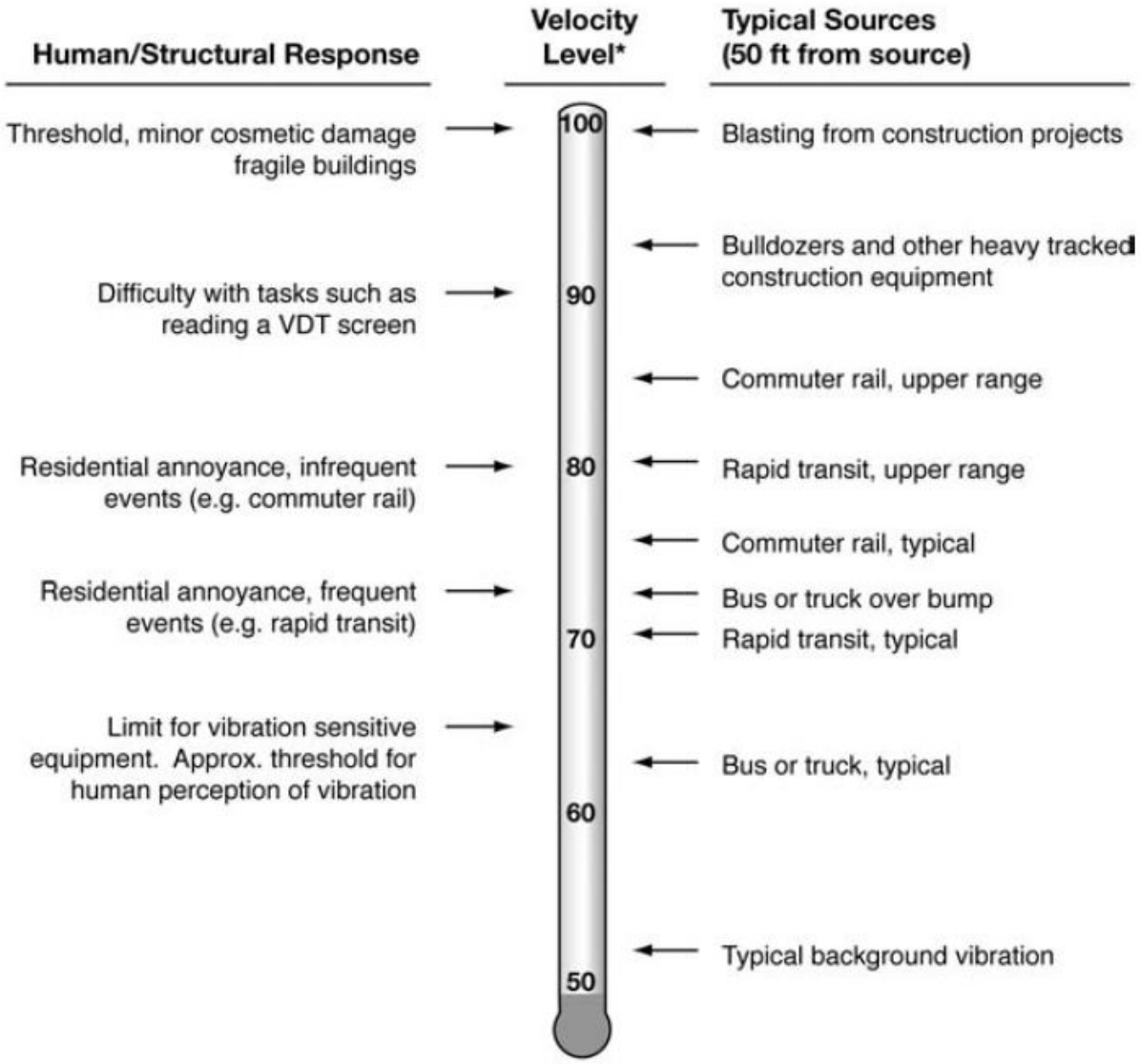
2.8 VIBRATION

According to the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (9), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



** RMS Vibration Velocity Level in VdB relative to 10^{-6} inches/second*

Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research (OPR). (10) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*.

3.2 STATE OF CALIFORNIA GREEN BUILDING STANDARDS CODE

The 2016 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (11) These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 MARCH JOINT POWERS AUTHORITY GENERAL PLAN NOISE/AIR QUALITY ELEMENT

The March Joint Powers Authority (March JPA) General Plan is currently being updated, so both the draft (yet to be approved) General Plan Update 2030 and adopted General Plan 1999 policies are described in this section in relation to the Project. The Noise/Air Quality Element of each version of the General Plan identify several goals and policies to protect and enhance the quality of life for those who live and work in the March JPA jurisdiction. (12) (3) The Noise Element provides policy guidance which addresses the generation, mitigation, avoidance, and the control of excessive noise.

3.3.1 GENERAL PLAN UPDATE 2030

To reduce noise levels within the March Joint Powers Authority jurisdiction, the General Plan Update 2030 Noise/Air Quality Element contains the following three goals:

3.4.2.1 Reduction of noise impacts through proper land use planning.
3.4.2.2 Analyze noise impacts caused by transportation.
3.4.2.3 Minimize noise impacts attributable to civilian aviation.

The noise policies specified in the March Joint Powers Authority Noise/Air Quality Element provide the guidelines necessary to satisfy these goals. The policies are provided below:

Policy 1a The MJPA will use the State Land Use Compatibility matrix (Figure III-1 of this Element) as the standard when approving future projects to ensure the reduction of potential noise impacts.
Policy 1b 60 dBA CNEL is established as the acceptable outdoor noise exposure level for schools, libraries, churches, hospitals, nursing homes and other medical facilities, and parks.
Policy 1c 65 dBA CNEL is established as the acceptable outdoor noise exposure level for transient lodging.
Policy 1d Indoor noise exposure levels of 45 dBA CNEL shall be maintained for all hospitals, nursing homes and other medical facilities, and transient lodging.
Policy 1e 70 dBA CNEL is the established acceptable outdoor noise exposure level for office buildings, businesses, commercial, professional, and mixed-use development.
Policy 1f 70 dBA CNEL is the established outdoor noise exposure level for golf courses, cemeteries, industrial, manufacturing, warehouse/distribution, and public facilities.
Policy 1g Land uses that are particularly sensitive to noise (such as schools, libraries, day care, residential uses, medical facilities, etc.) shall not be approved in areas that exceed the acceptable limits on noise as set forth in Figure III-1: State Land Use Compatibility of this Element.
Policy 1h The MJPA shall encourage site design that places structures such that noise generating uses are buffered from other developments, either through distance, human-made buffers, or other means.
Policy 1i Noise generating facilities shall be located in areas with compatible noise generating land uses (i.e., airport noise contour areas) to minimize land use incompatibilities, noise abatement and the necessity of extensive mitigation measures.
Policy 2a Noise impacts resulting from traffic shall be minimized through the use of sound attenuation measures such as berms, walls, or a combination thereof.
Policy 2b Truck routes shall be established and not located near areas where there are sensitive receptors that may be impacted.
Policy 2c Trucking operations shall be limited to appropriate routes, times and speeds.
Policy 2d The March JPA shall evaluate noise sensitivity and noise generation when considering transportation improvement projects. If necessary, these impacts shall be mitigated to acceptable levels.
Policy 2e Appropriate muffling systems for construction equipment and operations shall be required, as necessary.
Policy 3a March JPA shall adhere to the adopted 2005 AICUZ and draft Joint Land Use Plan criteria (or more current document) and promote the use of newer and quieter aircraft.

Policy 3b *March JPA shall analyze noise impacts associated with General Aviation as a component of the environmental review for the General Aviation ramp.*

Policy 3c *At a future date when the market demand and likely development of aviation facilities is known beyond speculation, March JPA shall prepare a comprehensive environmental analysis of noise impacts as part of a CEQA review for the build-out of the 21,000 annual operation civilian operations at March Inland Port.*

LAND USE COMPATIBILITY

The noise criteria identified in the March Joint Powers Authority General Plan Update 2030 Noise/Air Quality Element (Figure III-1) are guidelines to evaluate the land use compatibility of transportation-related noise. The compatibility criteria, shown on Exhibit 3-A, provides the City with a planning tool to gauge the compatibility of land uses relative to existing and future exterior noise levels. The *State Land Use Compatibility* guidelines indicate that industrial and manufacturing land uses, such as the Project, are considered *normally acceptable* with noise levels below 70 dBA CNEL and *conditionally acceptable* with noise levels of less than 75 dBA CNEL.

3.3.2 ADOPTED GENERAL PLAN 1999

The adopted March JPA General Plan includes the following goals in the Noise/Air Quality Element:

1 *Ensure that land uses are protected from excessive and unwanted noise.*

2 *Minimize incompatible noise level exposures throughout the Planning Area, and where possible, mitigate the effect of noise incompatibilities to provide a safe and health environment.*

3 *Work toward the reduction of noise impacts from vehicular traffic, and aviation and rail operations.*

The noise policies specified in the March Joint Powers Authority Noise/Air Quality Element provide the guidelines necessary to satisfy these goals. The policies are provided below:

Policy 1.1 *Establish acceptable limits of noise for various land uses throughout the March JPA Planning Area. Future development that could increase ambient noise levels shall be required to mitigate the anticipated noise increase, to the extent possible.*

Policy 1.2 *Noise sensitive uses (such as schools, libraries, hospitals, medical facilities, residential uses, etc.) shall be discouraged in areas where noise levels exceed acceptable limits.*

Policy 1.3 *Encourage good acoustical design in new construction.*

Policy 1.4 *Provide buffer areas between noise sources and other developments, where practical.*

Policy 2.1 *Avoid placing noise sensitive land uses in proximity to areas devoted to noise generating facilities such as areas of aviation related activities, industrial parks, transportation facilities, and other noise generating land uses.*

Policy 2.2 *Noise generating facilities shall be located in areas with compatible noise generating land uses (i.e., airport noise contour areas) to minimize land use incompatibilities, noise abatement and mitigation measures needed.*

Policy 2.3 *Noise sensitive land uses shall not be located in areas influenced by noise generating land uses, in particular the noise contours associated with the joint use airfield, unless appropriate mitigation is utilized.*

Policy 2.4 *March JPA shall evaluate noise sensitivity and noise generation when considering land use projects and transportation improvement projects, and where appropriate mitigation measures shall be employed.*

Policy 2.5 *March JPA shall utilize and comply with the CALTRANS standards for noise compatibility for aviation generated noise to proposed land use development.*

Policy 3.1 *Include mitigating measures such as landscaping, berming and site orientation, in the design of projects located near noise generating sources such as arterial roadways.*

Policy 3.2 *Coordinate with adjacent cities and county agencies for noise abatement.*

Policy 3.3 *Adhere to the adopted AICUZ and Comprehensive Land Use Plan standards and promote the use of newer and quieter aircraft and support equipment.*

Policy 3.4 *Where appropriate, noise mitigation measures shall be incorporated in the design and approval of development on property located adjacent to aviation and rail facilities.*

Policy 3.5 *Where appropriate, development in areas adjacent to freeways, arterial streets, and other noise source shall be designed to reduce the potential for noise impacts.*

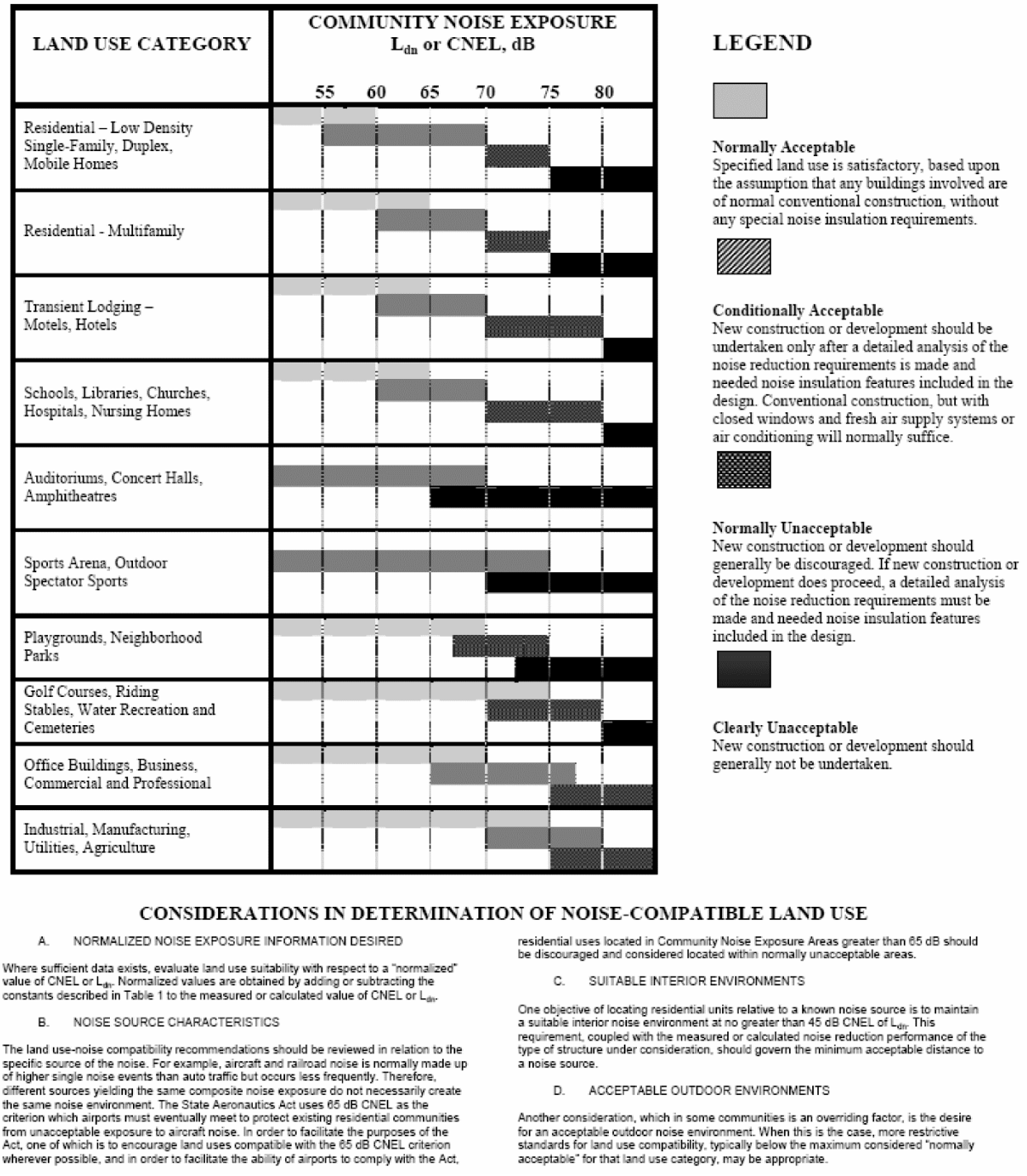
Policy 3.6 *Regulate the use of local streets by trucks, trailers, and construction vehicles, to the extent possible.*

Policy 3.7 *Limit trucking operations to appropriate routes, times and speeds.*

Policy 3.8 *Appropriate muffling systems for construction equipment and operations shall be required, as necessary.*

Policy 3.9 *March JPA shall encourage and facilitate the use of mass transit services and alternative transportation systems to minimize dependence of the automobile within the Planning Area, thereby minimizing the level of noise generated by surface transportation.*

EXHIBIT 3-A: STATE LAND USE COMPATIBILITY



Source: March Joint Powers Authority General Plan Update 2030 Noise/Air Quality Element, Figure III-1.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the K4 Parcel Project, stationary-source (operational) noise such as the expected idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements are typically evaluated against standards established under a jurisdiction's Municipal Code. Although the Project site is located within the March Joint Powers Authority, noise-sensitive receivers potentially impacted by operational noise activities are also located in the City of Moreno Valley jurisdiction. Therefore, to accurately describe the potential Project-related operational noise level contributions, this analysis presents the appropriate operational noise standards for each jurisdiction adjacent to the Project site. The March Joint Powers Authority and City of Moreno Valley operational noise level standards are shown on Table 3-1.

3.4.1 MARCH JOINT POWERS AUTHORITY OPERATIONAL NOISE STANDARDS

The March Joint Powers Authority Development Code, Chapter 9.10 *Performance Standards*, Section 9.10.140 identifies the exterior stationary-source noise level standards for commercial and industrial land uses. Based on Section 9.10.140 of the Development Code, the exterior noise level shall not exceed 55 dBA L_{eq} at any time beyond the boundaries of the property. (13) The March Joint Powers Authority Development Code is included in Appendix 3.1.

3.4.2 CITY OF MORENO VALLEY OPERATIONAL NOISE STANDARDS

The City of Moreno Valley Municipal Code defines *Maximum Sound Levels (in dB(A)) for Source Land Uses* in Table 11.80.030-2 for *Residential* and *Commercial* land uses. As defined by the Municipal Code, Section 11.80.020 *Definitions*, *Commercial* land use *means all uses of land not otherwise classified as residential,* and *Residential* land use *means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly.* (14) For the purpose of this analysis, the K4 Parcel Project is considered *Commercial* land use since it is not classified as residential. Based on this standard, the operational noise level limits for commercial land use, from Table 11.80.030-2, of 65 dBA L_{eq} during the daytime (8:00 a.m. to 10:00 p.m.) hours and 60 dBA L_{eq} during the nighttime (10:01 p.m. to 7:59 a.m.) hours shall apply to the operational noise from the Project.

Further, Section 11.80.030 (C) *Prohibited Acts*, *Nonimpulsive Sound Decibel Limits*, states: *No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on a privately owned property…* (14) Therefore, at a distance of 200 feet from the property line, the Project's operational noise levels shall not exceed the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime noise level standards for commercial land uses, as shown on Table 3-1.

The City of Moreno Valley Municipal Code also identifies continuous sound level limits in Table 11.80.030-1 based on the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health (NIOSH) noise exposure guidelines. A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The City of Moreno Valley noise level threshold starts at 90 dBA for more than eight hours per day, and for every increase, the exposure time is reduced. The City of Moreno Valley identifies noise level thresholds of 92 dBA for more than 6 hours per day, 95 dBA for more than 4 hour per day, 97 dBA for more than 3 hours per day, and up to 100 dBA for more than 2 hours per day. This noise study uses both the more restrictive daytime and nighttime City of Moreno Valley noise level limits of 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, and the 90 dBA L_{eq} 8- hour limit, shown on Table 3-1 of this report, to evaluate the potential operational noise levels due to the operation of the Project.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Source Land Use	Time Period	Exterior Noise Level Standards (dBA L_{eq})[2]
March JPA[1]	Commercial/ Industrial	Any Time	55
City of Moreno Valley[2]	Commercial (@ 200')	Daytime (8:00 a.m. - 10:00 p.m.)	65
		Nighttime (10:01 p.m. - 7:59 a.m.)	60
	Any	8 Hours per Day	90

[1] Source: March Joint Powers Authority, Development Code, Chapter 9.10 Performance Standards, Section 9.10.140 (Appendix 3.1).
[2] Source: City of Moreno Valley Municipal Code, Chapter 11.80 Noise Regulation (Appendix 3.2).
[3] L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.
"JPA" = Joint Powers Authority

3.5 CONSTRUCTION NOISE STANDARDS

To accurately describe the potential Project-related construction noise levels, including both on-site Project and off-site channel construction activities, this noise study presents the appropriate construction noise standards for each jurisdiction adjacent to the Project site including the March Joint Powers Authority and City of Moreno Valley. However, the permitted hours of construction for the March JPA are the only applicable hour restrictions for the Project since the construction activity will be within the March JPA jurisdiction.

3.5.1 MARCH JOINT POWERS AUTHORITY CONSTRUCTION NOISE STANDARDS

The March Joint Powers Authority Development Code, Section 9.10.030 *Exemptions*, states that construction activities are considered exempt from the noise performance standards if they occur within the permitted hours of 7:00 a.m. to 7:00 p.m. The March Joint Powers Authority Development Code does not identify a specific noise level standard for construction activity. The March Joint Powers Authority Development Code construction noise standards are shown on Table 3-2.

3.5.2 CITY OF MORENO VALLEY CONSTRUCTION NOISE STANDARDS

The City of Moreno Valley Municipal Code noise standards for construction are described below to determine the potential noise impacts at nearby sensitive receiver locations. As a subset of its stationary-source noise regulations, the City Municipal Code establishes permitted hours of construction activity. More specifically, Municipal Code Section 11.80.030 (D) (7), *Construction and Demolition*, provides the following:

> *No person shall operate, or cause operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee.*

Therefore, based on the Section 11.80.030 (D) (7) construction regulations, a construction-related *noise disturbance* occurs if Project construction activity occurs outside of the permitted hours. For this analysis, both the more restrictive daytime and nighttime City of Moreno Valley noise level limits of 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, and the 90 dBA L_{eq} 8- hour limit are used as appropriate thresholds for the nearby sensitive land uses (e.g. residential homes) in the Project study area. The City of Moreno Valley construction noise standards are shown on Table 3-2. As previously discussed in Section 3.4, the construction noise level threshold used in this noise study represents a conservative approach, since it is more restrictive than the continuous sound level limits of Table 11.80.030-1 of the City of Moreno Valley Municipal Code.

TABLE 3-2: CONSTRUCTION NOISE STANDARDS

Jurisdiction	Permitted Hours of Construction Activity	Construction Noise Level Standard (dBA L_{eq})[2]	
		Daytime	Nighttime
March JPA	7:00 a.m. to 7:00 p.m.	n/a	
City of Moreno Valley[1]	General Activity: 7:00 a.m. to 8:00 p.m. on any day. Grading is limited to 7:00 a.m. to 6:00 p.m. Monday to Friday; 8:00 a.m. to 4:00 p.m. on weekends and holidays.	65	60[3]
		90 (anytime)	

[1] Source: City of Moreno Valley Municipal Code, Section 11.80.030 (D) (7) and Section 8.21.050 (O) (Appendix 3.2).
[2] Acceptable threshold for determining the relative significance of short-term Project construction noise levels, based on the City of Moreno Valley stationary noise standards shown on Table 3-1.
[3] Any nighttime construction activity requires an exemption from the City of Moreno Valley Municipal Code as indicated in Section 11.80.030 (E) (8) for a special event permit (Section 11.80.040). The special event permit application shall be submitted to the City of Moreno Valley Planning Department for approval and meet the requirements of Municipal Code Section 11.80.040.
"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.; "n/a" = The March JPA Development Code does not identify construction-specific noise level limits.

3.6 VIBRATION STANDARDS

The March Joint Powers Authority and City of Moreno Valley General Plans and Municipal Codes do not identify specific vibration level standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. (9) Operational and construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Large bulldozers and loaded trucks can cause perceptible vibration levels proximate receptors. The FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Project-related vibration impacts due to on-site operational and construction activities.

3.7 MARCH AIR RESERVE BASE/INLAND PORT AIRPORT LAND USE COMPATIBILITY

The March Air Reserve Base/Inland Port Airport (MARB/IPA) runway is located approximately 0.7 miles southwest of the Project site. The *Riverside County Airport Land Use Compatibility Plan Policy Document* (RC ALUCP) includes the policies for determining the land use compatibility of the Project since it is located within 2 miles of an airport runway. Policy 4.1.5 *Noise Exposure for Other Land Uses* of the RC ALUCP requires that land uses, such as the industrial land use of the Project site, demonstrate compatibility with the acceptable noise levels on Table 2B. The Table 2B *Supporting Compatibility Criteria: Noise* matrix is shown on Exhibit 3-B and indicates that *normally acceptable* industrial land uses experience exterior noise levels between 60 to 65 dBA CNEL. *Normally acceptable* noise levels for industrial land uses indicate that *noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities*. (15)

The noise contour boundaries used to determine the potential aircraft-related noise impacts at the Project site are found on Exhibit MA-4 of the RC ALUCP and are presented on Exhibit 3-C of this report.

EXHIBIT 3-B: RC ALUCP SUPPORTING COMPATIBILITY CRITERIA: NOISE

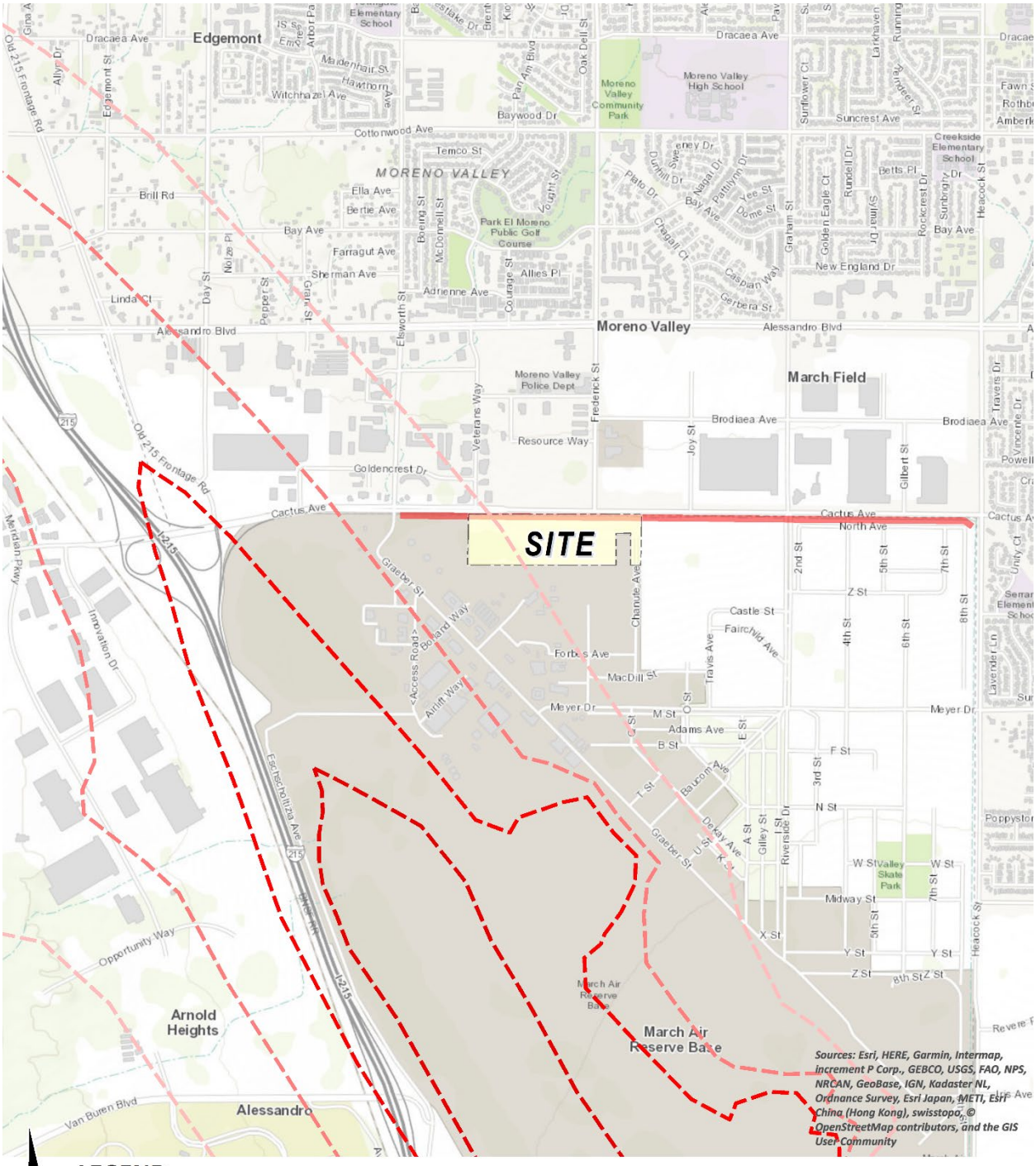
Land Use Category	CNEL (dB) 50–55	55–60	60–65	65–70	70–75
Residential *					
single-family, nursing homes, mobile homes	++	o	–	– –	– –
multi-family, apartments, condominiums	++	+	o	– –	– –
Public					
schools, libraries, hospitals	+	o	–	– –	– –
churches, auditoriums, concert halls	+	o	o	–	– –
transportation, parking, cemeteries	++	++	++	+	o
Commercial and Industrial					
offices, retail trade	++	+	o	o	–
service commercial, wholesale trade, warehousing, light industrial	++	++	+	o	o
general manufacturing, utilities, extractive industry	++	++	++	+	+
Agricultural and Recreational					
cropland	++	++	++	++	+
livestock breeding	++	+	o	o	–
parks, playgrounds, zoos	++	+	+	o	–
golf courses, riding stables, water recreation	++	++	+	o	o
outdoor spectator sports	++	+	+	o	–
amphitheaters	+	o	–	– –	– –

Land Use Acceptability		Interpretation/Comments
++	*Clearly Acceptable*	The activities associated with the specified land use can be carried out with essentially no interference from the noise exposure.
+	*Normally Acceptable*	Noise is a factor to be considered in that slight interference with outdoor activities may occur. Conventional construction methods will eliminate most noise intrusions upon indoor activities.
o	*Marginally Acceptable*	The indicated noise exposure will cause moderate interference with outdoor activities and with indoor activities when windows are open. The land use is acceptable on the conditions that outdoor activities are minimal and construction features which provide sufficient noise attenuation are used (e.g., installation of air conditioning so that windows can be kept closed). Under other circumstances, the land use should be discouraged.
–	*Normally Unacceptable*	Noise will create substantial interference with both outdoor and indoor activities. Noise intrusion upon indoor activities can be mitigated by requiring special noise insulation construction. Land uses which have conventionally constructed structures and/or involve outdoor activities which would be disrupted by noise should generally be avoided.
– –	*Clearly Unacceptable*	Unacceptable noise intrusion upon land use activities will occur. Adequate structural noise insulation is not practical under most circumstances. The indicated land use should be avoided unless strong overriding factors prevail and it should be prohibited if outdoor activities are involved.

* Subtract 5 dB for low-activity outlying airports (Chiriaco Summit and Desert Center)

Source: Riverside County Airport Land Use Compatibility Plan, Table 2B.

EXHIBIT 3-C: MARB/IPA FUTURE AIRPORT NOISE CONTOURS



LEGEND:

- Unmitigated 60 dBA CNEL Noise Level Contour Boundary
- Unmitigated 65 dBA CNEL Noise Level Contour Boundary
- Unmitigated 70 dBA CNEL Noise Level Contour Boundary
- Unmitigated 75 dBA CNEL Noise Level Contour Boundary

Source: Riverside County Airport Land Use Compatibility Plan, Chapter W7, Exhibit MA-4.

Off-Site Channel

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4 SIGNIFICANCE CRITERIA

The following significance criteria are based on guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

E. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the Project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the March Joint Powers Authority General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility. The closest airport which would require additional noise analysis under CEQA guidelines E and F is the MARB/IPA. As previously shown on Exhibit 3-C, the Project site is partially located within the 60 to 65 dBA CNEL noise level contour boundaries of MARB/IPA. Based on the RC ALUCP noise level contours for the MARB/IPA, the Project represents *normally acceptable* land use based on the RC ALUCP compatibility criteria, and no noise mitigation is required with typical building construction. Therefore, the potential impacts under CEQA guidelines E and F are considered to be *less than significant* and are not further analyzed in this noise study.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels and the location of noise-sensitive receivers in order to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (16)

4.1.1 SUBSTANTIAL PERMANENT NOISE LEVEL INCREASES

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (17) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (i.e., CNEL) and equivalent continuous noise level (L_{eq}).

For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. According to the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON, which inform the Significance Thresholds identified in Section 4.3 below.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.1.2 SUBSTANTIAL TEMPORARY OF PERIODIC NOISE LEVEL INCREASES

Due to the temporary, short-term nature of noise-generating construction activities, the temporary or periodic noise level increases over the existing ambient conditions must be considered under CEQA Guideline D. Therefore, the Caltrans *Traffic Noise Analysis Protocol* 12 dBA L_{eq} *substantial* noise level increase threshold is used in this analysis to assess temporary noise level increases. (18) If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a potentially significant impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions. (18)

4.2 NON-NOISE-SENSITIVE RECEIVERS

The March Joint Powers Authority General Plan Update 2030 Noise/Air Quality Element, Policy 1f is used to establish the satisfactory noise levels of significance for non-noise-sensitive land uses in the Project study area. While not yet adopted, the March Joint Powers Authority General Plan Update 2030 Noise/Air Quality Element contains specific land use compatibility criteria for different land uses, while the currently adopted 1999 General Plan does not identify any noise compatibility criteria. Therefore, the noise study relies on the specific land use compatibility criteria and noise policies outlined in the draft 2030 General Plan Update. As indicated in Policy 1f, the exterior noise level criteria for non-noise-sensitive land use, such as industrial use, is 70 dBA CNEL. Noise levels greater than 70 dBA CNEL are considered *conditionally acceptable* per the *State Land Use Compatibility* matrix, previously shown on Exhibit 3-A.

To determine if Project-related traffic noise level increases are significant at off-site non-noise-sensitive land uses, a *readily perceptible* 5 dBA and *barely perceptible* 3 dBA criteria are used. When the without Project noise levels at the non-noise-sensitive land uses are below the *normally acceptable* 70 dBA CNEL compatibility criteria, a *readily perceptible* 5 dBA or greater noise level increase is considered a significant impact. When the without Project noise levels are greater than the *normally acceptable* 70 dBA CNEL land use compatibility criteria, a *barely perceptible* 3 dBA or greater noise level increase is considered a significant impact since the noise level criteria is already exceeded. The noise level increases used to determine significant impacts for non-noise-sensitive land uses is generally consistent with the FICON noise level increase thresholds for noise-sensitive land uses but instead rely on the March Joint Powers Authority General Plan Noise/Air Quality Element, Policy 1f 70 dBA CNEL exterior noise level criteria.

4.3 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g., residential, etc.):
    - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
    - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
    - already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL (FICON, 1992).
- When the noise levels at existing and future non-noise-sensitive land uses (e.g., commercial, industrial, etc.):
    - are less than the March Joint Powers Authority General Plan Noise/Air Quality Element, Policy 1f, 70 dBA and the Project creates a *readily perceptible* 5 dBA or greater Project-related noise level increase; or
    - are greater than the March Joint Powers Authority General Plan Noise/Air Quality Element, Policy 1f, 70 dBA and the Project creates a *barely perceptible* 3 dBA or greater Project-related noise level increase.

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels:
    - exceed the exterior 55 dBA L_{eq} noise level standards at nearby receiver locations within the March Joint Powers Authority jurisdiction (March Joint Powers Authority Development Code, Section 9.10.140); or
    - exceed the 65 dBA L_{eq} daytime or 60 dBA L_{eq} nighttime noise level standards at 200 feet from the property line of the noise source (City of Moreno Valley Municipal Code, Table 11.80.030-2); or
    - exceed the 65 dBA L_{eq} daytime or 60 dBA L_{eq} nighttime noise level standards at residential receivers in the City of Moreno Valley (City of Moreno Valley Municipal Code, Table 11.80.030-2);
    - To present a conservative approach, the adjacent office uses in the Project study area are also analyzed based on the more conservative operational noise level limits required for noise-sensitive residential receiver locations.
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
    - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
    - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
    - already exceed 65 dBA L_{eq}, and the Project creates a community noise level increase of greater than 1.5 dBA L_{eq} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
    - create noise levels at sensitive residential receivers in the City of Moreno Valley which exceed the short-term construction noise level threshold of 65 dBA L_{eq} during the daytime

hours, or 60 dBA L_{eq} during the nighttime hours, or the continuous noise level limit of 90 dBA L_{eq} (based on the City of Moreno Valley Municipal Code, Table 11.80.030-2 source land use noise level limits, and the Table 11.80.030-1 continuous noise level limits); or

- o generate temporary Project construction-related noise level increases which exceed the 12 dBA L_{eq} substantial noise level increase threshold at noise-sensitive receiver locations (Caltrans, Traffic Noise Analysis Protocol).

- If short-term project generated construction source vibration levels could exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at noise-sensitive receiver locations.

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site	Noise-Sensitive[1]	if ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		if ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
	Non-Noise-Sensitive[2]	if ambient is < 70 dBA CNEL	≥ 5 dBA CNEL Project increase	
		if ambient is > 70 dBA CNEL	≥ 3 dBA CNEL Project increase	
Operational	Noise-Sensitive	Exterior Noise Level Standards	See Table 3-1.	
		if ambient is < 60 dBA L_{eq}[1]	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}[1]	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}[1]	≥ 1.5 dBA L_{eq} Project increase	
		Vibration Level Threshold[3]	80 VdB	
Construction	Noise-Sensitive	At residential land use[4]	65 dBA L_{eq}	60 dBA L_{eq}
			90 dBA L_{eq}	
		Noise Level Increase[5]	12 dBA L_{eq}	
		Vibration Level Threshold[3]	80 VdB	

[1] Source: FICON, 1992.
[2] Based on the FICON thresholds and March JPA General Plan Noise Element, Figure III-1, criteria for non-noise-sensitive land uses.
[3] Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.
[4] Based on the City of Moreno Valley Municipal Code, Chapter 11.80 Noise Regulation (Appendix 3.2).
[5] Source: Caltrans Traffic Noise Analysis Protocol, May 2011.
"Daytime" = 8:00 a.m. - 10:00 p.m.; "Nighttime" = 10:01 p.m. - 7:59 a.m.

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5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, four 24-hour noise level measurements were taken at potential receiver locations in the Project study area. The Project study area is based on the measurement locations discussed in this Section, in addition to the receiver locations used in this noise study, further described in Section 8. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A shows the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Friday, June 22nd, 2018. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (19)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (4) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (9)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (9) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the

future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (8:00 a.m. to 10:00 p.m.) and nighttime (10:01 p.m. to 7:59 a.m.) noise levels at each noise level measurement location consistent with the City of Moreno Valley Municipal Code. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the north of the Project site on Goldencrest Drive near existing office and commercial uses. The noise level measurements collected show an overall 24-hour exterior noise level of 62.6 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 58.5 dBA L_{eq} with an average nighttime noise level of 56.2 dBA L_{eq}.
- Location L2 represents the noise levels south of Cactus Avenue near the northern Project site boundary, north of March Air Reserve Base. The noise level measurements collected show an overall 24-hour exterior noise level of 66.2 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 60.3 dBA L_{eq} with an average nighttime noise level of 59.6 dBA L_{eq}.
- Located north of the Project site, location L3 represents the noise levels near existing office uses on Calle San Juan De Los Lagos. The noise level measurements collected show an overall 24-hour exterior noise level of 56.8 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 52.9 dBA L_{eq} with an average nighttime noise level of 49.9 dBA L_{eq}.
- Location L4 represents the noise levels east of the Project site near an existing Marine Corps Recruiting Station building on Riverside Drive. The noise level measurements collected show an overall 24-hour exterior noise level of 64.2 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 61.7 dBA L_{eq} with an average nighttime noise level of 57.2 dBA L_{eq}.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network and MARB/IPA. This includes the auto and heavy truck activities near the noise level measurement locations and aircraft overflight noise from the MARB/IPA. The 24-hour existing noise level measurements are shown on Table 5-1.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	Nighttime	
L1	530'	Located north of the Project site on Goldencrest Drive near existing office and commercial uses.	58.5	56.2	62.6
L2	0'	Located south of Cactus Avenue near the northern Project site boundary, north of March Air Reserve Base.	60.3	59.6	66.2
L3	1,420'	Located north of the Project site near existing office uses on Calle San Juan De Los Lagos.	52.9	49.9	56.8
L4	2,100'	Located east of the Project site near an existing Marine Corps Recruiting Station building on Riverside Drive.	61.7	57.2	64.2

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) average hourly levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS



6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The expected roadway noise level increases from vehicular traffic were calculated by Urban Crossroads, Inc. using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (20) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (21) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period. Research conducted by Caltrans has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model used in this analysis. (22)

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the 19 study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications according to the March Joint Powers Authority *General Plan Circulation Element*, and the posted vehicle speeds. The ADT volumes used in this study are presented on Table 6-2 were obtained from the *K4 Parcel Traffic Impact Analysis* prepared by Urban Crossroads, Inc., for the following traffic scenarios: Existing, Opening Year 2023, and Horizon Year 2040 conditions. (2) Table 6-3 provides the time of day (daytime, evening, and nighttime) vehicle splits.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	Adjacent Planned (Existing) Land Use[1]	Distance from Centerline to Nearest Adjacent Land Use (Feet)[2]	Posted Speed Limit (mph)
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	55'	50
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	56'	45
3	Veterans Wy.	n/o Cactus Av.	Business Park	39'	45
4	Frederick St.	n/o Cactus Av.	Business Park	44'	40
5	Graham St.	n/o Cactus Av.	Business Park	44'	45
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	50'	45
7	Heacock St.	s/o Cactus Av.	Residential	50'	45
8	Alessandro Bl.	w/o Barton St.	Public/Residential	60'	55
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	60'	55
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	67'	45
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	67'	45
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	67'	45
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	60'	45
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	60'	50
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	60'	50
16	Cactus Av.	e/o Frederick St.	Business Park	60'	50
17	Cactus Av.	e/o Graham St.	Business Park	60'	50
18	Cactus Av.	e/o Heacock St.	Residential	60'	50
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	60'	55

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Elements.

TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic Volumes[1]					
			Existing (2017)		Opening Year 2023		Horizon Year 2040	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Alessandro Bl.	n/o Trautwein Rd.	81,372	81,693	92,305	92,626	101,536	101,857
2	Meridian Pkwy.	s/o Cactus Av.	22,122	22,390	29,290	29,558	32,219	32,487
3	Veterans Wy.	n/o Cactus Av.	2,835	3,156	3,130	3,451	3,443	3,764
4	Frederick St.	n/o Cactus Av.	11,140	12,184	12,451	13,495	13,696	14,740
5	Graham St.	n/o Cactus Av.	7,288	7,567	8,479	8,758	9,944	10,223
6	Heacock St.	n/o Cactus Av.	15,779	16,218	17,853	18,292	19,639	20,078
7	Heacock St.	s/o Cactus Av.	30,212	30,592	33,789	34,169	37,167	37,547
8	Alessandro Bl.	w/o Barton St.	58,677	59,105	68,775	69,203	70,194	70,622
9	Alessandro Bl.	e/o Barton St.	48,718	49,254	58,157	58,693	70,194	70,730
10	Alessandro Bl.	e/o Old Frontage Rd.	33,720	34,256	41,841	42,377	44,657	45,193
11	Alessandro Bl.	w/o Frederick St.	36,713	36,927	42,118	42,332	46,330	46,544
12	Alessandro Bl.	e/o Frederick St.	36,956	37,224	41,925	42,193	46,117	46,385
13	Cactus Av.	e/o Meridian Pkwy.	20,275	20,543	30,459	30,727	33,505	33,773
14	Cactus Av.	e/o Old Frontage Rd.	41,223	44,098	50,969	53,844	56,065	58,940
15	Cactus Av.	w/o Veterans Wy.	42,886	45,761	52,276	55,151	57,503	60,378
16	Cactus Av.	e/o Frederick St.	49,456	51,089	60,278	61,911	66,305	67,938
17	Cactus Av.	e/o Graham St.	44,946	46,301	54,864	56,219	60,350	61,705
18	Cactus Av.	e/o Heacock St.	26,790	27,326	33,952	34,488	37,348	37,884
19	Van Buren Bl.	w/o Meridian Pkwy.	39,791	40,059	60,261	60,529	66,287	66,555

[1] Source: K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	69.14%	10.62%	20.24%	100.00%
Medium Trucks	70.51%	7.68%	21.81%	100.00%
Heavy Trucks	59.86%	10.26%	29.88%	100.00%

[1] Based on existing ADT counts by vehicle type taken on 5/17/2018 on Cactus Avenue west of Veterans Way (K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018). All values rounded to the nearest one-hundredth.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

According to the *K4 Parcel Traffic Impact Analysis* prepared by Urban Crossroads, Inc., the Project is expected to generate a net total of approximately 5,873 trip-ends per day (actual vehicles). (2) The Project trip generation includes 517 truck trip-ends per day from the Project site. This noise study relies on the actual Project trips to accurately account for the effect of individual truck trips on the study area roadway network.

To quantify the off-site noise levels, the Project related truck trips were added to the heavy truck category in the FHWA noise prediction model. The addition of the Project related truck trips increases the percentage of heavy trucks in the vehicle mix. This approach recognizes that the FHWA noise prediction model is significantly influenced by the number of heavy trucks in the vehicle mix.

The daily Project truck trip-ends were assigned to the individual off-site study area roadway segments based on the Project truck trip distribution percentages documented in the *Traffic Impact Analysis*. Using the Project truck trips in combination with the Project trip distribution, Urban Crossroads, Inc. calculated the number of additional Project truck trips and vehicle mix percentages for each of the study area roadway segments. Table 6-4 shows the traffic flow by vehicle type (vehicle mix) used for all without Project traffic scenarios, and Tables 6-5 to 6-7 show the vehicle mixes used for the with Project traffic scenarios.

TABLE 6-4: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total Daily % Traffic Flow[1]			Total
	Autos	Medium Trucks	Heavy Trucks	
All Segments	92.30%	3.22%	4.48%	100.00%

[1] Based on existing ADT counts by vehicle type taken on 5/17/2018 on Cactus Avenue west of Veterans Way (K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018). All values rounded to the nearest one-hundredth.

TABLE 6-5: EXISTING WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Alessandro Bl.	n/o Trautwein Rd.	92.33%	3.21%	4.46%	100.00%
2	Meridian Pkwy.	s/o Cactus Av.	92.40%	3.18%	4.43%	100.00%
3	Veterans Wy.	n/o Cactus Av.	93.09%	2.89%	4.02%	100.00%
4	Frederick St.	n/o Cactus Av.	92.75%	2.98%	4.28%	100.00%
5	Graham St.	n/o Cactus Av.	92.44%	3.13%	4.43%	100.00%
6	Heacock St.	n/o Cactus Av.	92.44%	3.14%	4.41%	100.00%
7	Heacock St.	s/o Cactus Av.	92.38%	3.18%	4.44%	100.00%
8	Alessandro Bl.	w/o Barton St.	92.36%	3.19%	4.45%	100.00%
9	Alessandro Bl.	e/o Barton St.	92.39%	3.18%	4.43%	100.00%
10	Alessandro Bl.	e/o Old Frontage Rd.	92.42%	3.17%	4.41%	100.00%
11	Alessandro Bl.	w/o Frederick St.	92.35%	3.20%	4.45%	100.00%
12	Alessandro Bl.	e/o Frederick St.	92.36%	3.19%	4.45%	100.00%
13	Cactus Av.	e/o Meridian Pkwy.	92.40%	3.18%	4.42%	100.00%
14	Cactus Av.	e/o Old Frontage Rd.	91.75%	3.18%	5.07%	100.00%
15	Cactus Av.	w/o Veterans Wy.	91.77%	3.18%	5.05%	100.00%
16	Cactus Av.	e/o Frederick St.	92.50%	3.12%	4.38%	100.00%
17	Cactus Av.	e/o Graham St.	92.49%	3.13%	4.38%	100.00%
18	Cactus Av.	e/o Heacock St.	92.45%	3.15%	4.39%	100.00%
19	Van Buren Bl.	w/o Meridian Pkwy.	92.35%	3.20%	4.45%	100.00%

[1] Source: K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-6: OPENING YEAR WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Alessandro Bl.	n/o Trautwein Rd.	92.33%	3.21%	4.46%	100.00%
2	Meridian Pkwy.	s/o Cactus Av.	92.37%	3.19%	4.44%	100.00%
3	Veterans Wy.	n/o Cactus Av.	93.02%	2.92%	4.06%	100.00%
4	Frederick St.	n/o Cactus Av.	92.71%	3.00%	4.30%	100.00%
5	Graham St.	n/o Cactus Av.	92.42%	3.14%	4.44%	100.00%
6	Heacock St.	n/o Cactus Av.	92.43%	3.15%	4.42%	100.00%
7	Heacock St.	s/o Cactus Av.	92.37%	3.19%	4.44%	100.00%
8	Alessandro Bl.	w/o Barton St.	92.35%	3.20%	4.45%	100.00%
9	Alessandro Bl.	e/o Barton St.	92.37%	3.19%	4.44%	100.00%
10	Alessandro Bl.	e/o Old Frontage Rd.	92.40%	3.18%	4.42%	100.00%
11	Alessandro Bl.	w/o Frederick St.	92.34%	3.20%	4.46%	100.00%
12	Alessandro Bl.	e/o Frederick St.	92.35%	3.20%	4.45%	100.00%
13	Cactus Av.	e/o Meridian Pkwy.	92.37%	3.19%	4.44%	100.00%
14	Cactus Av.	e/o Old Frontage Rd.	91.85%	3.19%	4.96%	100.00%
15	Cactus Av.	w/o Veterans Wy.	91.86%	3.19%	4.95%	100.00%
16	Cactus Av.	e/o Frederick St.	92.46%	3.14%	4.40%	100.00%
17	Cactus Av.	e/o Graham St.	92.46%	3.15%	4.39%	100.00%
18	Cactus Av.	e/o Heacock St.	92.42%	3.17%	4.41%	100.00%
19	Van Buren Bl.	w/o Meridian Pkwy.	92.34%	3.20%	4.46%	100.00%

[1] Source: K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

TABLE 6-7: HORIZON YEAR WITH PROJECT CONDITIONS VEHICLE MIX

ID	Roadway	Segment	With Project[1]			
			Autos	Medium Trucks	Heavy Trucks	Total[2]
1	Alessandro Bl.	n/o Trautwein Rd.	92.33%	3.21%	4.46%	100.00%
2	Meridian Pkwy.	s/o Cactus Av.	92.37%	3.19%	4.44%	100.00%
3	Veterans Wy.	n/o Cactus Av.	92.96%	2.94%	4.10%	100.00%
4	Frederick St.	n/o Cactus Av.	92.67%	3.02%	4.31%	100.00%
5	Graham St.	n/o Cactus Av.	92.41%	3.15%	4.44%	100.00%
6	Heacock St.	n/o Cactus Av.	92.42%	3.16%	4.43%	100.00%
7	Heacock St.	s/o Cactus Av.	92.37%	3.19%	4.44%	100.00%
8	Alessandro Bl.	w/o Barton St.	92.35%	3.20%	4.45%	100.00%
9	Alessandro Bl.	e/o Barton St.	92.36%	3.19%	4.45%	100.00%
10	Alessandro Bl.	e/o Old Frontage Rd.	92.39%	3.18%	4.43%	100.00%
11	Alessandro Bl.	w/o Frederick St.	92.34%	3.20%	4.46%	100.00%
12	Alessandro Bl.	e/o Frederick St.	92.35%	3.20%	4.45%	100.00%
13	Cactus Av.	e/o Meridian Pkwy.	92.36%	3.19%	4.44%	100.00%
14	Cactus Av.	e/o Old Frontage Rd.	91.89%	3.19%	4.92%	100.00%
15	Cactus Av.	w/o Veterans Wy.	91.90%	3.19%	4.91%	100.00%
16	Cactus Av.	e/o Frederick St.	92.45%	3.15%	4.40%	100.00%
17	Cactus Av.	e/o Graham St.	92.45%	3.15%	4.40%	100.00%
18	Cactus Av.	e/o Heacock St.	92.41%	3.17%	4.42%	100.00%
19	Van Buren Bl.	w/o Meridian Pkwy.	92.33%	3.21%	4.46%	100.00%

[1] Source: K4 Parcel Traffic Impact Analysis, Urban Crossroads, Inc., June 2018.
[2] Total of vehicle mix percentage values rounded to the nearest one-hundredth.

6.3 VIBRATION ASSESSMENT

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-8. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe

the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\ ft) - 30\log(D/25)$

TABLE 6-8: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet[1]
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

7 OFF-SITE TRAFFIC NOISE IMPACTS

To assess the off-site traffic CNEL noise level impacts associated with the proposed Project, noise contours were developed based on the *K4 Parcel Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without / With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year 2023 Without / With the Project: This scenario refers to Opening Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the *Traffic Impact Analysis*.
- Horizon Year 2040 Without / With the Project: This scenario refers to Horizon Year noise conditions without and with the proposed Project. This scenario includes all cumulative projects identified in the *Traffic Impact Analysis*.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not take into account the effect of any existing noise barriers or topography that may attenuate ambient noise levels and therefore present a conservative scenario for purposes of this analysis. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. An analysis of Project-related operational noise level increases over existing ambient conditions is provided in Section 9. Tables 7-1 through 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the study area roadway segments analyzed from the without Project to the with Project conditions in each of the three timeframes: Existing, Opening Year 2023, and Horizon Year 2040 conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	81.9	340	732	1578
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	75.2	124	267	575
3	Veterans Wy.	n/o Cactus Av.	Business Park	68.3	RW	64	139
4	Frederick St.	n/o Cactus Av.	Business Park	72.7	67	144	310
5	Graham St.	n/o Cactus Av.	Business Park	71.9	58	126	271
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	74.6	102	219	473
7	Heacock St.	s/o Cactus Av.	Residential	77.5	157	338	729
8	Alessandro Bl.	w/o Barton St.	Public/Residential	81.5	349	751	1618
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	80.7	308	664	1430
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	76.7	188	404	871
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	77.1	199	428	922
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	77.1	199	430	926
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	75.1	132	285	613
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	79.1	243	523	1128
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	79.3	249	537	1158
16	Cactus Av.	e/o Frederick St.	Business Park	79.9	274	591	1273
17	Cactus Av.	e/o Graham St.	Business Park	79.5	257	555	1195
18	Cactus Av.	e/o Heacock St.	Residential	77.2	182	393	846
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	79.8	269	580	1249

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	81.9	340	733	1579
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	75.2	124	268	577
3	Veterans Wy.	n/o Cactus Av.	Business Park	68.4	RW	66	142
4	Frederick St.	n/o Cactus Av.	Business Park	72.9	69	149	321
5	Graham St.	n/o Cactus Av.	Business Park	72.0	60	128	277
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	74.7	103	222	478
7	Heacock St.	s/o Cactus Av.	Residential	77.5	158	340	732
8	Alessandro Bl.	w/o Barton St.	Public/Residential	81.5	349	752	1621
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	80.7	309	665	1433
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	76.7	188	405	874
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	77.1	199	428	923
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	77.1	200	430	927
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	75.2	132	285	615
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	79.7	267	574	1237
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	79.9	273	588	1266
16	Cactus Av.	e/o Frederick St.	Business Park	80.0	277	597	1287
17	Cactus Av.	e/o Graham St.	Business Park	79.5	260	559	1205
18	Cactus Av.	e/o Heacock St.	Residential	77.3	183	394	850
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	79.8	270	581	1251

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR 2023 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	82.4	370	797	1716
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	76.4	149	322	694
3	Veterans Wy.	n/o Cactus Av.	Business Park	68.7	RW	69	148
4	Frederick St.	n/o Cactus Av.	Business Park	73.2	72	155	334
5	Graham St.	n/o Cactus Av.	Business Park	72.5	65	139	300
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	75.2	111	238	513
7	Heacock St.	s/o Cactus Av.	Residential	77.9	169	365	785
8	Alessandro Bl.	w/o Barton St.	Public/Residential	82.2	388	835	1799
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	81.4	347	747	1609
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	77.6	217	467	1006
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	77.7	218	469	1010
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	77.7	217	467	1007
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	76.9	173	373	804
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	80.0	280	603	1299
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	80.1	285	613	1321
16	Cactus Av.	e/o Frederick St.	Business Park	80.8	313	674	1453
17	Cactus Av.	e/o Graham St.	Business Park	80.4	294	633	1364
18	Cactus Av.	e/o Heacock St.	Residential	78.3	213	460	991
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	81.6	355	765	1647

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR 2023 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	82.4	370	797	1718
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	76.4	150	323	695
3	Veterans Wy.	n/o Cactus Av.	Business Park	68.8	RW	70	151
4	Frederick St.	n/o Cactus Av.	Business Park	73.4	74	160	345
5	Graham St.	n/o Cactus Av.	Business Park	72.6	66	142	305
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	75.2	112	241	518
7	Heacock St.	s/o Cactus Av.	Residential	78.0	170	366	788
8	Alessandro Bl.	w/o Barton St.	Public/Residential	82.2	388	836	1802
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	81.4	347	748	1612
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	77.7	217	468	1008
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	77.7	218	469	1011
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	77.7	217	468	1008
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	76.9	174	374	805
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	80.5	302	651	1402
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	80.6	307	660	1423
16	Cactus Av.	e/o Frederick St.	Business Park	80.8	316	680	1466
17	Cactus Av.	e/o Graham St.	Business Park	80.4	296	638	1374
18	Cactus Av.	e/o Heacock St.	Residential	78.3	214	461	994
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	81.6	355	765	1649

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: HORIZON YEAR 2040 WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	82.8	394	849	1829
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	76.8	159	343	739
3	Veterans Wy.	n/o Cactus Av.	Business Park	69.1	RW	73	158
4	Frederick St.	n/o Cactus Av.	Business Park	73.6	77	165	356
5	Graham St.	n/o Cactus Av.	Business Park	73.2	72	155	334
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	75.6	118	254	547
7	Heacock St.	s/o Cactus Av.	Residential	78.4	180	388	837
8	Alessandro Bl.	w/o Barton St.	Public/Residential	82.2	393	846	1824
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	82.2	393	846	1824
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	77.9	226	487	1050
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	78.1	232	500	1076
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	78.1	231	498	1073
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	77.3	185	398	857
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	80.4	298	643	1384
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	80.6	303	653	1408
16	Cactus Av.	e/o Frederick St.	Business Park	81.2	334	719	1548
17	Cactus Av.	e/o Graham St.	Business Park	80.8	313	675	1454
18	Cactus Av.	e/o Heacock St.	Residential	78.7	227	490	1056
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	82.0	378	815	1755

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HORIZON YEAR 2040 WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Adjacent Planned (Existing) Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alessandro Bl.	n/o Trautwein Rd.	Residential	82.8	394	850	1830
2	Meridian Pkwy.	s/o Cactus Av.	Business Park	76.8	160	344	741
3	Veterans Wy.	n/o Cactus Av.	Business Park	69.2	RW	75	161
4	Frederick St.	n/o Cactus Av.	Business Park	73.8	79	170	366
5	Graham St.	n/o Cactus Av.	Business Park	73.3	73	157	339
6	Heacock St.	n/o Cactus Av.	Business Park/Residential	75.6	119	256	552
7	Heacock St.	s/o Cactus Av.	Residential	78.4	181	390	839
8	Alessandro Bl.	w/o Barton St.	Public/Residential	82.3	393	848	1826
9	Alessandro Bl.	e/o Barton St.	Business Park/Residential	82.3	394	848	1827
10	Alessandro Bl.	e/o Old Frontage Rd.	Commercial	77.9	227	489	1053
11	Alessandro Bl.	w/o Frederick St.	Commercial/Residential	78.1	232	500	1077
12	Alessandro Bl.	e/o Frederick St.	Commercial/Residential	78.1	231	499	1074
13	Cactus Av.	e/o Meridian Pkwy.	Business Park	77.3	185	398	858
14	Cactus Av.	e/o Old Frontage Rd.	Business Park (Commercial)	80.9	320	689	1484
15	Cactus Av.	w/o Veterans Wy.	Business Park (Commercial)	81.0	325	699	1507
16	Cactus Av.	e/o Frederick St.	Business Park	81.2	336	724	1561
17	Cactus Av.	e/o Graham St.	Business Park	80.8	315	679	1464
18	Cactus Av.	e/o Heacock St.	Residential	78.7	228	492	1059
19	Van Buren Bl.	w/o Meridian Pkwy.	Cemetery/Business Park	82.0	379	816	1757

[1] Sources: March JPA General Plan Land Use Map, Figure II-3, City of Riverside General Plan Land Use Policy Map, Figure LU-10, and the City of Moreno Valley General Plan Land Use Map, Figure 2-2.

[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.

"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The Existing without Project exterior noise levels are expected to range from 68.3 to 81.9 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 68.4 to 81.9 dBA CNEL. As shown on Table 7-7 the Project is expected to generate an exterior noise level increase of up to 0.6 dBA CNEL at adjacent land uses, which will satisfy the significance thresholds identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Existing conditions.

TABLE 7-7: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACT

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?[2]	Threshold (dBA CNEL)[3]	Threshold Exceeded?[3]
			No Project	With Project	Project Addition			
1	Alessandro Bl.	n/o Trautwein Rd.	81.9	81.9	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	75.2	75.2	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	68.3	68.4	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	72.7	72.9	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	71.9	72.0	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	74.6	74.7	0.1	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	77.5	77.5	0.0	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	81.5	81.5	0.0	Yes	1.5	No
9	Alessandro Bl.	e/o Barton St.	80.7	80.7	0.0	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	76.7	76.7	0.0	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	77.1	77.1	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	77.1	77.1	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	75.1	75.2	0.1	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	79.1	79.7	0.6	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	79.3	79.9	0.6	No	1.5	No
16	Cactus Av.	e/o Frederick St.	79.9	80.0	0.1	No	1.5	No
17	Cactus Av.	e/o Graham St.	79.5	79.5	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	77.2	77.3	0.1	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	79.8	79.8	0.0	No	1.5	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[3] Significance Criteria (Section 4).

7.3 OPENING YEAR 2023 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-8 presents a comparison of the Opening Year 2023 without and with Project conditions CNEL noise levels. Table 7-3 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 68.7 to 82.4 dBA CNEL without the Project. Table 7-4 presents the Opening Year 2023 with Project conditions noise level contours that are expected to range from 68.8 to 82.4 dBA CNEL. As shown on Table 7-8 the Project is expected to generate an exterior noise level increase of up to 0.5 dBA CNEL at adjacent land uses, which will satisfy the significance thresholds identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Opening Year 2023 conditions and mitigation measures are not required.

TABLE 7-8: OPENING YEAR 2023 OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?[2]	Threshold (dBA CNEL)[3]	Threshold Exceeded?[3]
			No Project	With Project	Project Addition			
1	Alessandro Bl.	n/o Trautwein Rd.	82.4	82.4	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	76.4	76.4	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	68.7	68.8	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	73.2	73.4	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	72.5	72.6	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	75.2	75.2	0.0	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	77.9	78.0	0.1	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	82.2	82.2	0.0	Yes	1.5	No
9	Alessandro Bl.	e/o Barton St.	81.4	81.4	0.0	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	77.6	77.7	0.1	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	77.7	77.7	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	77.7	77.7	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	76.9	76.9	0.0	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	80.0	80.5	0.5	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	80.1	80.6	0.5	No	1.5	No
16	Cactus Av.	e/o Frederick St.	80.8	80.8	0.0	No	1.5	No
17	Cactus Av.	e/o Graham St.	80.4	80.4	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	78.3	78.3	0.0	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	81.6	81.6	0.0	No	1.5	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[3] Significance Criteria (Section 4).

7.4 HORIZON YEAR 2040 PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-9 presents a comparison of the Horizon Year 2040 without and with Project conditions CNEL noise levels. Table 7-5 shows that the exterior noise levels without accounting for any noise attenuation features are expected to range from 69.1 to 82.8 dBA CNEL without the Project. Table 7-6 presents the Horizon Year 2040 with Project conditions noise level contours that are expected to range from 69.2 to 82.8 dBA CNEL. As shown on Table 7-9 the Project is expected to generate an exterior noise level increase of up to 0.5 dBA CNEL at adjacent land uses, which will satisfy the significance thresholds identified in Section 4. Therefore, the off-site Project-related traffic noise level increase is considered a *less than significant* impact under Horizon Year 2040 conditions and mitigation measures are not required.

TABLE 7-9: HORIZON YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?[2]	Threshold (dBA CNEL)[3]	Threshold Exceeded?[3]
			No Project	With Project	Project Addition			
1	Alessandro Bl.	n/o Trautwein Rd.	82.8	82.8	0.0	Yes	1.5	No
2	Meridian Pkwy.	s/o Cactus Av.	76.8	76.8	0.0	No	1.5	No
3	Veterans Wy.	n/o Cactus Av.	69.1	69.2	0.1	No	1.5	No
4	Frederick St.	n/o Cactus Av.	73.6	73.8	0.2	No	1.5	No
5	Graham St.	n/o Cactus Av.	73.2	73.3	0.1	No	1.5	No
6	Heacock St.	n/o Cactus Av.	75.6	75.6	0.0	Yes	1.5	No
7	Heacock St.	s/o Cactus Av.	78.4	78.4	0.0	Yes	1.5	No
8	Alessandro Bl.	w/o Barton St.	82.2	82.3	0.1	Yes	1.5	No
9	Alessandro Bl.	e/o Barton St.	82.2	82.3	0.1	Yes	1.5	No
10	Alessandro Bl.	e/o Old Frontage Rd.	77.9	77.9	0.0	No	1.5	No
11	Alessandro Bl.	w/o Frederick St.	78.1	78.1	0.0	Yes	1.5	No
12	Alessandro Bl.	e/o Frederick St.	78.1	78.1	0.0	Yes	1.5	No
13	Cactus Av.	e/o Meridian Pkwy.	77.3	77.3	0.0	No	1.5	No
14	Cactus Av.	e/o Old Frontage Rd.	80.4	80.9	0.5	No	1.5	No
15	Cactus Av.	w/o Veterans Wy.	80.6	81.0	0.4	No	1.5	No
16	Cactus Av.	e/o Frederick St.	81.2	81.2	0.0	No	1.5	No
17	Cactus Av.	e/o Graham St.	80.8	80.8	0.0	No	1.5	No
18	Cactus Av.	e/o Heacock St.	78.7	78.7	0.0	Yes	1.5	No
19	Van Buren Bl.	w/o Meridian Pkwy.	82.0	82.0	0.0	No	1.5	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] "Yes" = Existing, noise-sensitive land uses adjacent to the study area roadway segment.
[3] Significance Criteria (Section 4).

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following receiver locations, as shown on Exhibit 8-A, were identified as representative locations for analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Non-noise-sensitive receivers near the Project site include existing office uses in the City of Moreno Valley and MARB facilities, as described below. No sensitive receiver locations are located closer than the non-noise sensitive receiver locations identified below; however, existing noise-sensitive residential homes, represented by receiver location R6, are located east of the Project site at roughly 4,777 feet, adjacent to Heacock Avenue and the off-site channel construction associated with the Project. Additional noise-sensitive receiver locations in the Project study area include residential homes located roughly 0.5 miles southeast of the Project site, south of Meyer Drive. However, receiver locations which are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Therefore, noise levels that would be experienced at these residential homes would be less than those identified at R5, which represent a closer receiver location with direct line-of-sight to the Project site.

Further, existing non-noise-sensitive MARB facilities located south of the Project site will benefit from additional barrier attenuation/shielding provided by the Project building and site design, which locates all truck activity north of the Project site building. For the purpose of the operational noise analysis, the Project building is modeled at a height of 30 feet. Other noise-sensitive and/or non-noise-sensitive receiver locations in the Project study area which are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Located approximately 188 feet north of the Project site, R1 represents existing non-noise-sensitive office uses north of Cactus Avenue. A long-term noise measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Located roughly 100 feet south of the Project site, R2 represents existing non-noise-sensitive MARB facilities. A long-term noise measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Located north of the Project site at approximately 771 feet on Frederick Street, R3 represents existing non-noise-sensitive office uses. A long-term noise measurement was taken near this location, L3, to describe the existing ambient noise environment.

R4: Located approximately 2,231 feet east of the Project site, R4 represents the existing non-noise-sensitive Marine Corps Recruiting Station building on Riverside Drive. A long-term noise measurement was taken near this location, L4, to describe the existing ambient noise environment.

R5: Located approximately 669 feet southeast of the Project site, R5 represents existing non-noise-sensitive MARB buildings on Castle Street. A long-term noise measurement, L4, is used to describe the existing ambient noise environment at this location due to limited access to MARB.

R6: Located approximately 4,777 feet east of the Project site, R6 represents existing noise-sensitive residential uses. Receiver location R6 has been identified to assess potential off-site construction of the off-site Cactus Avenue channel as part of Project-related construction activities, and as such, is only included in the construction noise analysis. Exhibit 10-A of this report shows the off-site channel location in relation to the receiver locations. Operational noise levels due to the Project at this location would be lower than those presented in this report at closer receiver locations due to the additional attenuation from distance and the shielding of intervening structures.

EXHIBIT 8-A: RECEIVER LOCATIONS



LEGEND:

- Receiver Locations
- Distance from receiver to Project site boundary (in feet)
- Off-Site Channel Construction

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9 OPERATIONAL NOISE IMPACTS

This section analyzes the potential stationary-source operational noise impacts at the nearby receiver locations, identified in Section 8, resulting from operation of the proposed K4 Parcel Project. Exhibit 9-A identifies the representative receiver locations and noise source locations used to assess the operational noise levels.

9.1 OPERATIONAL NOISE SOURCES

At the time this noise analysis was prepared the future tenants of the proposed Project were unknown. To present the potential worst-case noise conditions, this analysis assumes the Project would be operational 24 hours per day, seven days per week. The Project business operations would primarily be conducted within the enclosed buildings, except for traffic movement, parking, as well as loading and unloading of trucks at designated loading bays. The on-site Project-related noise sources are expected to include: idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements.

9.2 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements all operating continuously. These noise level impacts will likely vary throughout the day.

9.2.1 TRUCK IDLING, DELIVERIES, BACKUP ALARMS, AND LOADING/UNLOADING

Short-term reference noise level measurements were collected on Wednesday, January 7th, 2015, by Urban Crossroads, Inc. at the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino. The noise level measurements represent the typical weekday dry goods logistics warehouse operation in a single building, of roughly 285,000 square feet, with a loading dock area on the western side of the building façade. Up to ten trucks were observed in the loading dock area including a combination of track trailer semi-trucks, two-axle delivery trucks, and background forklift operations.

The unloading/docking activity noise level measurement was taken over a fifteen-minute period and represents multiple noise sources taken from the center of loading dock activities generating a reference noise level of 62.8 dBA L_{eq} at a uniform reference distance of 50 feet. At this measurement location, the noise sources associated with employees unloading a docked truck container included the squeaking of the truck's shocks when weight was removed from the truck, employees playing music over a radio, as well as a forklift horn and backup alarm. In addition,

during the noise level measurement a truck entered the loading dock area and proceeded to reverse and dock in a nearby loading bay, adding truck engine and air brakes noise.

9.2.2 ROOF-TOP AIR CONDITIONING UNITS

In order to assess the impacts created by the roof-top air conditioning units at the Project buildings, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe mechanical roof-top air conditioning units on the roof of an existing Walmart store. The reference noise level represents Lennox SCA120 series 10-ton model packaged air conditioning units. At 5 feet from the closest roof-top air conditioning unit, the exterior noise levels were measured at 77.2 dBA L_{eq}. Using the uniform reference distance of 50 feet, the noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The roof-top air condition units were observed to operate the most during the daytime hours, for a total of 39 minutes per hour, and are anticipated to operate during the daytime and nighttime hours at the Project site. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.2.3 PARKING LOT VEHICLE MOVEMENTS (AUTOS)

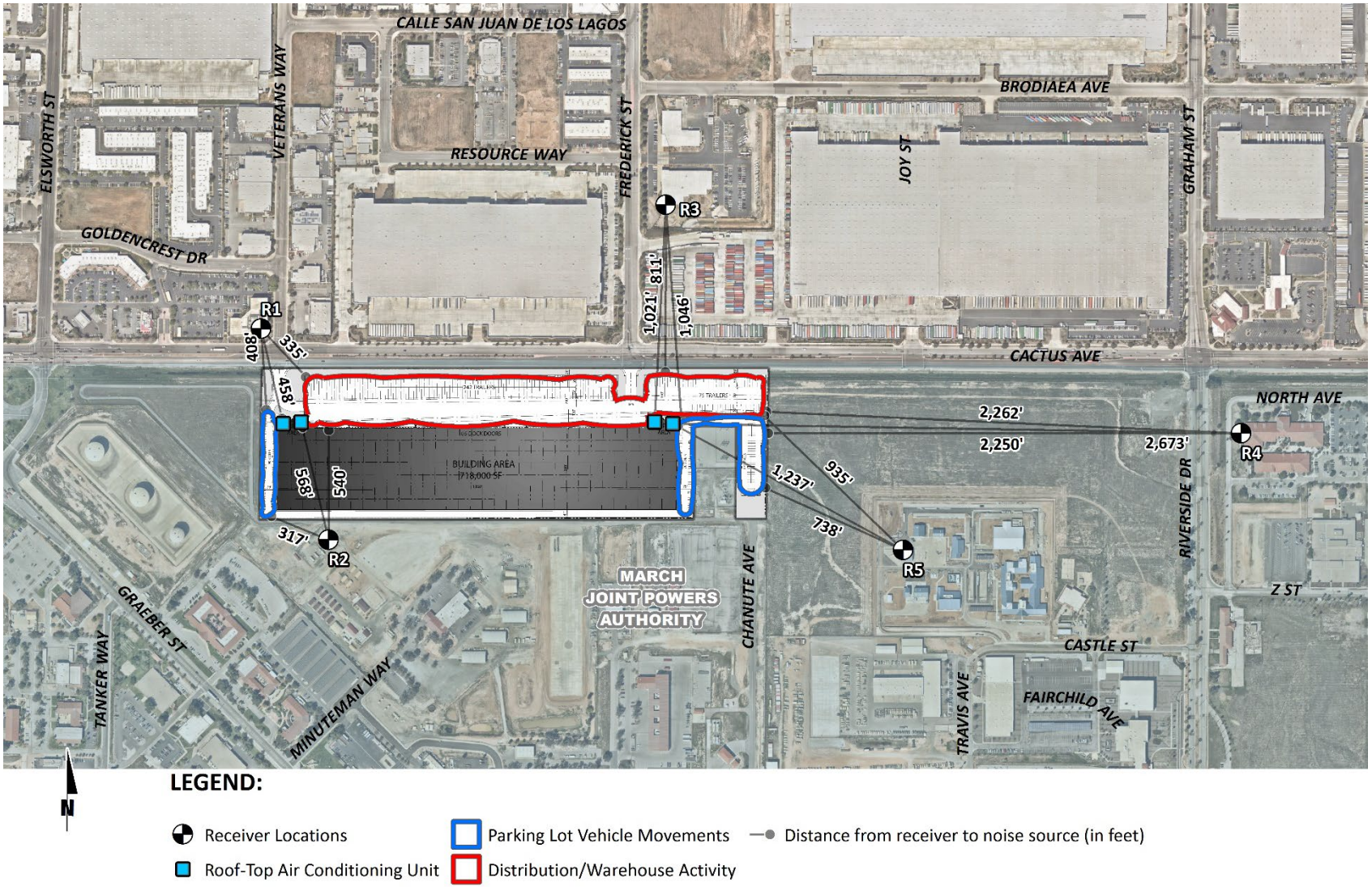
To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements over a 24-hour period on May 17th, 2017 at the parking lot for the Panasonic Avionics Corporation in the City of Lake Forest. The peak hour of activity measured over the 24-hour noise level measurement period occurred between 12:00 p.m. to 1:00 p.m., or the typical lunch hour for employees working in the area. The measured reference noise level at 50 feet from parking lot vehicle movements was measured at 41.7 dBA L_{eq}. The parking lot noise levels are mainly due to cars pulling in and out of spaces during peak lunch hour activity and employees talking. Noise associated with parking lot vehicle movements is expected to operate for the entire hour (60 minutes).

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Ref. Distance (Feet)	Noise Source Height (Feet)	Hourly Activity (Mins)[4]	Reference Noise Level (dBA L_{eq})	
					@ Ref. Dist.	@ 50 Feet
Truck Unloading/Docking Activity[1]	0:15:00	30'	8'	60	67.2	62.8
Roof-Top Air Conditioning Units[2]	96:00:00	5'	5'	39	77.2	57.2
Parking Lot Vehicle Movements[3]	01:00:00	10'	5'	60	52.2	41.7

[1] Reference noise level measurements were collected from the existing operations of the Motivational Fulfillment & Logistics Services distribution facility located at 6810 Bickmore Avenue in the City of Chino on Wednesday, January 7, 2015.
[2] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[3] As measured by Urban Crossroads, Inc. on 5/17/2017 at the Panasonic Avionics Corporation parking lot in the City of Lake Forest.
[4] Anticipated duration (minutes within the hour) of noise activity during typical hourly conditions expected at the Project site based on the reference noise level measurement activity.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE LOCATIONS



9.3 PROJECT OPERATIONAL NOISE LEVELS

Using the reference noise levels to represent the proposed warehouse operations that include idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements, Urban Crossroads, Inc. calculated the operational source noise levels that are expected to be generated at the Project site and the Project-related noise level increases that would be experienced at each of the receiver locations. The operational noise level calculations, shown on Table 9-2, account for the distance attenuation provided due to geometric spreading when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. With geometric spreading, sound levels attenuate (or decrease) at a rate of 6 dB for each doubling of distance from a point source (e.g. idling trucks, delivery truck activities, backup alarms, as well as loading and unloading of dry goods, roof-top air conditioning units, and parking lot vehicle movements).

Table 9-2 presents the combined total operational noise level projections at 200 feet consistent with the City of Moreno Valley Municipal Code. The Project operational noise levels at 200 feet are estimated at 51.5 dBA L_{eq}. Based on the results of this analysis, the Project operational noise levels associated with the K4 Parcel will satisfy the City of Moreno Valley Municipal Code 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime exterior noise level standards at 200 feet from the source land use. Further, it should be noted that the land uses within 200 feet of the Project site boundary are designated as business park, office, and commercial land use.

TABLE 9-2: OPERATIONAL NOISE LEVELS AT 200 FEET

Noise Source	Ref. Noise Level (dBA L_{eq})	Distance Atten. @ 200' (dBA L_{eq})[1]	Hourly Activity (Mins.)[2]	Hourly Activity Adjustment (dBA L_{eq})	Noise Level @ 200' (dBA L_{eq})
Truck Unloading/Docking Activity	67.2	-16.5	60	0.0	50.7
Roof-Top Air Conditioning Units	77.2	-32.0	39	-1.9	43.3
Parking Lot Vehicle Movements	52.2	-19.5	60	0.0	32.7
				Combined Total:	51.5

[1] Drop off rate of 6 dBA per doubling of distance (point source) and 4.5 dBA per doubline of distance (line source).
[2] Anticipated duration (minutes within the hour) of noise activity during peak hourly conditions expected at the Project site.

Table 9-3 indicates that the unmitigated hourly noise levels associated with the K4 Parcel Project at the nearby sensitive receiver locations are expected to range from 30.4 to 46.7 dBA L_{eq}. The Project-related operational noise levels, as shown on Table 9-3, will satisfy the March Joint Powers Authority and City of Moreno Valley exterior noise level standards at all nearby sensitive receiver locations. The operational noise level calculations are included in Appendix 9.1.

TABLE 9-3: UNMITIGATED OPERATIONAL NOISE LEVELS AT RECEIVER LOCATIONS

Receiver Location[1]	Land Use	Noise Levels by Noise Source (dBA L_{eq})[2]			Combined Operational Noise Levels (dBA L_{eq})[3]	Threshold Exceeded?[4]		
						March JPA	Moreno Valley	
		Unloading/ Docking Activity	Roof-Top Air Conditioning Unit	Parking Lot Vehicle Movements		Any Time (55 dBA L_{eq})	Daytime (65 dBA L_{eq})	Nighttime (60 dBA L_{eq})
R1	Office	46.2	36.1	28.0	46.7	No	No	No
R2	MARB	24.5	34.2	29.7	35.8	No	No	No
R3	Office	38.6	29.1	21.9	39.1	No	No	No
R4	Office	29.7	20.7	16.9	30.4	No	No	No
R5	Office	37.3	27.4	24.2	37.9	No	No	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Calculations for each noise source are provided in Appendix 9.1.
[4] Do the Project operational noise levels exceed the standards (Table 3-1)?

9.4 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions, the Project operational noise levels are combined with the existing ambient noise levels measurements for the nearby receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (4) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions to the existing ambient noise environment. Noise levels that would be experienced at receiver locations when Project-source noise is added to the ambient daytime and nighttime conditions are presented on Tables 9-4 and 9-5.

As indicated on Tables 9-4 and 9-5, the Project will contribute a daytime operational noise level increase of up to 0.3 dBA L_{eq} and a nighttime operational noise level increase of up to 0.5 dBA L_{eq} at the sensitive receiver locations. Since the Project-related operational noise level contributions will satisfy the significance criteria discussed in Section 4, the increases at the sensitive receiver locations will be *less than significant* and mitigation measures are not required.

As previously indicated in Section 8, receiver location R6 is identified in this report to assess potential off-site construction of the off-site Cactus Avenue channel as part of Project-related construction activities, and as such, is not included in the operational noise analysis. Exhibit 10-A of this report shows the off-site channel location in relation to the receiver locations. Operational noise levels due to the Project at R6 would be lower than those presented in this

report at closer receiver locations due to the additional attenuation from distance and the shielding of intervening structures.

TABLE 9-4: PROJECT DAYTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R1	46.7	L1	58.5	58.8	0.3	5.0	No
R2	35.8	L2	60.3	60.3	0.0	3.0	No
R3	39.1	L3	52.9	53.1	0.2	5.0	No
R4	30.4	L4	61.7	61.7	0.0	3.0	No
R5	37.9	L4	61.7	61.7	0.0	3.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

TABLE 9-5: PROJECT NIGHTTIME NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R1	46.7	L1	56.2	56.7	0.5	5.0	No
R2	35.8	L2	59.6	59.6	0.0	5.0	No
R3	39.1	L3	49.9	50.3	0.4	5.0	No
R4	30.4	L4	57.2	57.2	0.0	5.0	No
R5	37.9	L4	57.2	57.3	0.1	5.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-3.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

9.5 OPERATIONAL VIBRATION IMPACTS

Although the human threshold of perception for vibration is around 65 VdB, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Truck vibration levels are dependent on vehicle characteristics, load, speed, and pavement condition. Typical vibration levels for heavy trucks at normal traffic speeds do not exceed 65 VdB, and therefore, will be a *less than significant* impact as vibration levels would remain below the FTA vibration threshold of 80 VdB at nearby receiver locations. Therefore, no mitigation is required.

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10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction noise source locations in relation to the nearby receiver locations previously described in Section 8.

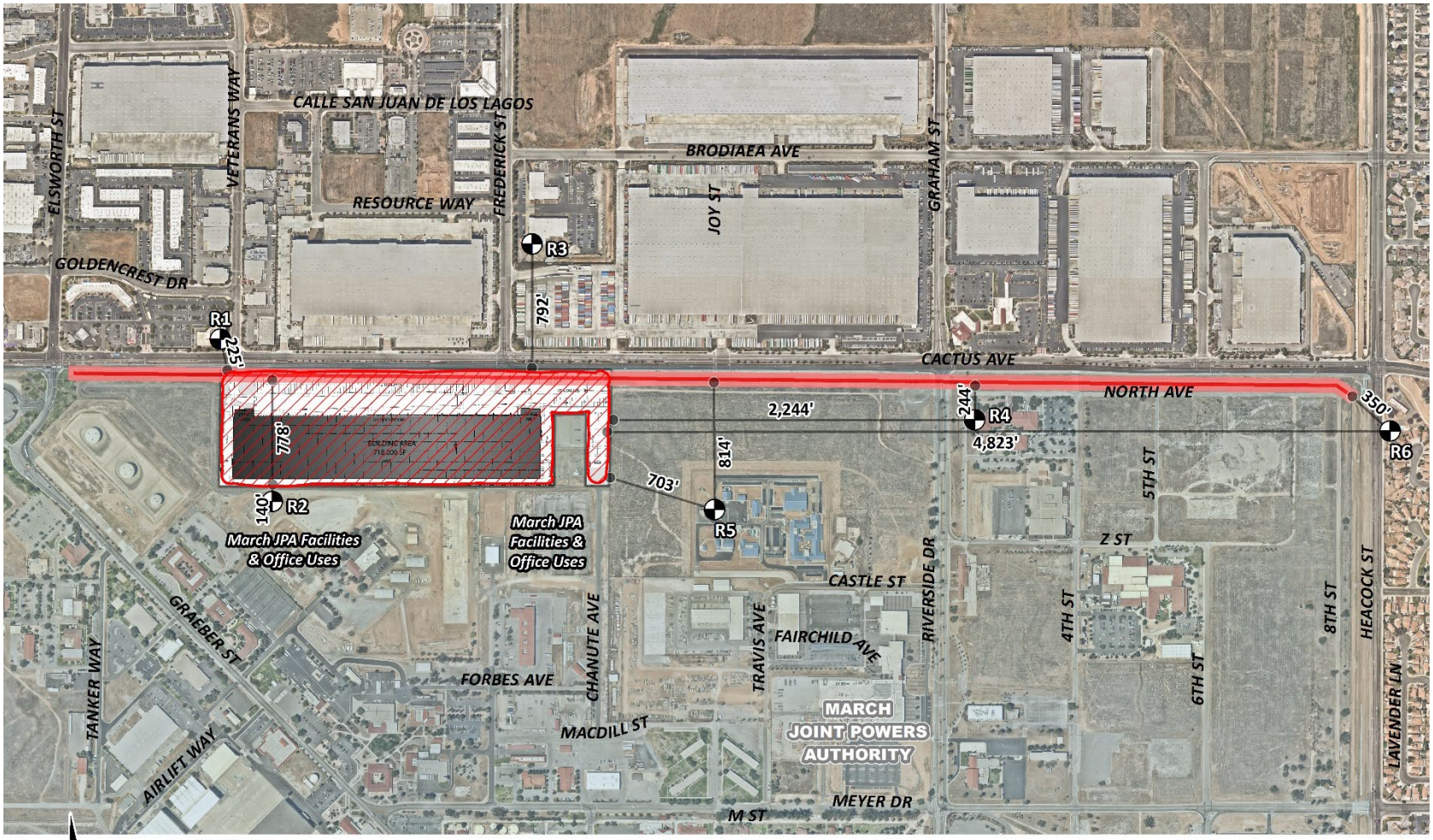
10.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating
- Off-Site Channel (Cactus Avenue)
- Nighttime Concrete Pours

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages are based on the *K4 Parcel Construction Equipment List* provided by the Project Applicant. (23)

EXHIBIT 10-A: CONSTRUCTION NOISE SOURCE LOCATIONS



10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances of 30 feet and 50 feet, all construction noise level measurements presented on Table 10-1 have been adjusted for consistency to describe a common reference distance of 50 feet.

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Reference Distance From Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[5]
1	Truck Pass-Bys & Dozer Activity (Single Dozer)[1]	30'	63.6	59.2
2	Dozer Activity (Multiple Dozers)[1]	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	30'	71.9	67.5
4	Foundation Trenching[2]	30'	72.6	68.2
5	Rough Grading Activities[2]	30'	77.9	73.5
6	Framing[2]	30'	66.7	62.3
7	Concrete Mixer Truck Movements[3]	50'	71.2	71.2
8	Concrete Paver Activities[3]	30'	70.0	65.6
9	Concrete Mixer Pour & Paving Activities[3]	30'	70.3	65.9
10	Concrete Mixer Backup Alarms & Air Brakes[3]	50'	71.6	71.6
11	Concrete Mixer Pour Activities[3]	50'	67.7	67.7

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[4] As measured by Urban Crossroads, Inc. on 9/9/16 during the demolition of an existing parking lot at 41 Corporate Park in Irvine.
[5] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

10.3 DAYTIME CONSTRUCTION NOISE ANALYSIS

Using the reference construction equipment noise levels, calculations of the daytime Project construction noise level impacts at the nearby sensitive receiver locations were completed. Tables 10-2 to 10-7 present the short-term daytime construction noise levels for each stage of construction. Table 10-9 provides a summary of the construction noise levels by stage at the noise receiver locations. Based on the stages of construction, the noise impacts associated with the proposed Project are expected to create temporarily high noise levels at the nearby receiver locations. To assess the peak daytime construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the primary construction activity to each receiver location.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	51.1
R2	140'	-8.9	0.0	55.2
R3	792'	-24.0	0.0	40.2
R4	2,244'	-33.0	0.0	31.1
R5	703'	-23.0	0.0	41.2
R6	4,823'	-39.7	0.0	24.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	60.4
R2	140'	-8.9	0.0	64.5
R3	792'	-24.0	0.0	49.5
R4	2,244'	-33.0	0.0	40.4
R5	703'	-23.0	0.0	50.5
R6	4,823'	-39.7	0.0	33.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Framing	62.3
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	55.1
R2	140'	-8.9	0.0	59.2
R3	792'	-24.0	0.0	44.2
R4	2,244'	-33.0	0.0	35.1
R5	703'	-23.0	0.0	45.2
R6	4,823'	-39.7	0.0	28.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

TABLE 10-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	58.5
R2	140'	-8.9	0.0	62.7
R3	792'	-24.0	0.0	47.6
R4	2,244'	-33.0	0.0	38.6
R5	703'	-23.0	0.0	48.6
R6	4,823'	-39.7	0.0	31.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

TABLE 10-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Framing	62.3
Construction Vehicle Maintenance Activities	67.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	54.4
R2	140'	-8.9	0.0	58.5
R3	792'	-24.0	0.0	43.5
R4	2,244'	-33.0	0.0	34.4
R5	703'	-23.0	0.0	44.5
R6	4,823'	-39.7	0.0	27.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

TABLE 10-7: OFF-SITE CHANNEL EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	51.1
R2	778'	-23.8	0.0	40.3
R3	792'	-24.0	0.0	40.2
R4	244'	-13.8	0.0	50.4
R5	814'	-24.2	0.0	39.9
R6	350'	-16.9	0.0	47.3

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

10.4 NIGHTTIME CONCRETE POUR NOISE ANALYSIS

Using the reference concrete pour activity construction equipment noise levels, calculations of the nighttime Project construction noise level impacts at the nearby receiver locations were completed. Table 10-8 presents the short-term nighttime construction noise levels at the receiver locations which are expected to range from 38.6 to 62.7 dBA L_{eq}. To assess the peak nighttime construction noise levels, this analysis shows the highest noise impacts when the equipment with the highest reference noise level is operating at the closest point from the primary construction activity to each receiver location.

TABLE 10-8: NIGHTTIME CONCRETE POUR EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance to Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	225'	-13.1	0.0	58.5
R2	140'	-8.9	0.0	62.7
R3	792'	-24.0	0.0	47.6
R4	2,244'	-33.0	0.0	38.6
R5	703'	-23.0	0.0	48.6
R6	4,823'	-39.7	0.0	31.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier attenuation (if any) from existing barriers/berms in the Project study area.

10.5 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when equipment is operating at the closest point from primary construction activity to each sensitive receiver location. As shown on Table 10-9, the highest unmitigated daytime construction noise levels are expected to range from 49.5 to 64.5 dBA L_{eq} and nighttime construction noise levels are expected to range from 38.6 to 62.7 dBA L_{eq} at the nearby receiver locations.

As shown on Table 10-9, the unmitigated Project daytime and nighttime construction noise levels satisfy the 65 dBA L_{eq} daytime and 60 dBA L_{eq} nighttime City of Moreno Valley Municipal Code thresholds, respectively, during Project construction activity at all receiver locations, including the off-site Cactus Avenue channel construction. Further, the closest receiver locations represent non-noise-sensitive uses that are typically unoccupied during the hours when nighttime concrete pours would take place, and as such, are not analyzed against the nighttime noise level standards. Further, the unmitigated Project-related construction noise levels will satisfy the less restrictive 90 dBA L_{eq} 8-hour continuous noise level limit identified in the City of Moreno Valley Municipal Code. Therefore, impacts from Project construction noise levels are considered *less than significant* and mitigation measures are not required.

10.5 TEMPORARY CONSTRUCTION NOISE LEVEL CONTRIBUTIONS

To describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site noise-sensitive receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime and nighttime ambient conditions are presented on Tables 10-10 and 10-11, respectively. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used to assess the Project-construction noise level increases. (18) To evaluate potential nighttime construction activity at the Project site, both daytime and nighttime noise level increases above the ambient measured noise levels are analyzed in this noise study.

As indicated in Table 10-10, the Project will contribute unmitigated, worst-case construction noise level increases approaching 0.2 dBA L_{eq} during the daytime hours at the closest sensitive receiver location, R6. Table 10-11 shows the Project will not contribute an unmitigated, worst-case construction noise level increase during the nighttime hours at the closest sensitive receiver location, R6. Since the worst-case temporary noise level increases during Project construction will satisfy the 12 dBA L_{eq} significance threshold, the unmitigated construction noise level increases are considered *less than significant* temporary noise impacts at all receiver locations.

TABLE 10-9: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location	Daytime Construction Noise Levels (dBA L_{eq})[1]							Nighttime Concrete Pour Noise Levels (dBA L_{eq})[2]	Threshold Exceeded?[3]	
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Off-Site Channel	Highest Construction Noise Levels		Daytime (65 dBA L_{eq})	Nighttime (60 dBA L_{eq})
R1	51.1	60.4	55.1	58.5	54.4	51.1	60.4	58.5	No	n/a
R2	55.2	64.5	59.2	62.7	58.5	40.3	64.5	62.7	No	n/a
R3	40.2	49.5	44.2	47.6	43.5	40.2	49.5	47.6	No	n/a
R4	31.1	40.4	35.1	38.6	34.4	50.4	50.4	38.6	No	n/a
R5	41.2	50.5	45.2	48.6	44.5	39.9	50.5	48.6	No	n/a
R6	24.5	33.8	28.5	31.9	27.8	47.3	47.3	31.9	No	No

[1] Daytime construction noise levels as shown on Tables 10-2 to 10-7.
[2] Nighttime construction noise levels as shown on Table 10-8.
[3] Do the daytime and/or nighttime construction noise levels exceed their respective, applicable Municipal Code noise level standards?
"n/a" = receiver location represents a use that would be unoccupied during nighttime construction activity.

TABLE 10-10: TEMPORARY DAYTIME CONSTRUCTION NOISE LEVEL INCREASES

Receiver Location[1]	Daytime Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R6	47.3	L4	61.7	61.9	0.2	12.0	No

[1] See Exhibit 10-A for the sensitive receiver locations.
[2] Daytime Project construction noise levels as shown on Table 10-9.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

TABLE 10-11: TEMPORARY NIGHTTIME CONSTRUCTION NOISE LEVEL INCREASES

Receiver Location[1]	Nighttime Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R6	31.9	L4	57.2	57.2	0.0	12.0	No

[1] See Exhibit 10-A for the sensitive receiver locations.
[2] Nighttime Project construction noise levels as shown on Table 10-9.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed nighttime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

10.7 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration. Construction activities that would have the potential to generate low levels of ground-borne vibration within

the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-8 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-12 presents the expected Project related vibration levels at the nearby receiver locations.

Based on the reference vibration levels provided by the FTA, a large bulldozer represents the peak source of vibration with a reference level of 87 VdB at 25 feet. At distances ranging from 140 to 4,823 feet from the Project construction activities, construction vibration levels are expected to range from 42.0 to 64.6 VdB, as shown on Table 10-12. Using the construction vibration assessment methods provided by the FTA, Project construction vibration levels will remain below the FTA 80 VdB threshold at all sensitive receiver locations, and therefore, is considered a *less than significant* impact and mitigation measures are not required.

Further, vibration levels at the site of the closest sensitive receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating at the Project site perimeter.

TABLE 10-12: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Closest Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold Exceeded?[3]
		Small Bulldozer	Jackhammer	Loaded Trucks	Large Bulldozer	Highest Vibration Level	
R1	225'	29.4	50.4	57.4	58.4	58.4	No
R2	140'	35.6	56.6	63.6	64.6	64.6	No
R3	792'	13.0	34.0	41.0	42.0	42.0	No
R4	244'	28.3	49.3	56.3	57.3	57.3	No
R5	703'	14.5	35.5	42.5	43.5	43.5	No
R6	350'	23.6	44.6	51.6	52.6	52.6	No

[1] Noise receiver locations are shown on Exhibit 10-A. Distance to closest Project-related construction activity (on- or off-site).
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-8.
[3] Does the peak vibration exceed the FTA maximum acceptable vibration standard of 80 VdB?

10.8 CONSTRUCTION NOISE AND VIBRATION BEST PRACTICES

Though construction noise is temporary, intermittent and of short duration, and will not present any long-term impacts, the following practices would reduce noise and vibration levels produced by the construction equipment to the nearby receiver locations:

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receivers nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction.
- The construction contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

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11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2016.
2. **Urban Crossroads, Inc.** *K4 Parcel Traffic Impact Analysis.* June 2018.
3. **March Joint Powers Authority.** *General Plan Update 2030 Noise/Air Quality Element.* March 2010.
4. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
5. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
6. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.
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8. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
9. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.
10. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2003.
11. **State of California.** *California Green Building Standards Code.* January 2016.
12. **March Joint Powers Authority.** *General Plan Noise/Air Quality Element.* 1999.
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14. **City of Moreno Valley.** *Municipal Code, Chapter 11.80 Noise Regulation.*
15. **Riverside County.** *Airport Land Use Compatibility Plan.* October 2004.
16. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
17. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
18. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* May 2011.
19. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
20. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.
21. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.
22. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

23. **Lewis Management Corporation.** *K4 Parcel Construction Equipment List.* June 2018.

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12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed K4 Parcel Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.



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EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

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APPENDIX 3.1:

MARCH JOINT POWERS AUTHORITY DEVELOPMENT CODE

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Except as otherwise provided in this Title, all open areas shall be landscaped, surfaced, or treated and maintained permanently in a dust-free, weed-free condition.

Section 9.10.130 Mechanical and Electrical Equipment

All mechanical and electrical equipment, including air conditioners, antennas, pumps, transformers, and heating and ventilating equipment shall be located, operated and screened in a manner that does not disturb adjacent uses and activities. In addition, all central building electrical controlling equipment and switching facilities shall be located within the building for all commercial, industrial and business facilities.

Section 9.10.140 Noise and Sound

Unless otherwise specified in Chapter 9.08, General Development Standards, or Chapter 9.09, Specific Use Development Standards, all commercial and industrial uses shall be operated so that noise created by any loudspeaker, bells, gongs, buzzers, or other noise attention or attracting devices shall not exceed 55 dBA at any one time beyond the boundaries of the property.

Section 9.10.150 Odors

No operation or activity shall be permitted which emits odorous gases or other odorous matter in such quantities as to be dangerous, injurious, noxious, or otherwise objectionable to a level that is detectable with or without the aid of instruments at or beyond the lot line of the property containing said operation or activity.

Section 9.10.160 Outdoor Storage, Trash Areas, and Service Areas

All storage areas for storage of maintenance equipment or vehicles or refuse, and all collection areas and service areas, shall be enclosed or effectively screened from public view with a fence, wall, landscaping, berming or a combination thereof. Doors to trash enclosures shall be closed at all times except when the enclosure is being accessed for refuse disposal or pick-up. The screening requirements of Section 9.08.150 are also referenced and not intended to be superseded hereby.

Section 9.10.170 Vibration

No vibration shall be permitted which can be felt at or beyond the property line.

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APPENDIX 3.2:

CITY OF MORENO VALLEY MUNICIPAL CODE

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Chapter 11.80 NOISE REGULATION

11.80.010 Legislative findings.

It is found and declared that:

A. Excessive sound within the limits of the city is a condition which has existed for some time, and the amount and intensity of such sound is increasing.

B. Such excessive sound is a detriment to the public health, safety, and welfare and quality of life of the residents of the city.

C. The necessity in the public interest for the provisions and prohibitions hereinafter contained and enacted is declared as a matter of legislative determination and public policy, and it is further declared that the provisions and prohibitions hereinafter contained and enacted are in pursuance of and for the purpose of securing and promoting the public health, safety, welfare and quality of life of the city and its inhabitants. (Ord. 740 § 1.2, 2007)

11.80.020 Definitions.

For purposes of this chapter, certain words and phrases used herein are defined as follows:

"A-weighted sound level" means the sound pressure level in decibels as measured with a sound level meter using the A-weighting network. The unit of measurement is the dB(A).

"Commercial" means all uses of land not otherwise classified as residential, as defined in this section.

"Construction" means any site preparation, and/or any assembly, erection, repair, or alteration, excluding demolition, of any structure, or improvements to real property.

"Continuous airborne sound" means sound that is measured by the slow-response setting of a meter manufactured to the specifications of ANSI Section 1.4-1983 (R2006) "Specification for Sound Level Meters," or its successor.

"Daytime" means eight a.m. to ten p.m. the same day.

"Decibel" (dB) means a unit for measuring the amplitude of sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) microPascals (twenty (20) microNewtons per square meter.)

"Demolition" means any dismantling, intentional destruction or removal of structures or other improvements to real property.

"Disturb" means to interrupt, interfere with, or hinder the enjoyment of peace or quiet or the normal listening activities or the sleep, rest or mental concentration of the hearer.

"Emergency" means any occurrence or set of circumstances involving actual or imminent physical trauma or significant property damage which necessitates immediate action. Economic loss alone shall not constitute an emergency. It shall be the burden of an alleged violator to prove an "emergency."

"Emergency work" means any work made necessary to restore property to a safe condition following an emergency, or to protect persons or property threatened by an imminent emergency, to the extent such work is, in fact, necessary to protect persons or property from exposure to imminent danger or damage.

"Frequency" means the number of complete oscillation cycles per unit of time.

"Impulsive sound" means sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drop forge impacts, and discharge of firearms.

"Nighttime" means 10:01 p.m. to 7:59 a.m. the following day.

"Noise disturbance" means any sound which:

1. Disturbs a reasonable person of normal sensitivities;

2. Exceeds the sound level limits set forth in this chapter; or

3. Is plainly audible as defined in this section. Where no specific distance is set forth for the determination of audibility, references to noise disturbance shall be deemed to mean plainly audible at a distance of two hundred (200) feet from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right of way, public space or other publicly owned property.

"Person" means any person, person's firm, association, copartnership, joint venture, corporation, or any entity public or private in nature.

"Plainly audible" means that the sound or noise produced or reproduced by any particular source, can be clearly distinguished from ambient noise by a person using his/her normal hearing faculties.

"Public right-of-way" means any street, avenue, boulevard, sidewalk, bike path or alley, or similar place normally accessible to the public which is owned or controlled by a governmental entity.

"Public space" means any park, recreational or community facility, or lot which contains at least one building that is open to the general public during its hours of operation.

"Residential" means all uses of land primarily for dwelling units, as well as hospitals, schools, colleges and universities, and places of religious assembly.

"Sound" means an oscillation in pressure, particle displacement, particle velocity or other physical parameter, in a medium with internal forces that causes compression and rarefaction of that medium capable of producing an auditory impression. The description of sound may include any characteristic of such sound, including duration, intensity and frequency.

"Sound level" means the weighted sound pressure level as measured in dB(A) by a sound level meter and as specified in American National Standards Institute (ANSI) specifications for sound-level meters (ANSI Section 1.4-1971 (R1976)). If the frequency weighting employed is not indicated, the A-weighting shall apply.

"Sound level meter" means an instrument, demonstrably capable of accurately measuring sound levels as defined above.

All technical definitions not defined above shall be in accordance with applicable publications and standards of the American National Standards Institute (ANSI). (Ord. 740 § 1.2, 2007)

11.80.030 Prohibited acts.

A. General Prohibition. It is unlawful and a violation of this chapter to maintain, make, cause, or allow the making of any sound that causes a noise disturbance, as defined in Section 11.80.020.

B. Sound causing permanent hearing loss.

1. Sound level limits. Based on statistics from the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health, Table 1 and Table 1-A specify sound level limits which, if exceeded, will have a high probability of producing permanent hearing loss in anyone in the area where the sound levels are being exceeded. No sound shall be permitted within the city which exceeds the parameters set forth in Tables 11.80.030-1 and 11.80.030-1-A of this chapter:

Table 11.80.030-1

MAXIMUM CONTINUOUS SOUND LEVELS*

Duration per Day Continuous Hours	**Sound level [db(A)]**
8	90
6	92
4	95
3	97

2	100
1.5	102
1	105
0.5	110
0.25	115

* When the daily sound exposure is composed of two or more periods of sound exposure at different levels, the combined effect of all such periods shall constitute a violation of this section if the sum of the percent of allowed period of sound exposure at each level exceeds 100 percent

Table 11.80.030-1A

MAXIMUM IMPULSIVE SOUND LEVELS

Number of Repetitions per 24-Hour Period	Sound level [dB(A)]
1	145
10	135
100	125

2. Exemptions. No violation shall exist if the only persons exposed to sound levels in excess of those listed in Tables 11.80.030-1 and 11.80.030-1A are exposed as a result of:

a. Trespass;

b. Invitation upon private property by the person causing or permitting the sound; or

c. Employment by the person or a contractor of the person causing or permitting the sound.

C. Nonimpulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimplusive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

Table 11.80.030-2

MAXIMUM SOUND LEVELS (IN dB(A)) FOR SOURCE LAND USES

Residential		Commercial	
Daytime	**Nighttime**	**Daytime**	**Nighttime**
60	55	65	60

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by this chapter, the following specific acts, or the causing or permitting thereof, are regulated as follows:

1. Motor Vehicles. No person shall operate or cause to be operated a public or private motor vehicle, or combination of vehicles towed by a motor vehicle, that creates a sound exceeding the sound level limits in Table 11.80.030-2 when the vehicle(s) are not otherwise subject to noise regulations provided for by the California Vehicle Code.

2. Radios, Televisions, Electronic Audio Equipment, Musical Instruments or Similar Devices from a Stationary Source. No person shall operate, play or permit the operation or playing of any radio, tape player, television, electronic audio equipment, musical instrument, sound amplifier or other mechanical or electronic sound making device that produces, reproduces or amplifies sound in such a manner as to create a noise disturbance. However, this subsection shall not apply to any use or activity exempted in subsection E of this section and any use or activity for which a special permit has been issued pursuant to Section 11.80.040.

3. Radios, Electronic Audio Equipment, or Similar Devices from a Mobile Source Such as a Motor Vehicle. Sound amplification or reproduction equipment on or in a motor vehicle is subject to regulation in accordance with the California Vehicle Code when upon the public right-of-way. When upon public space or publicly owned property other than the public right-of-way or upon private property open to the public, sound amplification or reproduction equipment shall not be operated in such a manner that it is plainly audible at a distance of fifty (50) feet in any direction from the vehicle.

4. Portable, Hand-Held Music or Sound Amplification or Reproduction Equipment. Such equipment shall not be operated on a public right-of-way, public space or other publicly owned property in such a manner as to be plainly audible at a distance of fifty (50) feet in any direction from the operator.

5. Loudspeakers and Public Address Systems.

a. Except as permitted by Section 11.80.040, no person shall operate, or permit the operation of, any loudspeaker, public address system or similar device, for any commercial purpose:

1. Which produces, reproduces or amplifies sound in such a manner as to create a noise disturbance; or

2. During nighttime hours on a public right-of-way, public space or other publicly owned property.

b. No person shall operate, or permit the operation of, any loudspeaker, public address system or similar device, for any noncommercial purpose, during nighttime hours in such a manner as to create a noise disturbance.

6. Animals. No person shall own, possess or harbor an animal or bird that howls, barks, meows, squawks, or makes other sounds that:

a. Create a noise disturbance;

b. Are of frequent or continued duration for ten (10) or more consecutive minutes and are plainly audible at a distance of fifty (50) feet from the real property line of the source of the sound; or

c. Are intermittent for a period of thirty (30) or more minutes and are plainly audible at a distance of fifty (50) feet from the real property line of the source of the sound.

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of eight p.m. and seven a.m. the following day such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. This section shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

8. Emergency Signaling Devices. No person shall intentionally sound or permit the sounding outdoors of any fire, burglar or civil defense alarm, siren or whistle, or similar stationary emergency signaling device, except for emergency purposes or for testing as follows:

a. Testing of a stationary emergency signaling device shall not occur between seven p.m. and seven a.m. the following day;

b. Testing of a stationary emergency signaling device shall use only the minimum cycle test time, in no case to exceed sixty (60) seconds;

c. Testing of a complete emergency signaling system, including the functioning of the signaling device and the personnel response to the signaling device, shall not occur more than once in each calendar month. Such testing shall only occur only on weekdays between seven a.m. and seven p.m. and shall be exempt from the time limit specified in subsection (D)(8)(2) of this section.

9. Power Tools. No person shall operate or permit the operation of any mechanically, electrically or gasoline motor-driven tool during nighttime hours so as to cause a noise disturbance across a residential real property boundary.

10. Pumps, Air Conditioners, Air-Handling Equipment and Other Continuously Operating Equipment. Notwithstanding the general prohibitions of subsection a of this section, no person shall operate or permit the operation of any pump, air

conditioning, air-handling or other continuously operating motorized equipment in a state of disrepair or in a manner which otherwise creates a noise disturbance distinguishable from normal operating sounds.

E. Exemptions. The following uses and activities shall be exempt from the sound level regulations except the maximum sound levels provided in Tables 11.80.030-1 and 11.80.030-1A:

1. Sounds resulting from any authorized emergency vehicle when responding to an emergency call or acting in time of an emergency.

2. Sounds resulting from emergency work as defined in Section 11.80.020

3. Any aircraft operated in conformity with, or pursuant to, federal law, federal air regulations and air traffic control instruction used pursuant to and within the duly adopted federal air regulations; and any aircraft operating under technical difficulties in any kind of distress, under emergency orders of air traffic control, or being operated pursuant to and subsequent to the declaration of an emergency under federal air regulations.

4. All sounds coming from the normal operations of interstate motor and rail carriers, to the extent that local regulation of sound levels of such vehicles has been preempted by the Noise Control Act of 1972 (42 U.S.C. § 4901 et seq.) or other applicable federal laws or regulations

5. Sounds from the operation of motor vehicles, to the extent they are regulated by the California Vehicle Code.

6. Any constitutionally protected noncommercial speech or expression conducted within or upon a any public right-of-way, public space or other publicly owned property constituting an open or a designated public forum in compliance with any applicable reasonable time, place and manner restrictions on such speech or expression or otherwise pursuant to legal authority.

7. Sounds produced at otherwise lawful and permitted city-sponsored events, organized sporting events, school assemblies, school playground activities, by permitted fireworks, and by permitted parades on public right-of-way, public space or other publicly owned property.

8. An event for which a temporary use permit or special event permit has been issued under other provisions of this code, where the provisions of Section 11.80.040 are met, the permit granted expressly grants an exemption from specific standards contained in this chapter, and the permittee and all persons under the permittee's reasonable control actually comply with all conditions of such permit. Violation of any condition of such a permit related to sound or sound equipment shall be a violation of this chapter and punishable as such.

F. Nothing in this chapter shall be construed to limit, modify or repeal any other regulation elsewhere in this code relating to the regulation of noise sources, nor shall any such other regulation be read to permit the emission of noise in violation of any provision of this chapter. (Ord. 740 § 1.2, 2007)

11.80.040 Special provisions for temporary use and special event permits.

The exemption by permit set forth in Section 11.80.030(E)(8) shall be subject to the following requirements and conditions:

A. The permit application shall include the name, address and telephone number of the permit applicant; the date, hours and location for which the permit is requested; and the nature of the event or activity. It shall also specify the types of sounds and/or sound equipment to be permitted, the proposed duration of such sound, the specific standards from which the sound is to be exempted, and the reasons for each requested exemption.

B. The permit shall be issued provided the proposed activity meets the requirements of this section and the issuing official determines that the sound to be emitted at the event as proposed would not be detrimental to the public health, safety or welfare, that the event cannot reasonably achieve its legitimate aims and purposes without the exemption and that the sound levels proposed will not unreasonably damage the peace and quiet enjoyment of the lawful users of surrounding properties, nor constitute a public nuisance.

C. The official issuing the permit may prescribe any reasonable conditions or requirements he/she deems necessary to minimize noise disturbances upon the community or the surrounding neighborhood, and/or to protect the health, safety or welfare of the public, including participants in the permitted event, including use of mufflers, screens or other sound-attenuating devices.

D. Any permit granted must be in writing and shall contain all conditions upon which the permit shall be effective.

E. No more than six events requiring a sound limit exemption may be held at any particular location upon privately owned or controlled property per calendar year, provided further that the number of events shall not exceed the number permitted under the regulations for the type of permit issued. For purposes of this subsection, "location" means a legal parcel of real property or a complete shopping or commercial center or mall sharing common parking and access even if comprised of multiple legal parcels.

F. The exemption from sound limits under such permit shall not exceed maximum period of four hours in one twenty-four (24) hour day.

G. The permit will only be granted for hours between nine a.m. and ten p.m. on all days other than Friday and Saturday; and, on Friday and Saturday, between the hours of nine a.m. and one a.m. of the following day, except in the following circumstances:

1. A permit may be granted for hours between nine a.m. on New Year's Eve and one a.m. the following day (New Year's Day).

2. A permit may be granted for hours between nine a.m. and two a.m. the following day if there are no residences, hospitals, or nursing homes within a 0.5 mile radius of the property where the function is taking place.

H. Functions for which the permits are issued shall be limited to a continuous airborne sound level not to exceed seventy (70) dB(A), as measured two hundred (200) feet from the real property boundary of the source property if on private property, or from the source if on public right of way, public space or other publicly owned property. (Ord. 740 § 1.2, 2007)

11.80.050 Measurement or assessment of sound.

A. Measurement With Sound Meter.

1. The measurement of sound shall be made with a sound level meter meeting the standards prescribed by ANSI Section 1.4-1983 (R2006). The instruments shall be maintained in calibration and good working order. A calibration check shall be made of the system at the time of any sound level measurement. Measurements recorded shall be taken so as to provide a proper representation of the source of the sound. The microphone during measurement shall be positioned so as not to create any unnatural enhancement or diminution of the measured sound. A windscreen for the microphone shall be used at all times. However, a violation of this chapter may occur without the occasion of the measurements being made as otherwise provided.

2. The slow meter response of the sound level meter shall be used in order to best determine the average amplitude.

3. The measurement shall be made at any point on the property into which the sound is being transmitted and shall be made at least three feet away from any ground, wall, floor, ceiling, roof and other plane surface.

4. In case of multiple occupancy of a property, the measurement may be made at any point inside the premises to which any complainant has right of legal private occupancy; provided that the measurement shall not be made within three feet of any ground, wall, floor, ceiling, roof or other plane surface.

5. All measurements of sound provided for in this chapter will be made by qualified officials of the city who are designated by the city manger or designee to operate the apparatus used to make the measurements.

B. Assessment Without Sound Level Meter. Any police officer, code enforcement officer, or other official designated by the city manager or designee who hears a noise or sound that is plainly audible, as defined in Section 11.80.020, in violation of this chapter, may enforce this chapter and shall assess the noise or sound according to the following standards:

1. The primary means of detection shall be by means of the official's normal hearing faculties, not artificially enhanced.

2. The official shall first attempt to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates so that the official can readily identify the offending source of the sound or noise and the distance involved. If the official is unable to have a direct line of sight and hearing to the vehicle or real property from which the sound or noise emanates, then the official shall confirm the source of the sound or noise by approaching the suspected vehicle or real property until the official is able to obtain a direct line of sight and hearing, and confirm the source of the sound or noise that was heard at the place of the original assessment of the sound or noise.

3. The official need not be required to identify song titles, artists, or lyrics in order to establish a violation. (Ord. 740 § 1.2, 2007)

11.80.060 Violation.

A. Violation of Sound Level Limits. Any person violating any of the provisions of this chapter shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punishable by a fine not to exceed one thousand dollars ($1,000.00) and/or six months in the county jail, or both. Notwithstanding the foregoing, any violation of the provisions of this chapter may, in the discretion of the citing officer or the city attorney, be cited and/or prosecuted as an infraction or be subject to civil citation pursuant to Chapter 1.10.

B. Joint and Several Responsibility. In addition to the person causing the offending sound, the owner, tenant or lessee of property, or a manager, overseer or agent, or any other person lawfully entitled to possess the property from which the offending sound is emitted at the time the offending sound is emitted, shall be responsible for compliance with this chapter if the additionally responsible party knows or should have known of the offending noise disturbance. It shall not be a lawful defense to assert that some other person caused the sound. The lawful possessor or operator of the premises shall be responsible for operating or maintaining the premises in compliance with this chapter and may be cited regardless of whether or not the person actually causing the sound is also cited.

C. Violation May be Declared a Public Nuisance. The operation or maintenance of any device, equipment, instrument, vehicle or machinery in violation of any provisions of this chapter which endangers the public health, safety and quality of life of residents in the area is declared to be a public nuisance, and may be subject to abatement summarily or by a restraining order or injunction issued

by a court of competent jurisdiction. (Ord. 824 § 1.2, 2011; Ord. 740 § 1.2, 2007)

View the mobile version.

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APPENDIX 5.1:

STUDY AREA PHOTOS

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L1_E
33, 54' 40.280000", 117, 16' 4.090000"



L1_N
33, 54' 40.280000", 117, 16' 4.090000"



L1_S
33, 54' 40.250000", 117, 16' 4.050000"



L1_W
33, 54' 40.280000", 117, 16' 4.090000"



L2_E
33, 54' 36.010000", 117, 15' 58.370000"



L2_NW
33, 54' 36.030000", 117, 15' 58.490000"



L2_S
33, 54' 36.010000", 117, 15' 58.370000"



L2_SE
33, 54' 36.010000", 117, 15' 58.370000"



L2_W
33, 54' 36.010000", 117, 15' 58.370000"



L3_E
33, 54' 50.500000", 117, 15' 44.340000"



L3_N
33, 54' 50.500000", 117, 15' 44.340000"



L3_NW
33, 54' 50.500000", 117, 15' 44.340000"



L3_S
33, 54' 50.500000", 117, 15' 44.340000"



L3_W
33, 54' 50.500000", 117, 15' 44.340000"



L4_E
33, 54' 27.930000", 117, 15' 7.610000"



L4_N
33, 54' 27.930000", 117, 15' 7.610000"



L4_SE
33, 54' 27.930000", 117, 15' 7.610000"



L4_W
33, 54' 27.930000", 117, 15' 7.610000"

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APPENDIX 5.2:

NOISE LEVEL MEASUREMENT WORKSHEETS

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24-Hour Noise Level Measurement Summary

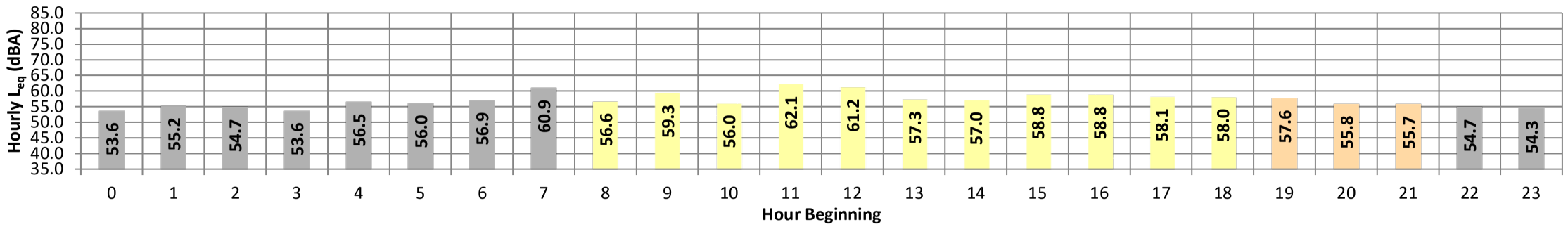
Date: Friday, June 22, 2018
Project: K4 Parcel

Location: L1 - Located north of the Project site on Goldencrest Drive near existing office and commercial uses.

Meter: Piccolo I

JN: 11743
Analyst: A. Wolfe

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	53.6	75.2	47.6	61.0	59.0	57.0	56.0	53.0	51.0	49.0	48.0	48.0	53.6	10.0	63.6
	1	55.2	83.5	46.5	61.0	60.0	58.0	57.0	53.0	50.0	48.0	48.0	47.0	55.2	10.0	65.2
	2	54.7	67.8	46.3	62.0	60.0	59.0	58.0	56.0	52.0	48.0	48.0	47.0	54.7	10.0	64.7
	3	53.6	67.9	46.8	61.0	60.0	58.0	57.0	54.0	51.0	48.0	47.0	47.0	53.6	10.0	63.6
	4	56.5	76.3	45.5	66.0	63.0	60.0	59.0	56.0	53.0	48.0	47.0	46.0	56.5	10.0	66.5
	5	56.0	73.3	44.5	63.0	62.0	60.0	59.0	56.0	54.0	48.0	47.0	45.0	56.0	10.0	66.0
	6	56.9	72.9	46.2	66.0	64.0	61.0	60.0	56.0	53.0	49.0	48.0	47.0	56.9	10.0	66.9
	7	60.9	84.6	48.0	69.0	67.0	63.0	61.0	57.0	55.0	51.0	50.0	49.0	60.9	0.0	60.9
Day	8	56.6	79.7	47.6	65.0	63.0	60.0	59.0	55.0	53.0	50.0	49.0	48.0	56.6	0.0	56.6
	9	59.3	80.0	47.6	72.0	68.0	62.0	60.0	56.0	53.0	50.0	50.0	49.0	59.3	0.0	59.3
	10	56.0	76.0	47.4	65.0	63.0	60.0	58.0	54.0	52.0	49.0	49.0	48.0	56.0	0.0	56.0
	11	62.1	90.8	46.5	74.0	70.0	64.0	61.0	55.0	53.0	49.0	49.0	47.0	62.1	0.0	62.1
	12	61.2	76.5	48.0	68.0	66.0	65.0	65.0	64.0	56.0	51.0	50.0	49.0	61.2	0.0	61.2
	13	57.3	77.2	47.6	66.0	64.0	62.0	60.0	56.0	54.0	50.0	50.0	48.0	57.3	0.0	57.3
	14	57.0	76.1	47.0	67.0	64.0	61.0	59.0	56.0	54.0	50.0	49.0	48.0	57.0	0.0	57.0
	15	58.8	75.4	46.7	65.0	63.0	61.0	60.0	59.0	58.0	52.0	50.0	48.0	58.8	0.0	58.8
	16	58.8	78.8	48.3	67.0	65.0	62.0	61.0	58.0	56.0	51.0	51.0	49.0	58.8	0.0	58.8
	17	58.1	82.9	48.6	64.0	62.0	61.0	60.0	58.0	55.0	51.0	50.0	49.0	58.1	0.0	58.1
	18	58.0	73.5	48.8	66.0	64.0	62.0	61.0	58.0	55.0	52.0	51.0	50.0	58.0	0.0	58.0
Evening	19	57.6	78.3	49.6	63.0	62.0	60.0	59.0	57.0	55.0	52.0	51.0	50.0	57.6	5.0	62.6
	20	55.8	68.9	49.3	62.0	61.0	59.0	58.0	56.0	54.0	51.0	50.0	50.0	55.8	5.0	60.8
	21	55.7	70.0	50.0	62.0	61.0	59.0	58.0	56.0	54.0	51.0	51.0	50.0	55.7	5.0	60.7
Night	22	54.7	72.5	49.3	61.0	60.0	58.0	57.0	54.0	53.0	51.0	50.0	50.0	54.7	10.0	64.7
	23	54.3	69.4	48.0	62.0	60.0	57.0	56.0	54.0	52.0	50.0	49.0	49.0	54.3	10.0	64.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	56.0	73.5	46.5	64.0	62.0	60.0	58.0	54.0	52.0	49.0	49.0	47.0
	Max	62.1	90.8	48.8	74.0	70.0	65.0	65.0	64.0	58.0	52.0	51.0	50.0
Energy Average		58.9	Average:		67.2	64.7	61.8	60.4	57.2	54.5	50.5	49.8	48.5
Evening	Min	55.7	68.9	49.3	62.0	61.0	59.0	58.0	56.0	54.0	51.0	50.0	50.0
	Max	57.6	78.3	50.0	63.0	62.0	60.0	59.0	57.0	55.0	52.0	51.0	50.0
Energy Average		56.5	Average:		62.3	61.3	59.3	58.3	56.3	54.3	51.3	50.7	50.0
Night	Min	53.6	67.8	44.5	61.0	59.0	57.0	56.0	53.0	50.0	48.0	47.0	45.0
	Max	60.9	84.6	49.3	69.0	67.0	63.0	61.0	57.0	55.0	51.0	50.0	50.0
Energy Average		56.2	Average:		63.2	61.5	59.1	58.0	54.9	52.4	49.0	48.2	47.5

24-Hour L_{eq} (dBA)

57.7

24-Hour CNEL (dBA)

62.6

24-Hour Noise Level Measurement Summary

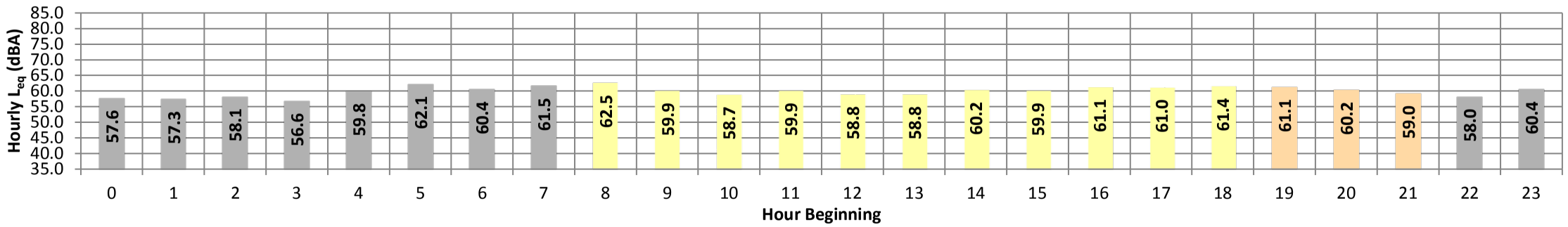
Date: Friday, June 22, 2018
Project: K4 Parcel

Location: L2 - Located south of Cacust Avenue near the northern Project site boundary, north of March Air Force Base.

Meter: Piccolo I

JN: 11743
Analyst: A. Wolfe

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	57.6	77.7	43.8	68.0	66.0	63.0	61.0	56.0	52.0	46.0	45.0	44.0	57.6	10.0	67.6
	1	57.3	75.9	43.1	68.0	66.0	63.0	61.0	56.0	51.0	45.0	45.0	44.0	57.3	10.0	67.3
	2	58.1	80.2	42.6	68.0	67.0	63.0	61.0	56.0	51.0	45.0	44.0	43.0	58.1	10.0	68.1
	3	56.6	72.9	43.1	67.0	65.0	62.0	60.0	56.0	52.0	46.0	45.0	44.0	56.6	10.0	66.6
	4	59.8	81.5	42.7	70.0	68.0	64.0	62.0	58.0	54.0	47.0	46.0	44.0	59.8	10.0	69.8
	5	62.1	87.3	44.5	71.0	69.0	66.0	65.0	60.0	56.0	49.0	47.0	46.0	62.1	10.0	72.1
	6	60.4	77.7	44.9	69.0	68.0	66.0	64.0	60.0	57.0	50.0	49.0	47.0	60.4	10.0	70.4
	7	61.5	80.7	45.5	71.0	69.0	67.0	65.0	61.0	57.0	50.0	49.0	47.0	61.5	0.0	61.5
Day	8	62.5	91.9	44.8	70.0	68.0	65.0	63.0	59.0	55.0	49.0	48.0	46.0	62.5	0.0	62.5
	9	59.9	78.6	43.3	69.0	68.0	65.0	64.0	59.0	55.0	48.0	46.0	45.0	59.9	0.0	59.9
	10	58.7	77.8	43.9	68.0	66.0	64.0	62.0	58.0	54.0	47.0	46.0	45.0	58.7	0.0	58.7
	11	59.9	78.7	43.8	70.0	68.0	65.0	63.0	59.0	55.0	47.0	46.0	45.0	59.9	0.0	59.9
	12	58.8	74.2	43.3	68.0	66.0	64.0	62.0	59.0	55.0	48.0	46.0	45.0	58.8	0.0	58.8
	13	58.8	75.2	43.8	68.0	66.0	64.0	62.0	59.0	55.0	48.0	47.0	45.0	58.8	0.0	58.8
	14	60.2	80.0	43.9	70.0	67.0	65.0	63.0	60.0	56.0	48.0	47.0	45.0	60.2	0.0	60.2
	15	59.9	80.5	43.9	69.0	67.0	64.0	63.0	60.0	57.0	48.0	47.0	45.0	59.9	0.0	59.9
	16	61.1	75.9	44.9	70.0	69.0	66.0	64.0	61.0	58.0	50.0	49.0	47.0	61.1	0.0	61.1
	17	61.0	77.2	45.9	69.0	68.0	66.0	64.0	61.0	59.0	50.0	49.0	47.0	61.0	0.0	61.0
	18	61.4	76.9	45.6	70.0	68.0	66.0	65.0	62.0	59.0	51.0	50.0	48.0	61.4	0.0	61.4
Evening	19	61.1	80.9	46.3	69.0	68.0	65.0	64.0	61.0	58.0	51.0	50.0	48.0	61.1	5.0	66.1
	20	60.2	79.7	46.0	69.0	67.0	65.0	63.0	60.0	56.0	50.0	49.0	48.0	60.2	5.0	65.2
	21	59.0	73.1	46.4	68.0	66.0	64.0	63.0	59.0	55.0	49.0	48.0	47.0	59.0	5.0	64.0
Night	22	58.0	75.4	45.7	66.0	65.0	62.0	61.0	58.0	55.0	48.0	47.0	46.0	58.0	10.0	68.0
	23	60.4	87.2	43.7	68.0	66.0	63.0	62.0	58.0	54.0	48.0	47.0	45.0	60.4	10.0	70.4

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	58.7	74.2	43.3	68.0	66.0	64.0	62.0	58.0	54.0	47.0	46.0	45.0
	Max	62.5	91.9	45.9	70.0	69.0	66.0	65.0	62.0	59.0	51.0	50.0	48.0
Energy Average		60.4	Average:		69.2	67.4	64.9	63.2	59.7	56.2	48.5	47.4	45.7
Evening	Min	59.0	73.1	46.0	68.0	66.0	64.0	63.0	59.0	55.0	49.0	48.0	47.0
	Max	61.1	80.9	46.4	69.0	68.0	65.0	64.0	61.0	58.0	51.0	50.0	48.0
Energy Average		60.2	Average:		68.7	67.0	64.7	63.3	60.0	56.3	50.0	49.0	47.7
Night	Min	56.6	72.9	42.6	66.0	65.0	62.0	60.0	56.0	51.0	45.0	44.0	43.0
	Max	62.1	87.3	45.7	71.0	69.0	67.0	65.0	61.0	57.0	50.0	49.0	47.0
Energy Average		59.6	Average:		68.6	66.9	63.9	62.2	57.9	53.9	47.4	46.4	45.0

24-Hour L_{eq} (dBA)

60.0

24-Hour CNEL (dBA)

66.2

24-Hour Noise Level Measurement Summary

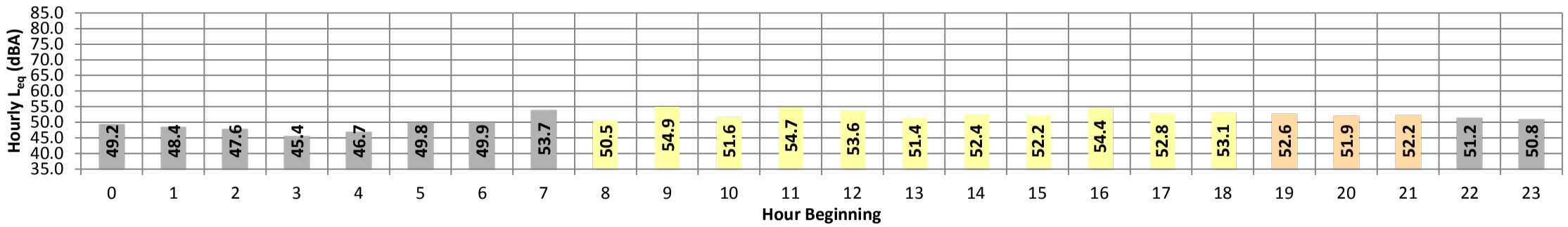
Date: Friday, June 22, 2018
Project: K4 Parcel

Location: L3 - Located north of the Project site near existing office uses on Calle San Juan De Los Lagos.

Meter: Piccolo I

JN: 11743
Analyst: A. Wolfe

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	49.2	68.3	46.3	55.0	53.0	51.0	50.0	48.0	48.0	47.0	47.0	46.0	49.2	10.0	59.2
	1	48.4	68.9	45.8	52.0	50.0	49.0	49.0	48.0	47.0	46.0	46.0	46.0	48.4	10.0	58.4
	2	47.6	61.2	43.7	52.0	50.0	49.0	48.0	47.0	47.0	45.0	44.0	44.0	47.6	10.0	57.6
	3	45.4	58.5	43.0	50.0	49.0	47.0	46.0	45.0	44.0	44.0	43.0	43.0	45.4	10.0	55.4
	4	46.7	66.1	42.7	55.0	52.0	49.0	48.0	45.0	44.0	43.0	43.0	43.0	46.7	10.0	56.7
	5	49.8	69.9	43.1	57.0	56.0	53.0	52.0	50.0	48.0	45.0	44.0	43.0	49.8	10.0	59.8
	6	49.9	65.5	43.7	58.0	56.0	54.0	52.0	49.0	47.0	45.0	45.0	44.0	49.9	10.0	59.9
	7	53.7	72.2	45.1	65.0	60.0	56.0	55.0	51.0	50.0	47.0	47.0	46.0	53.7	0.0	53.7
Day	8	50.5	67.7	45.6	59.0	56.0	53.0	52.0	50.0	48.0	47.0	47.0	46.0	50.5	0.0	50.5
	9	54.9	75.5	46.0	67.0	65.0	59.0	55.0	50.0	49.0	47.0	47.0	46.0	54.9	0.0	54.9
	10	51.6	67.1	47.1	60.0	58.0	55.0	54.0	50.0	49.0	48.0	47.0	47.0	51.6	0.0	51.6
	11	54.7	72.7	46.3	67.0	64.0	58.0	55.0	52.0	50.0	48.0	47.0	47.0	54.7	0.0	54.7
	12	53.6	74.7	46.2	62.0	61.0	58.0	56.1	52.0	50.0	48.0	48.0	47.0	53.6	0.0	53.6
	13	51.4	66.6	46.1	59.0	58.0	55.0	54.0	51.0	49.0	47.0	47.0	46.0	51.4	0.0	51.4
	14	52.4	75.1	46.6	61.0	58.0	55.0	53.0	50.0	49.0	47.0	47.0	47.0	52.4	0.0	52.4
	15	52.2	68.1	47.3	60.0	58.0	55.0	54.0	51.2	50.0	49.0	48.0	48.0	52.2	0.0	52.2
	16	54.4	72.0	48.1	63.0	61.0	58.0	56.0	53.0	51.0	50.0	49.0	49.0	54.4	0.0	54.4
	17	52.8	65.2	48.7	59.0	57.0	56.0	55.0	53.0	51.0	50.0	49.0	49.0	52.8	0.0	52.8
	18	53.1	70.3	48.4	60.0	58.0	56.0	54.0	52.0	51.0	50.0	49.0	49.0	53.1	0.0	53.1
Evening	19	52.6	67.6	48.9	58.0	56.0	54.0	54.0	52.0	51.0	50.0	50.0	49.0	52.6	5.0	57.6
	20	51.9	67.0	48.7	57.0	55.0	54.0	53.0	52.0	51.0	50.0	49.0	49.0	51.9	5.0	56.9
	21	52.2	71.1	49.1	57.0	55.0	54.0	53.0	52.0	51.0	50.0	50.0	49.0	52.2	5.0	57.2
Night	22	51.2	67.3	48.6	55.0	54.0	53.0	52.0	51.0	50.0	49.0	49.0	49.0	51.2	10.0	61.2
	23	50.8	71.9	46.7	57.0	55.0	53.0	52.0	50.0	49.0	48.0	47.0	47.0	50.8	10.0	60.8

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.5	65.2	45.6	59.0	56.0	53.0	52.0	50.0	48.0	47.0	47.0	46.0
	Max	54.9	75.5	48.7	67.0	65.0	59.0	56.1	53.0	51.0	50.0	49.0	49.0
Energy Average		53.1	Average:		61.5	59.5	56.2	54.4	51.3	49.7	48.3	47.7	47.4
Evening	Min	51.9	67.0	48.7	57.0	55.0	54.0	53.0	52.0	51.0	50.0	49.0	49.0
	Max	52.6	71.1	49.1	58.0	56.0	54.0	54.0	52.0	51.0	50.0	50.0	49.0
Energy Average		52.2	Average:		57.3	55.3	54.0	53.3	52.0	51.0	50.0	49.7	49.0
Night	Min	45.4	58.5	42.7	50.0	49.0	47.0	46.0	45.0	44.0	43.0	43.0	43.0
	Max	53.7	72.2	48.6	65.0	60.0	56.0	55.0	51.0	50.0	49.0	49.0	49.0
Energy Average		49.9	Average:		55.6	53.5	51.4	50.4	48.4	47.4	45.9	45.5	45.1

24-Hour L_{eq} (dBA)

51.9

24-Hour CNEL (dBA)

56.8

24-Hour Noise Level Measurement Summary

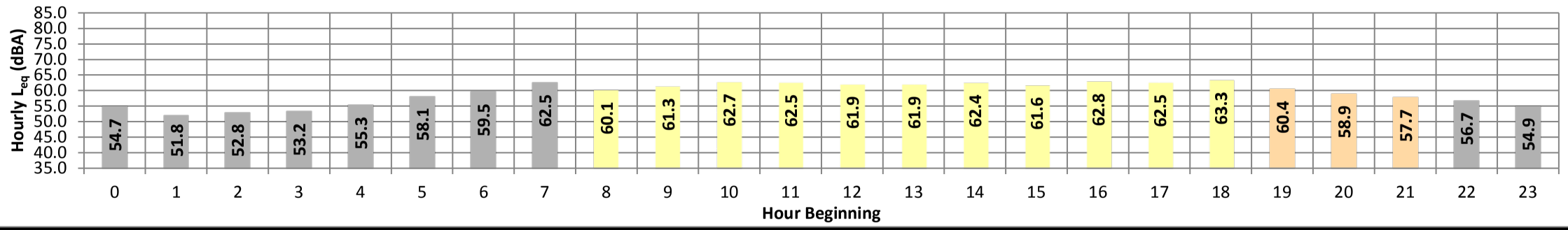
Date: Friday, June 22, 2018
Project: K4 Parcel

Location: L4 - Located east of the Project site near an existing Marine Corps Recruiting Station building on Riverside Drive.

Meter: Piccolo I

JN: 11743
Analyst: A. Wolfe

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	54.7	75.0	44.8	66.0	63.0	59.0	57.0	51.0	48.0	46.0	46.0	45.0	54.7	10.0	64.7
	1	51.8	70.1	44.2	63.0	60.0	56.0	54.0	49.0	47.0	45.0	45.0	44.0	51.8	10.0	61.8
	2	52.8	72.4	44.3	64.0	61.0	57.0	55.0	50.0	48.0	46.0	45.0	45.0	52.8	10.0	62.8
	3	53.2	71.9	43.4	65.0	63.0	57.0	55.0	49.0	47.0	45.0	45.0	44.0	53.2	10.0	63.2
	4	55.3	77.7	43.0	67.0	65.0	60.0	57.0	50.0	47.0	44.0	44.0	43.0	55.3	10.0	65.3
	5	58.1	75.8	42.9	69.0	68.0	64.0	62.0	56.0	51.0	47.0	45.0	44.0	58.1	10.0	68.1
	6	59.5	80.6	44.7	69.0	68.0	66.0	64.0	57.0	52.0	47.0	46.0	45.0	59.5	10.0	69.5
	7	62.5	85.5	46.0	71.0	70.0	68.0	67.0	61.0	56.0	49.0	48.0	46.0	62.5	0.0	62.5
Day	8	60.1	76.8	45.5	70.0	69.0	66.0	65.0	58.0	53.0	48.0	47.0	47.0	60.1	0.0	60.1
	9	61.3	87.6	45.0	71.0	69.0	66.0	65.0	58.0	53.0	47.0	46.0	46.0	61.3	0.0	61.3
	10	62.7	79.2	44.1	73.0	72.0	69.0	67.0	62.0	57.0	48.0	46.0	45.0	62.7	0.0	62.7
	11	62.5	87.5	44.2	71.0	69.0	67.0	66.0	61.0	56.0	48.0	47.0	46.0	62.5	0.0	62.5
	12	61.9	84.8	44.1	70.0	69.0	67.0	66.0	61.0	56.0	48.0	47.0	46.0	61.9	0.0	61.9
	13	61.9	87.3	43.1	70.0	68.0	66.0	65.0	60.0	55.0	47.0	46.0	44.0	61.9	0.0	61.9
	14	62.4	82.0	42.4	72.0	70.0	67.0	66.0	62.0	57.0	48.0	47.0	45.0	62.4	0.0	62.4
	15	61.6	77.9	43.9	70.0	69.0	67.0	66.0	62.0	57.0	49.0	47.0	45.0	61.6	0.0	61.6
	16	62.8	76.7	46.0	71.0	69.0	68.0	67.0	63.0	60.0	52.0	50.0	48.0	62.8	0.0	62.8
	17	62.5	77.6	46.9	71.0	69.0	68.0	67.0	63.0	59.0	52.0	50.0	48.0	62.5	0.0	62.5
	18	63.3	87.6	49.2	71.0	70.0	68.0	67.0	63.0	58.0	52.0	51.0	50.0	63.3	0.0	63.3
Evening	19	60.4	73.8	48.9	69.0	68.0	66.0	65.0	60.0	56.0	51.0	51.0	50.0	60.4	5.0	65.4
	20	58.9	75.4	48.5	68.0	67.0	64.0	63.0	58.0	54.0	50.0	50.0	49.0	58.9	5.0	63.9
	21	57.7	74.0	48.0	68.0	66.0	63.0	61.0	56.0	52.0	49.0	49.0	48.0	57.7	5.0	62.7
Night	22	56.7	73.5	46.9	67.0	65.0	62.0	60.0	55.0	52.0	49.0	49.0	48.0	56.7	10.0	66.7
	23	54.9	72.2	45.3	66.0	63.0	60.0	58.0	53.0	50.0	47.0	46.0	46.0	54.9	10.0	64.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.1	76.7	42.4	70.0	68.0	66.0	65.0	58.0	53.0	47.0	46.0	44.0
	Max	63.3	87.6	49.2	73.0	72.0	69.0	67.0	63.0	60.0	52.0	51.0	50.0
Energy Average		62.2	Average:		70.9	69.4	67.2	66.1	61.2	56.5	49.0	47.6	46.4
Evening	Min	57.7	73.8	48.0	68.0	66.0	63.0	61.0	56.0	52.0	49.0	49.0	48.0
	Max	60.4	75.4	48.9	69.0	68.0	66.0	65.0	60.0	56.0	51.0	51.0	50.0
Energy Average		59.1	Average:		68.3	67.0	64.3	63.0	58.0	54.0	50.0	50.0	49.0
Night	Min	51.8	70.1	42.9	63.0	60.0	56.0	54.0	49.0	47.0	44.0	44.0	43.0
	Max	62.5	85.5	46.9	71.0	70.0	68.0	67.0	61.0	56.0	49.0	49.0	48.0
Energy Average		57.2	Average:		66.7	64.6	60.9	58.9	53.1	49.8	46.5	45.9	45.0

24-Hour L_{eq} (dBA)

60.3

24-Hour CNEL (dBA)

64.2

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE CONTOURS

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Alessandro Bl.
Road Segment: n/o Trautwein Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	81,372 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	8,137 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	6.46	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-8.11	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-6.68	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	73.0	70.9	68.9	76.1	76.4
Medium Trucks:	71.6	69.3	65.7	65.5	72.6	72.8
Heavy Trucks:	77.5	74.4	72.8	72.7	79.3	79.6
Vehicle Noise:	80.2	77.5	75.4	74.7	81.6	81.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	326	702	1,513	3,259
CNEL:	340	732	1,578	3,400

Tuesday, June 26, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Meridian Pkwy.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,122 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,212 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.26	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-13.31	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-11.88	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	65.9	63.8	61.8	69.0	69.4
Medium Trucks:	64.7	62.4	58.8	58.6	65.7	65.9
Heavy Trucks:	71.0	68.0	66.3	66.2	72.9	73.1
Vehicle Noise:	73.5	70.8	68.7	68.1	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	256	552	1,189
CNEL:	124	267	575	1,240

Tuesday, June 26, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Veterans Wy.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	2,835 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	284 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.66	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-22.24	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-20.80	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.4	59.0	56.9	54.9	62.1	62.4
Medium Trucks:	57.8	55.5	51.9	51.7	58.8	59.0
Heavy Trucks:	64.1	61.1	59.4	59.3	65.9	66.2
Vehicle Noise:	66.6	63.8	61.8	61.2	68.0	68.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	29	62	133	286
CNEL:	30	64	139	299

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Frederick St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,140 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,114 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-1.20	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-15.78	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.35	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.4	63.0	60.9	58.9	66.1	66.4
Medium Trucks:	62.0	59.7	56.1	55.9	63.0	63.2
Heavy Trucks:	68.8	65.7	64.1	64.0	70.6	70.9
Vehicle Noise:	71.0	68.2	66.2	65.6	72.5	72.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	64	138	298	641
CNEL:	67	144	310	668

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: K4 Parcel
Road Name: Graham St. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,288 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	729 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.56	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-18.14	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.70	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.0	62.6	60.5	58.5	65.7	66.0
Medium Trucks:	61.4	59.1	55.5	55.3	62.3	62.6
Heavy Trucks:	67.7	64.6	63.0	62.9	69.5	69.8
Vehicle Noise:	70.2	67.4	65.4	64.7	71.6	71.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	121	260	561
CNEL:	58	126	271	585

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: K4 Parcel
Road Name: Heacock St. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	15,779 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,578 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.20	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-14.78	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.34	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.4	63.3	61.3	68.5	68.8
Medium Trucks:	64.2	61.9	58.3	58.1	65.1	65.4
Heavy Trucks:	70.4	67.4	65.8	65.7	72.3	72.6
Vehicle Noise:	72.9	70.2	68.2	67.5	74.4	74.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	98	210	453	977
CNEL:	102	219	473	1,019

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: K4 Parcel
Road Name: Heacock St. | Job Number: 11743
Road Segment: s/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,212 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,021 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.62	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.96	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.52	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.2	66.1	64.1	71.3	71.6
Medium Trucks:	67.0	64.7	61.1	60.9	67.9	68.2
Heavy Trucks:	73.3	70.2	68.6	68.5	75.1	75.4
Vehicle Noise:	75.8	73.0	71.0	70.3	77.2	77.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	151	324	699	1,506
CNEL:	157	338	729	1,570

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project | Project Name: K4 Parcel
Road Name: Alessandro Bl. | Job Number: 11743
Road Segment: w/o Barton St.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,677 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,868 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.63	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.95	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.51	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.3	72.9	70.8	68.9	76.0	76.4
Medium Trucks:	71.4	69.1	65.5	65.3	72.3	72.6
Heavy Trucks:	76.8	73.8	72.2	72.0	78.7	79.0
Vehicle Noise:	79.8	77.1	75.1	74.3	81.2	81.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	334	720	1,551	3,341
CNEL:	349	751	1,618	3,487

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	48,718 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,872 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.82	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-10.76	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-9.32	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.5	72.1	70.0	68.0	75.2	75.6
Medium Trucks:	70.6	68.3	64.7	64.4	71.5	71.8
Heavy Trucks:	76.0	73.0	71.4	71.2	77.9	78.1
Vehicle Noise:	79.0	76.3	74.3	73.5	80.4	80.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	295	636	1,370	2,951
CNEL:	308	664	1,430	3,080

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,720 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,372 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.09	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.48	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.05	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.8	67.4	65.3	63.4	70.5	70.9
Medium Trucks:	66.3	64.0	60.4	60.1	67.2	67.4
Heavy Trucks:	72.5	69.5	67.9	67.7	74.4	74.6
Vehicle Noise:	75.0	72.3	70.3	69.6	76.4	76.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	180	388	835	1,799
CNEL:	188	404	871	1,876

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,713 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,671 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.46	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.11	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.68	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.8	65.7	63.7	70.9	71.3
Medium Trucks:	66.6	64.3	60.7	60.5	67.6	67.8
Heavy Trucks:	72.9	69.9	68.2	68.1	74.8	75.0
Vehicle Noise:	75.4	72.7	70.6	70.0	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	190	410	884	1,904
CNEL:	199	428	922	1,986

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,956 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,696 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.49	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.08	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.65	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.8	65.7	63.8	70.9	71.3
Medium Trucks:	66.7	64.4	60.8	60.5	67.6	67.8
Heavy Trucks:	72.9	69.9	68.2	68.1	74.8	75.0
Vehicle Noise:	75.4	72.7	70.7	70.0	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	191	412	888	1,912
CNEL:	199	430	926	1,995

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,275 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,028 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.88	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-13.69	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-12.26	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	65.9	63.8	61.8	69.0	69.3
Medium Trucks:	64.7	62.4	58.8	58.6	65.6	65.9
Heavy Trucks:	70.9	67.9	66.3	66.2	72.8	73.1
Vehicle Noise:	73.4	70.7	68.7	68.0	74.9	75.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	127	273	588	1,266
CNEL:	132	285	613	1,321

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,223 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,122 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.51	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-11.07	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.63	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.6	70.2	68.1	66.2	73.3	73.7
Medium Trucks:	68.9	66.6	63.0	62.7	69.8	70.0
Heavy Trucks:	74.7	71.7	70.0	69.9	76.6	76.8
Vehicle Noise:	77.4	74.7	72.7	72.0	78.8	79.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	233	502	1,081	2,329
CNEL:	243	523	1,128	2,430

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,886 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,289 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.68	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.90	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.46	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.8	70.4	68.3	66.3	73.5	73.9
Medium Trucks:	69.1	66.7	63.1	62.9	70.0	70.2
Heavy Trucks:	74.9	71.8	70.2	70.1	76.7	77.0
Vehicle Noise:	77.6	74.9	72.9	72.2	79.0	79.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	239	515	1,110	2,391
CNEL:	249	537	1,158	2,495

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,456 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,946 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.30	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.28	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.84	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.4	71.0	68.9	67.0	74.1	74.5
Medium Trucks:	69.7	67.4	63.8	63.5	70.6	70.8
Heavy Trucks:	75.5	72.5	70.8	70.7	77.4	77.6
Vehicle Noise:	78.2	75.5	73.5	72.8	79.6	79.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	263	566	1,220	2,629
CNEL:	274	591	1,273	2,743

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,946 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,495 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.88	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.69	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.26	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.0	70.6	68.5	66.5	73.7	74.1
Medium Trucks:	69.3	67.0	63.3	63.1	70.2	70.4
Heavy Trucks:	75.1	72.1	70.4	70.3	76.9	77.2
Vehicle Noise:	77.8	75.1	73.1	72.4	79.2	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	247	532	1,145	2,467
CNEL:	257	555	1,195	2,574

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	26,790 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,679 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.64	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-12.94	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.50	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.3	71.5	71.8
Medium Trucks:	67.0	64.7	61.1	60.9	67.9	68.2
Heavy Trucks:	72.8	69.8	68.2	68.0	74.7	74.9
Vehicle Noise:	75.6	72.9	70.8	70.1	77.0	77.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	175	376	811	1,747
CNEL:	182	393	846	1,823

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Van Buren Bl.
Road Segment: w/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	39,791 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,979 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.94	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-11.64	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-10.20	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.6	71.3	69.1	67.2	74.4	74.7
Medium Trucks:	69.7	67.4	63.8	63.6	70.6	70.9
Heavy Trucks:	75.1	72.1	70.5	70.4	77.0	77.3
Vehicle Noise:	78.1	75.5	73.4	72.6	79.5	79.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	258	556	1,197	2,579
CNEL:	269	580	1,249	2,691

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: n/o Trautwein Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	81,693 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	8,169 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.33%
Medium Trucks:	70.5%	7.7%	21.8%	3.21%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	6.48	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-8.11	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-6.68	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	73.0	70.9	68.9	76.1	76.5
Medium Trucks:	71.6	69.3	65.7	65.5	72.6	72.8
Heavy Trucks:	77.5	74.4	72.8	72.7	79.3	79.6
Vehicle Noise:	80.2	77.5	75.4	74.7	81.6	81.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	326	703	1,514	3,261
CNEL:	340	733	1,579	3,403

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Meridian Pkwy.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	22,390 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,239 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.40%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.43%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.32	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-13.31	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-11.88	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.0	63.9	61.9	69.1	69.4
Medium Trucks:	64.7	62.4	58.8	58.6	65.7	65.9
Heavy Trucks:	71.0	68.0	66.3	66.2	72.9	73.1
Vehicle Noise:	73.5	70.8	68.7	68.1	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	119	257	553	1,191
CNEL:	124	268	577	1,243

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Veterans Wy.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,156 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	316 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	93.09%
Medium Trucks:	70.5%	7.7%	21.8%	2.89%
Heavy Trucks:	59.9%	10.3%	29.9%	4.02%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.16	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-22.24	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-20.80	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.9	59.5	57.4	55.4	62.6	62.9
Medium Trucks:	57.8	55.5	51.9	51.7	58.8	59.0
Heavy Trucks:	64.1	61.1	59.4	59.3	65.9	66.2
Vehicle Noise:	66.7	64.0	62.0	61.3	68.1	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	29	63	136	292
CNEL:	30	66	142	305

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Frederick St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,184 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,218 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.75%
Medium Trucks:	70.5%	7.7%	21.8%	2.98%
Heavy Trucks:	59.9%	10.3%	29.9%	4.28%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.80	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-15.73	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-14.16	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.8	63.4	61.3	59.3	66.5	66.8
Medium Trucks:	62.1	59.8	56.2	55.9	63.0	63.2
Heavy Trucks:	68.9	65.9	64.3	64.2	70.8	71.1
Vehicle Noise:	71.2	68.5	66.5	65.9	72.7	72.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	143	308	663
CNEL:	69	149	321	692

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Graham St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	7,567 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	757 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.44%
Medium Trucks:	70.5%	7.7%	21.8%	3.13%
Heavy Trucks:	59.9%	10.3%	29.9%	4.43%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-3.39	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-18.10	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.58	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.1	62.8	60.6	58.7	65.8	66.2
Medium Trucks:	61.5	59.2	55.5	55.3	62.4	62.6
Heavy Trucks:	67.8	64.8	63.1	63.0	69.6	69.9
Vehicle Noise:	70.3	67.6	65.5	64.9	71.7	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	57	123	265	571
CNEL:	60	128	277	596

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Heacock St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	16,218 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,622 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.44%
Medium Trucks:	70.5%	7.7%	21.8%	3.14%
Heavy Trucks:	59.9%	10.3%	29.9%	4.41%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.08	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-14.76	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-13.29	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.9	65.5	63.4	61.4	68.6	68.9
Medium Trucks:	64.2	61.9	58.3	58.1	65.1	65.4
Heavy Trucks:	70.5	67.5	65.8	65.7	72.4	72.6
Vehicle Noise:	73.0	70.3	68.3	67.6	74.4	74.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	99	213	458	987
CNEL:	103	222	478	1,029

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Heacock St.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,592 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,059 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.38%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.67	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.96	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.51	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.6	68.2	66.1	64.2	71.3	71.7
Medium Trucks:	67.0	64.7	61.1	60.9	67.9	68.2
Heavy Trucks:	73.3	70.3	68.6	68.5	75.1	75.4
Vehicle Noise:	75.8	73.1	71.0	70.4	77.2	77.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	151	326	701	1,511
CNEL:	158	340	732	1,576

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: w/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	59,105 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,911 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.36%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.66	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.95	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.51	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.4	73.0	70.9	68.9	76.1	76.4
Medium Trucks:	71.4	69.1	65.5	65.3	72.3	72.6
Heavy Trucks:	76.8	73.8	72.2	72.0	78.7	79.0
Vehicle Noise:	79.8	77.2	75.1	74.3	81.2	81.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	335	721	1,553	3,346
CNEL:	349	752	1,621	3,492

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	49,254 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,925 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.39%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.43%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	3.87	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-10.76	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-9.32	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.6	72.2	70.1	68.1	75.3	75.6
Medium Trucks:	70.6	68.3	64.7	64.4	71.5	71.8
Heavy Trucks:	76.0	73.0	71.4	71.2	77.9	78.1
Vehicle Noise:	79.0	76.4	74.3	73.5	80.4	80.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	296	637	1,373	2,958
CNEL:	309	665	1,433	3,088

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,256 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,426 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.42%
Medium Trucks:	70.5%	7.7%	21.8%	3.17%
Heavy Trucks:	59.9%	10.3%	29.9%	4.41%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.17	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.48	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.05	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.5	65.4	63.4	70.6	71.0
Medium Trucks:	66.3	64.0	60.4	60.1	67.2	67.4
Heavy Trucks:	72.5	69.5	67.9	67.7	74.4	74.6
Vehicle Noise:	75.0	72.3	70.3	69.6	76.5	76.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	180	389	838	1,804
CNEL:	188	405	874	1,882

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,927 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,693 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.49	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.11	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.68	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.2	67.8	65.7	63.8	70.9	71.3
Medium Trucks:	66.6	64.3	60.7	60.5	67.6	67.8
Heavy Trucks:	72.9	69.9	68.2	68.1	74.8	75.0
Vehicle Noise:	75.4	72.7	70.6	70.0	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	191	411	885	1,906
CNEL:	199	428	923	1,988

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,224 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,722 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.36%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.53	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-11.08	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.65	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.3	67.9	65.8	63.8	71.0	71.3
Medium Trucks:	66.7	64.4	60.8	60.5	67.6	67.8
Heavy Trucks:	72.9	69.9	68.2	68.1	74.8	75.0
Vehicle Noise:	75.4	72.7	70.7	70.0	76.8	77.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	191	413	889	1,915
CNEL:	200	430	927	1,997

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,543 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,054 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.40%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.42%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.95	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-13.69	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-12.26	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	65.9	63.8	61.9	69.0	69.4
Medium Trucks:	64.7	62.4	58.8	58.6	65.6	65.9
Heavy Trucks:	70.9	67.9	66.3	66.2	72.8	73.1
Vehicle Noise:	73.5	70.7	68.7	68.0	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	127	274	589	1,270
CNEL:	132	285	615	1,324

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,098 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,410 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.75%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	5.07%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.78	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.82	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.80	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.9	70.5	68.4	66.4	73.6	73.9
Medium Trucks:	69.1	66.8	63.2	63.0	70.0	70.3
Heavy Trucks:	75.5	72.5	70.9	70.7	77.4	77.6
Vehicle Noise:	78.0	75.3	73.3	72.6	79.4	79.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	256	551	1,186	2,556
CNEL:	267	574	1,237	2,666

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,761 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,576 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.77%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	5.05%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.94	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.66	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.66	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.1	70.7	68.6	66.6	73.8	74.1
Medium Trucks:	69.3	67.0	63.4	63.1	70.2	70.4
Heavy Trucks:	75.7	72.6	71.0	70.9	77.5	77.8
Vehicle Noise:	78.2	75.4	73.4	72.8	79.6	79.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	262	563	1,214	2,615
CNEL:	273	588	1,266	2,728

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	51,089 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,109 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.50%
Medium Trucks:	70.5%	7.7%	21.8%	3.12%
Heavy Trucks:	59.9%	10.3%	29.9%	4.38%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.45	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.27	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.80	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.6	71.2	69.1	67.1	74.3	74.6
Medium Trucks:	69.7	67.4	63.8	63.5	70.6	70.8
Heavy Trucks:	75.5	72.5	70.9	70.7	77.4	77.7
Vehicle Noise:	78.3	75.6	73.6	72.8	79.7	80.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	266	573	1,234	2,658
CNEL:	277	597	1,287	2,773

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,301 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,630 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.49%
Medium Trucks:	70.5%	7.7%	21.8%	3.13%
Heavy Trucks:	59.9%	10.3%	29.9%	4.38%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.02	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.68	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-9.23	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.2	70.8	68.6	66.7	73.9	74.2
Medium Trucks:	69.3	67.0	63.4	63.1	70.2	70.4
Heavy Trucks:	75.1	72.1	70.4	70.3	77.0	77.2
Vehicle Noise:	77.9	75.2	73.1	72.4	79.3	79.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	249	536	1,155	2,489
CNEL:	260	559	1,205	2,597

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,326 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,733 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.45%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.39%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	1.73	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-12.94	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-11.50	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.9	68.5	66.4	64.4	71.6	71.9
Medium Trucks:	67.0	64.7	61.1	60.9	67.9	68.2
Heavy Trucks:	72.8	69.8	68.2	68.0	74.7	74.9
Vehicle Noise:	75.6	72.9	70.8	70.1	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	175	378	814	1,754
CNEL:	183	394	850	1,830

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing + Project
Road Name: Van Buren Bl.
Road Segment: w/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	40,059 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,006 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	2.97	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-11.64	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-10.20	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	71.3	69.2	67.2	74.4	74.7
Medium Trucks:	69.7	67.4	63.8	63.6	70.6	70.9
Heavy Trucks:	75.1	72.1	70.5	70.4	77.0	77.3
Vehicle Noise:	78.2	75.5	73.4	72.6	79.5	79.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	258	556	1,199	2,583
CNEL:	270	581	1,251	2,695

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: n/o Trautwein Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	92,305 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	9,231 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	7.01	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-7.57	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-6.13	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.9	73.5	71.4	69.5	76.6	77.0
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	78.0	75.0	73.3	73.2	79.9	80.1
Vehicle Noise:	80.8	78.1	76.0	75.3	82.1	82.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	354	764	1,645	3,545
CNEL:	370	797	1,716	3,698

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Meridian Pkwy.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,290 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,929 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.48	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-12.09	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.66	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.5	67.1	65.0	63.1	70.2	70.6
Medium Trucks:	66.0	63.7	60.0	59.8	66.9	67.1
Heavy Trucks:	72.2	69.2	67.5	67.4	74.1	74.3
Vehicle Noise:	74.7	72.0	69.9	69.3	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	143	309	665	1,433
CNEL:	149	322	694	1,495

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Veterans Wy.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,130 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	313 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-7.23	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-21.81	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-20.37	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	61.8	59.4	57.3	55.3	62.5	62.9
Medium Trucks:	58.3	56.0	52.3	52.1	59.2	59.4
Heavy Trucks:	64.5	61.5	59.8	59.7	66.4	66.6
Vehicle Noise:	67.0	64.3	62.2	61.6	68.4	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	66	142	306
CNEL:	32	69	148	319

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Frederick St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,451 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,245 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.72	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-15.30	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-13.86	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.9	63.5	61.4	59.4	66.6	66.9
Medium Trucks:	62.5	60.2	56.6	56.4	63.4	63.7
Heavy Trucks:	69.2	66.2	64.6	64.5	71.1	71.4
Vehicle Noise:	71.5	68.7	66.7	66.1	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	149	320	690
CNEL:	72	155	334	720

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Graham St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,479 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	848 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.90	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-17.48	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-16.04	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.6	63.2	61.1	59.2	66.3	66.7
Medium Trucks:	62.1	59.8	56.2	55.9	63.0	63.2
Heavy Trucks:	68.3	65.3	63.7	63.5	70.2	70.4
Vehicle Noise:	70.8	68.1	66.1	65.4	72.2	72.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	62	134	288	620
CNEL:	65	139	300	647

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Heacock St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	17,853 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,785 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.33	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-14.24	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.81	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	65.9	63.8	61.8	69.0	69.3
Medium Trucks:	64.7	62.4	58.8	58.6	65.7	65.9
Heavy Trucks:	71.0	68.0	66.3	66.2	72.8	73.1
Vehicle Noise:	73.5	70.8	68.7	68.1	74.9	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	106	228	492	1,060
CNEL:	111	238	513	1,106

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Heacock St.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,789 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,379 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.10	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.47	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.04	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.7	66.6	64.6	71.8	72.1
Medium Trucks:	67.5	65.2	61.6	61.4	68.4	68.7
Heavy Trucks:	73.7	70.7	69.1	69.0	75.6	75.9
Vehicle Noise:	76.2	73.5	71.5	70.8	77.7	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	162	350	753	1,622
CNEL:	169	365	785	1,692

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: w/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	68,775 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,878 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.32	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.26	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.82	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.0	73.6	71.5	69.5	76.7	77.1
Medium Trucks:	72.1	69.8	66.2	65.9	73.0	73.2
Heavy Trucks:	77.5	74.5	72.9	72.7	79.4	79.6
Vehicle Noise:	80.5	77.8	75.8	75.0	81.9	82.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	371	800	1,724	3,714
CNEL:	388	835	1,799	3,876

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,157 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,816 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.59	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.99	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.55	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.3	72.9	70.8	68.8	76.0	76.3
Medium Trucks:	71.4	69.1	65.5	65.2	72.3	72.5
Heavy Trucks:	76.8	73.8	72.1	72.0	78.7	78.9
Vehicle Noise:	79.8	77.1	75.0	74.3	81.1	81.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	332	716	1,542	3,321
CNEL:	347	747	1,609	3,466

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,841 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,184 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.03	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.55	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.11	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.3	71.5	71.8
Medium Trucks:	67.2	64.9	61.3	61.1	68.1	68.4
Heavy Trucks:	73.5	70.4	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.2	71.2	70.5	77.4	77.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	208	448	964	2,077
CNEL:	217	467	1,006	2,167

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,118 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,212 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.06	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.52	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.08	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.3	71.5	71.9
Medium Trucks:	67.2	64.9	61.3	61.1	68.2	68.4
Heavy Trucks:	73.5	70.5	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.3	71.2	70.6	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	209	450	968	2,087
CNEL:	218	469	1,010	2,176

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	41,925 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,193 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.04	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.54	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.10	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.3	71.5	71.8
Medium Trucks:	67.2	64.9	61.3	61.1	68.1	68.4
Heavy Trucks:	73.5	70.4	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.2	71.2	70.5	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	208	448	966	2,080
CNEL:	217	467	1,007	2,170

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,459 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,046 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.65	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.92	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.49	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	67.6	65.5	63.6	70.7	71.1
Medium Trucks:	66.5	64.2	60.6	60.3	67.4	67.6
Heavy Trucks:	72.7	69.7	68.1	67.9	74.6	74.8
Vehicle Noise:	75.2	72.5	70.5	69.8	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	166	358	771	1,661
CNEL:	173	373	804	1,732

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	50,969 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,097 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.43	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.15	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.71	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.6	71.2	69.1	67.1	74.3	74.6
Medium Trucks:	69.8	67.5	63.9	63.7	70.7	71.0
Heavy Trucks:	75.6	72.6	71.0	70.8	77.5	77.7
Vehicle Noise:	78.4	75.7	73.6	72.9	79.8	80.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	268	578	1,245	2,683
CNEL:	280	603	1,299	2,799

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	52,276 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,228 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.54	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-10.04	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.60	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.7	71.3	69.2	67.2	74.4	74.7
Medium Trucks:	69.9	67.6	64.0	63.8	70.8	71.1
Heavy Trucks:	75.7	72.7	71.1	70.9	77.6	77.8
Vehicle Noise:	78.5	75.8	73.7	73.0	79.9	80.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	273	588	1,266	2,728
CNEL:	285	613	1,321	2,847

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	60,278 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,028 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.16	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.42	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.98	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.3	71.9	69.8	67.8	75.0	75.3
Medium Trucks:	70.5	68.2	64.6	64.4	71.5	71.7
Heavy Trucks:	76.3	73.3	71.7	71.6	78.2	78.5
Vehicle Noise:	79.1	76.4	74.3	73.6	80.5	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	300	646	1,393	3,000
CNEL:	313	674	1,453	3,130

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	54,864 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,486 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.75	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.83	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.39	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.9	71.5	69.4	67.4	74.6	74.9
Medium Trucks:	70.1	67.8	64.2	64.0	71.0	71.3
Heavy Trucks:	75.9	72.9	71.3	71.1	77.8	78.1
Vehicle Noise:	78.7	76.0	73.9	73.2	80.1	80.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	282	607	1,308	2,818
CNEL:	294	633	1,364	2,940

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,952 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,395 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.67	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-11.91	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-10.47	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.8	69.4	67.3	65.3	72.5	72.8
Medium Trucks:	68.0	65.7	62.1	61.9	69.0	69.2
Heavy Trucks:	73.9	70.8	69.2	69.1	75.7	76.0
Vehicle Noise:	76.6	73.9	71.8	71.1	78.0	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	205	441	950	2,046
CNEL:	213	460	991	2,135

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 Without Project | Project Name: K4 Parcel
Road Name: Van Buren Bl. | Job Number: 11743
Road Segment: w/o Meridian Pkwy.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	60,261 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,026 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.74	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.83	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.40	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.5	73.1	70.9	69.0	76.2	76.5
Medium Trucks:	71.5	69.2	65.6	65.4	72.4	72.7
Heavy Trucks:	76.9	73.9	72.3	72.2	78.8	79.1
Vehicle Noise:	79.9	77.3	75.2	74.4	81.3	81.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	340	733	1,579	3,401
CNEL:	355	765	1,647	3,549

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Alessandro Bl. | Job Number: 11743
Road Segment: n/o Trautwein Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	92,626 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	9,263 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.33%
Medium Trucks:	70.5%	7.7%	21.8%	3.21%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	7.03	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-7.57	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-6.13	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.0	73.6	71.5	69.5	76.7	77.0
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	78.0	75.0	73.3	73.2	79.9	80.1
Vehicle Noise:	80.8	78.1	76.0	75.3	82.1	82.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	355	764	1,646	3,547
CNEL:	370	797	1,718	3,701

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Meridian Pkwy. | Job Number: 11743
Road Segment: s/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,558 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,956 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.52	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-12.09	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.66	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.6	67.2	65.1	63.1	70.3	70.6
Medium Trucks:	66.0	63.7	60.0	59.8	66.9	67.1
Heavy Trucks:	72.2	69.2	67.5	67.4	74.1	74.3
Vehicle Noise:	74.7	72.0	70.0	69.3	76.1	76.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	144	309	666	1,436
CNEL:	150	323	695	1,498

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Veterans Wy. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,451 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	345 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	93.02%
Medium Trucks:	70.5%	7.7%	21.8%	2.92%
Heavy Trucks:	59.9%	10.3%	29.9%	4.06%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-6.77	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-21.81	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-20.37	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.3	59.9	57.8	55.8	63.0	63.3
Medium Trucks:	58.3	56.0	52.3	52.1	59.2	59.4
Heavy Trucks:	64.5	61.5	59.8	59.7	66.4	66.6
Vehicle Noise:	67.1	64.4	62.4	61.7	68.5	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	31	67	145	312
CNEL:	33	70	151	325

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Frederick St. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,495 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,349 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.71%
Medium Trucks:	70.5%	7.7%	21.8%	3.00%
Heavy Trucks:	59.9%	10.3%	29.9%	4.30%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.35	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-15.25	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-13.69	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.2	63.8	61.7	59.8	66.9	67.3
Medium Trucks:	62.6	60.3	56.7	56.4	63.5	63.7
Heavy Trucks:	69.4	66.4	64.7	64.6	71.3	71.5
Vehicle Noise:	71.7	68.9	66.9	66.3	73.1	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	71	153	330	712
CNEL:	74	160	345	742

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Graham St. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,758 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	876 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.42%
Medium Trucks:	70.5%	7.7%	21.8%	3.14%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.76	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-17.45	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.94	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.8	63.4	61.3	59.3	66.5	66.8
Medium Trucks:	62.1	59.8	56.2	56.0	63.0	63.3
Heavy Trucks:	68.4	65.4	63.8	63.6	70.3	70.5
Vehicle Noise:	70.9	68.2	66.2	65.5	72.3	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	63	136	293	630
CNEL:	66	142	305	657

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Heacock St. | Job Number: 11743
Road Segment: n/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	18,292 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,829 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.43%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.42%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.44	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-14.23	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.76	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.4	66.0	63.9	61.9	69.1	69.5
Medium Trucks:	64.8	62.4	58.8	58.6	65.7	65.9
Heavy Trucks:	71.0	68.0	66.4	66.2	72.9	73.1
Vehicle Noise:	73.5	70.8	68.8	68.1	75.0	75.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	107	231	497	1,070
CNEL:	112	241	518	1,116

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project | Project Name: K4 Parcel
Road Name: Heacock St. | Job Number: 11743
Road Segment: s/o Cactus Av.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,169 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,417 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.15	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.47	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.03	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.7	66.6	64.6	71.8	72.2
Medium Trucks:	67.5	65.2	61.6	61.4	68.4	68.7
Heavy Trucks:	73.8	70.7	69.1	69.0	75.6	75.9
Vehicle Noise:	76.3	73.5	71.5	70.9	77.7	78.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	163	351	756	1,628
CNEL:	170	366	788	1,698

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Alessandro Bl.
Road Segment: w/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	69,203 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,920 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.35	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.26	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.82	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.1	73.7	71.5	69.6	76.8	77.1
Medium Trucks:	72.1	69.8	66.2	65.9	73.0	73.2
Heavy Trucks:	77.5	74.5	72.9	72.7	79.4	79.6
Vehicle Noise:	80.5	77.9	75.8	75.0	81.9	82.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	372	801	1,726	3,719
CNEL:	388	836	1,802	3,881

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,693 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,869 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.63	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.99	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.55	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.3	72.9	70.8	68.9	76.0	76.4
Medium Trucks:	71.4	69.1	65.5	65.2	72.3	72.5
Heavy Trucks:	76.8	73.8	72.1	72.0	78.7	78.9
Vehicle Noise:	79.8	77.1	75.0	74.3	81.2	81.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	333	717	1,545	3,328
CNEL:	347	748	1,612	3,473

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,377 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,238 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.40%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.42%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.09	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.55	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.11	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.4	71.5	71.9
Medium Trucks:	67.2	64.9	61.3	61.1	68.1	68.4
Heavy Trucks:	73.5	70.4	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.2	71.2	70.6	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	208	449	967	2,082
CNEL:	217	468	1,008	2,172

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,332 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,233 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.34%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.08	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.52	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.08	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.4	71.5	71.9
Medium Trucks:	67.2	64.9	61.3	61.1	68.2	68.4
Heavy Trucks:	73.5	70.5	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.3	71.2	70.6	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	209	450	969	2,089
CNEL:	218	469	1,011	2,178

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	42,193 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,219 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.07	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.54	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-9.10	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.4	66.3	64.3	71.5	71.9
Medium Trucks:	67.2	64.9	61.3	61.1	68.1	68.4
Heavy Trucks:	73.5	70.4	68.8	68.7	75.3	75.6
Vehicle Noise:	76.0	73.2	71.2	70.6	77.4	77.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	208	449	967	2,083
CNEL:	217	468	1,008	2,172

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,727 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,073 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.69	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.92	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.49	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.1	67.7	65.6	63.6	70.8	71.1
Medium Trucks:	66.5	64.2	60.6	60.3	67.4	67.6
Heavy Trucks:	72.7	69.7	68.1	67.9	74.6	74.8
Vehicle Noise:	75.2	72.5	70.5	69.8	76.6	76.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	166	358	772	1,664
CNEL:	174	374	805	1,735

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	53,844 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,384 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.85%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.96%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.65	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.95	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.03	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.8	71.4	69.3	67.3	74.5	74.8
Medium Trucks:	70.0	67.7	64.1	63.9	70.9	71.2
Heavy Trucks:	76.3	73.3	71.6	71.5	78.2	78.4
Vehicle Noise:	78.8	76.1	74.1	73.4	80.3	80.5

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	290	624	1,344	2,895
CNEL:	302	651	1,402	3,020

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	55,151 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,515 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.86%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.95%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.75	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.84	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.93	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	73.9	71.5	69.4	67.4	74.6	74.9
Medium Trucks:	70.1	67.8	64.2	64.0	71.0	71.3
Heavy Trucks:	76.4	73.4	71.7	71.6	78.3	78.5
Vehicle Noise:	78.9	76.2	74.2	73.5	80.4	80.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	294	633	1,364	2,939
CNEL:	307	660	1,423	3,066

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	61,911 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,191 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.46%
Medium Trucks:	70.5%	7.7%	21.8%	3.14%
Heavy Trucks:	59.9%	10.3%	29.9%	4.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.28	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.41	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.95	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.4	72.0	69.9	67.9	75.1	75.5
Medium Trucks:	70.5	68.2	64.6	64.4	71.5	71.7
Heavy Trucks:	76.4	73.4	71.7	71.6	78.2	78.5
Vehicle Noise:	79.2	76.5	74.4	73.7	80.5	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	303	652	1,405	3,027
CNEL:	316	680	1,466	3,158

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,219 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,622 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.46%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.39%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.86	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.82	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.37	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.0	71.6	69.5	67.5	74.7	75.0
Medium Trucks:	70.1	67.8	64.2	64.0	71.0	71.3
Heavy Trucks:	76.0	72.9	71.3	71.2	77.8	78.1
Vehicle Noise:	78.7	76.0	74.0	73.3	80.1	80.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	284	611	1,317	2,838
CNEL:	296	638	1,374	2,961

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	34,488 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,449 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.42%
Medium Trucks:	70.5%	7.7%	21.8%	3.17%
Heavy Trucks:	59.9%	10.3%	29.9%	4.41%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	2.74	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-11.91	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-10.47	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.9	69.5	67.4	65.4	72.6	72.9
Medium Trucks:	68.0	65.7	62.1	61.9	69.0	69.2
Heavy Trucks:	73.9	70.8	69.2	69.1	75.7	76.0
Vehicle Noise:	76.6	73.9	71.9	71.2	78.0	78.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	205	442	953	2,053
CNEL:	214	461	994	2,142

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: OY 2023 With Project
Road Name: Van Buren Bl.
Road Segment: w/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	60,529 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,053 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.34%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	4.76	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.83	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-8.40	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.5	73.1	71.0	69.0	76.2	76.5
Medium Trucks:	71.5	69.2	65.6	65.4	72.4	72.7
Heavy Trucks:	76.9	73.9	72.3	72.2	78.8	79.1
Vehicle Noise:	80.0	77.3	75.2	74.4	81.3	81.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	340	733	1,580	3,404
CNEL:	355	765	1,649	3,553

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: n/o Trautwein Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	101,536 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10,154 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	7.42	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-7.15	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-5.72	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.4	74.0	71.8	69.9	77.1	77.4
Medium Trucks:	72.6	70.3	66.7	66.4	73.5	73.8
Heavy Trucks:	78.4	75.4	73.8	73.6	80.3	80.5
Vehicle Noise:	81.2	78.5	76.4	75.7	82.6	82.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	378	814	1,753	3,777
CNEL:	394	849	1,829	3,941

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Meridian Pkwy.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,219 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,222 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.90	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-11.68	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.24	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.9	67.5	65.4	63.5	70.6	71.0
Medium Trucks:	66.4	64.1	60.5	60.2	67.3	67.5
Heavy Trucks:	72.6	69.6	68.0	67.8	74.5	74.7
Vehicle Noise:	75.1	72.4	70.4	69.7	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	153	329	709	1,527
CNEL:	159	343	739	1,593

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Veterans Wy.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,443 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	344 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-6.82	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-21.39	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-19.96	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.2	59.8	57.7	55.7	62.9	63.3
Medium Trucks:	58.7	56.4	52.8	52.5	59.6	59.8
Heavy Trucks:	64.9	61.9	60.3	60.1	66.8	67.0
Vehicle Noise:	67.4	64.7	62.6	62.0	68.8	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	70	151	326
CNEL:	34	73	158	340

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Frederick St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	13,696 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,370 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	-0.31	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-14.88	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-13.45	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.3	63.9	61.8	59.8	67.0	67.3
Medium Trucks:	62.9	60.6	57.0	56.8	63.9	64.1
Heavy Trucks:	69.7	66.6	65.0	64.9	71.5	71.8
Vehicle Noise:	71.9	69.1	67.1	66.5	73.3	73.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	74	158	341	736
CNEL:	77	165	356	767

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Graham St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	9,944 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	994 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.21	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-16.79	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.35	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.3	63.9	61.8	59.8	67.0	67.4
Medium Trucks:	62.8	60.5	56.9	56.6	63.7	63.9
Heavy Trucks:	69.0	66.0	64.3	64.2	70.9	71.1
Vehicle Noise:	71.5	68.8	66.7	66.1	72.9	73.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	69	149	320	690
CNEL:	72	155	334	719

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Heacock St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,639 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,964 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.75	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-13.83	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.39	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.7	66.3	64.2	62.2	69.4	69.8
Medium Trucks:	65.2	62.8	59.2	59.0	66.1	66.3
Heavy Trucks:	71.4	68.4	66.7	66.6	73.3	73.5
Vehicle Noise:	73.9	71.2	69.1	68.5	75.3	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	113	243	524	1,130
CNEL:	118	254	547	1,178

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Heacock St.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,167 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,717 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.52	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.06	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-9.62	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.1	67.0	65.0	72.2	72.5
Medium Trucks:	67.9	65.6	62.0	61.8	68.8	69.1
Heavy Trucks:	74.2	71.1	69.5	69.4	76.0	76.3
Vehicle Noise:	76.7	73.9	71.9	71.2	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	173	372	802	1,729
CNEL:	180	388	837	1,803

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: w/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,194 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,019 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.41	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.17	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.73	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.1	73.7	71.6	69.6	76.8	77.2
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	77.6	74.6	73.0	72.8	79.5	79.7
Vehicle Noise:	80.6	77.9	75.8	75.1	82.0	82.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	376	811	1,748	3,765
CNEL:	393	846	1,824	3,929

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,194 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,019 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.41	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.17	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.73	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.1	73.7	71.6	69.6	76.8	77.2
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	77.6	74.6	73.0	72.8	79.5	79.7
Vehicle Noise:	80.6	77.9	75.8	75.1	82.0	82.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	376	811	1,748	3,765
CNEL:	393	846	1,824	3,929

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	44,657 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,466 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.31	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.26	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.83	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.7	66.6	64.6	71.8	72.1
Medium Trucks:	67.5	65.2	61.6	61.3	68.4	68.6
Heavy Trucks:	73.7	70.7	69.1	68.9	75.6	75.9
Vehicle Noise:	76.2	73.5	71.5	70.8	77.7	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	217	467	1,007	2,170
CNEL:	226	487	1,050	2,263

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,330 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,633 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.47	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.10	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.67	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	68.8	66.7	64.7	71.9	72.3
Medium Trucks:	67.7	65.3	61.7	61.5	68.6	68.8
Heavy Trucks:	73.9	70.9	69.2	69.1	75.8	76.0
Vehicle Noise:	76.4	73.7	71.6	71.0	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	222	479	1,032	2,223
CNEL:	232	500	1,076	2,319

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,117 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,612 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.45	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.12	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.69	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	68.8	66.7	64.7	71.9	72.2
Medium Trucks:	67.6	65.3	61.7	61.5	68.6	68.8
Heavy Trucks:	73.9	70.9	69.2	69.1	75.7	76.0
Vehicle Noise:	76.4	73.7	71.6	71.0	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	222	478	1,029	2,217
CNEL:	231	498	1,073	2,312

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,505 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,351 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.07	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.51	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.07	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.1	65.9	64.0	71.2	71.5
Medium Trucks:	66.9	64.6	61.0	60.7	67.8	68.0
Heavy Trucks:	73.1	70.1	68.5	68.3	75.0	75.2
Vehicle Noise:	75.6	72.9	70.9	70.2	77.0	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	177	381	822	1,770
CNEL:	185	398	857	1,846

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	56,065 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,607 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.84	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.73	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.30	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.0	71.6	69.5	67.5	74.7	75.0
Medium Trucks:	70.2	67.9	64.3	64.1	71.1	71.4
Heavy Trucks:	76.0	73.0	71.4	71.2	77.9	78.2
Vehicle Noise:	78.8	76.1	74.0	73.3	80.2	80.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	286	616	1,327	2,859
CNEL:	298	643	1,384	2,982

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	57,503 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,750 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	4.95	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.62	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-8.19	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.1	71.7	69.6	67.6	74.8	75.1
Medium Trucks:	70.3	68.0	64.4	64.2	71.2	71.5
Heavy Trucks:	76.1	73.1	71.5	71.4	78.0	78.3
Vehicle Noise:	78.9	76.2	74.1	73.4	80.3	80.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	291	626	1,349	2,907
CNEL:	303	653	1,408	3,033

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	66,305 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,631 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.57	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.00	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.57	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.7	72.3	70.2	68.2	75.4	75.7
Medium Trucks:	70.9	68.6	65.0	64.8	71.9	72.1
Heavy Trucks:	76.8	73.7	72.1	72.0	78.6	78.9
Vehicle Noise:	79.5	76.8	74.8	74.0	80.9	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	320	689	1,484	3,197
CNEL:	334	719	1,548	3,335

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	60,350 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,035 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.16	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.41	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.98	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.3	71.9	69.8	67.8	75.0	75.3
Medium Trucks:	70.5	68.2	64.6	64.4	71.5	71.7
Heavy Trucks:	76.4	73.3	71.7	71.6	78.2	78.5
Vehicle Noise:	79.1	76.4	74.3	73.6	80.5	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	300	647	1,394	3,003
CNEL:	313	675	1,454	3,133

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,348 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,735 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	3.08	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-11.50	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-10.06	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	69.8	67.7	65.7	72.9	73.3
Medium Trucks:	68.5	66.1	62.5	62.3	69.4	69.6
Heavy Trucks:	74.3	71.2	69.6	69.5	76.1	76.4
Vehicle Noise:	77.0	74.3	72.3	71.6	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	218	470	1,012	2,181
CNEL:	227	490	1,056	2,275

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 Without Project
Road Name: Van Buren Bl.
Road Segment: w/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	66,287 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,629 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.30%
Medium Trucks:	70.5%	7.7%	21.8%	3.22%
Heavy Trucks:	59.9%	10.3%	29.9%	4.48%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.16	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.42	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.98	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	75.9	73.5	71.4	69.4	76.6	76.9
Medium Trucks:	71.9	69.6	66.0	65.8	72.9	73.1
Heavy Trucks:	77.4	74.3	72.7	72.6	79.2	79.5
Vehicle Noise:	80.4	77.7	75.6	74.9	81.7	82.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	362	781	1,682	3,624
CNEL:	378	815	1,755	3,782

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: n/o Trautwein Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	101,857 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	10,186 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	55.0 feet
Centerline Dist. to Observer:	55.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.33%
Medium Trucks:	70.5%	7.7%	21.8%	3.21%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	49.739
Medium Trucks:	49.561
Heavy Trucks:	49.578

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	7.44	-0.07	-1.20	-4.67	0.000	0.000
Medium Trucks:	81.00	-7.15	-0.05	-1.20	-4.87	0.000	0.000
Heavy Trucks:	85.38	-5.72	-0.05	-1.20	-5.38	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.4	74.0	71.9	69.9	77.1	77.4
Medium Trucks:	72.6	70.3	66.7	66.4	73.5	73.8
Heavy Trucks:	78.4	75.4	73.8	73.6	80.3	80.5
Vehicle Noise:	81.2	78.5	76.4	75.7	82.6	82.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	378	814	1,754	3,780
CNEL:	394	850	1,830	3,943

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Meridian Pkwy.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	32,487 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,249 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	56.0 feet
Centerline Dist. to Observer:	56.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	50.843
Medium Trucks:	50.669
Heavy Trucks:	50.686

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.93	-0.21	-1.20	-4.67	0.000	0.000
Medium Trucks:	79.45	-11.68	-0.19	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-10.24	-0.19	-1.20	-5.37	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	67.6	65.5	63.5	70.7	71.0
Medium Trucks:	66.4	64.1	60.5	60.2	67.3	67.5
Heavy Trucks:	72.6	69.6	68.0	67.8	74.5	74.7
Vehicle Noise:	75.1	72.4	70.4	69.7	76.5	76.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	153	330	710	1,530
CNEL:	160	344	741	1,595

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Veterans Wy.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	3,764 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	376 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	24 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	39.0 feet
Centerline Dist. to Observer:	39.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.96%
Medium Trucks:	70.5%	7.7%	21.8%	2.94%
Heavy Trucks:	59.9%	10.3%	29.9%	4.10%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	37.443
Medium Trucks:	37.206
Heavy Trucks:	37.229

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-6.40	1.78	-1.20	-4.58	0.000	0.000
Medium Trucks:	79.45	-21.39	1.82	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-19.96	1.82	-1.20	-5.57	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	60.2	58.1	56.2	63.3	63.7
Medium Trucks:	58.7	56.4	52.8	52.5	59.6	59.8
Heavy Trucks:	64.9	61.9	60.3	60.1	66.8	67.0
Vehicle Noise:	67.5	64.8	62.8	62.1	68.9	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	71	154	332
CNEL:	35	75	161	346

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Frederick St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,740 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,474 vehicles
Vehicle Speed:	40 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.67%
Medium Trucks:	70.5%	7.7%	21.8%	3.02%
Heavy Trucks:	59.9%	10.3%	29.9%	4.31%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	66.51	0.03	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	77.72	-14.84	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	82.99	-13.30	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.6	64.2	62.1	60.1	67.3	67.7
Medium Trucks:	63.0	60.7	57.1	56.8	63.9	64.1
Heavy Trucks:	69.8	66.8	65.1	65.0	71.7	71.9
Vehicle Noise:	72.1	69.3	67.3	66.7	73.5	73.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	76	163	351	757
CNEL:	79	170	366	789

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Graham St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,223 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,022 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	44.0 feet
Centerline Dist. to Observer:	44.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.41%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	40.460
Medium Trucks:	40.241
Heavy Trucks:	40.262

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.08	1.28	-1.20	-4.61	0.000	0.000
Medium Trucks:	79.45	-16.76	1.31	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-15.26	1.31	-1.20	-5.50	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.5	64.1	61.9	60.0	67.2	67.5
Medium Trucks:	62.8	60.5	56.9	56.6	63.7	64.0
Heavy Trucks:	69.1	66.1	64.4	64.3	71.0	71.2
Vehicle Noise:	71.6	68.9	66.8	66.2	73.0	73.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	151	325	699
CNEL:	73	157	339	729

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Heacock St.
Road Segment: n/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,078 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,008 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.42%
Medium Trucks:	70.5%	7.7%	21.8%	3.16%
Heavy Trucks:	59.9%	10.3%	29.9%	4.43%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.85	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-13.82	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-12.35	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.8	66.4	64.3	62.3	69.5	69.9
Medium Trucks:	65.2	62.9	59.3	59.0	66.1	66.3
Heavy Trucks:	71.4	68.4	66.8	66.6	73.3	73.6
Vehicle Noise:	73.9	71.2	69.2	68.5	75.4	75.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	114	246	529	1,140
CNEL:	119	256	552	1,189

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Heacock St.
Road Segment: s/o Cactus Av.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,547 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,755 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	48 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	50.0 feet
Centerline Dist. to Observer:	50.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.37%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	44.147
Medium Trucks:	43.947
Heavy Trucks:	43.966

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.56	0.71	-1.20	-4.65	0.000	0.000
Medium Trucks:	79.45	-11.06	0.74	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-9.61	0.73	-1.20	-5.43	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.5	69.1	67.0	65.1	72.2	72.6
Medium Trucks:	67.9	65.6	62.0	61.8	68.8	69.1
Heavy Trucks:	74.2	71.2	69.5	69.4	76.0	76.3
Vehicle Noise:	76.7	74.0	71.9	71.3	78.1	78.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	173	374	805	1,734
CNEL:	181	390	839	1,808

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: w/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,622 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,062 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.43	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.17	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.73	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.1	73.7	71.6	69.7	76.8	77.2
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	77.6	74.6	73.0	72.8	79.5	79.7
Vehicle Noise:	80.6	77.9	75.9	75.1	82.0	82.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	377	812	1,750	3,770
CNEL:	393	848	1,826	3,934

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Barton St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	70,730 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	7,073 vehicles
Vehicle Speed:	55 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.36%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	71.78	5.44	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	82.40	-9.17	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	86.40	-7.73	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	76.2	73.8	71.6	69.7	76.9	77.2
Medium Trucks:	72.2	69.9	66.3	66.0	73.1	73.3
Heavy Trucks:	77.6	74.6	73.0	72.8	79.5	79.7
Vehicle Noise:	80.6	77.9	75.9	75.1	82.0	82.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	377	812	1,750	3,771
CNEL:	394	848	1,827	3,936

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	45,193 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,519 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.39%
Medium Trucks:	70.5%	7.7%	21.8%	3.18%
Heavy Trucks:	59.9%	10.3%	29.9%	4.43%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.37	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.26	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.83	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	68.7	66.6	64.6	71.8	72.2
Medium Trucks:	67.5	65.2	61.6	61.3	68.4	68.6
Heavy Trucks:	73.7	70.7	69.1	68.9	75.6	75.9
Vehicle Noise:	76.3	73.5	71.5	70.8	77.7	77.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	217	468	1,009	2,174
CNEL:	227	489	1,053	2,268

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: w/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,544 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,654 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.34%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.49	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.10	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.67	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	68.9	66.7	64.8	71.9	72.3
Medium Trucks:	67.7	65.3	61.7	61.5	68.6	68.8
Heavy Trucks:	73.9	70.9	69.2	69.1	75.8	76.0
Vehicle Noise:	76.4	73.7	71.6	71.0	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	223	479	1,033	2,225
CNEL:	232	500	1,077	2,321

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Alessandro Bl.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	46,385 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	4,638 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	82 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	67.0 feet
Centerline Dist. to Observer:	67.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.35%
Medium Trucks:	70.5%	7.7%	21.8%	3.20%
Heavy Trucks:	59.9%	10.3%	29.9%	4.45%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	53.226
Medium Trucks:	53.059
Heavy Trucks:	53.076

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	4.48	-0.51	-1.20	-4.71	0.000	0.000
Medium Trucks:	79.45	-10.12	-0.49	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-8.69	-0.49	-1.20	-5.29	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.2	68.8	66.7	64.8	71.9	72.3
Medium Trucks:	67.6	65.3	61.7	61.5	68.6	68.8
Heavy Trucks:	73.9	70.9	69.2	69.1	75.7	76.0
Vehicle Noise:	76.4	73.7	71.6	71.0	77.8	78.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	222	478	1,030	2,219
CNEL:	231	499	1,074	2,314

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: e/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,773 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,377 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.36%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.44%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.10	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	79.45	-11.51	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-10.07	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.5	68.1	66.0	64.0	71.2	71.5
Medium Trucks:	66.9	64.6	61.0	60.7	67.8	68.0
Heavy Trucks:	73.1	70.1	68.5	68.3	75.0	75.2
Vehicle Noise:	75.6	72.9	70.9	70.2	77.1	77.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	177	382	823	1,773
CNEL:	185	398	858	1,849

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: e/o Old Frontage Rd.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	58,940 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	5,894 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.89%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.92%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.04	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.55	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.67	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.2	71.8	69.7	67.7	74.9	75.2
Medium Trucks:	70.4	68.1	64.5	64.2	71.3	71.6
Heavy Trucks:	76.7	73.6	72.0	71.9	78.5	78.8
Vehicle Noise:	79.2	76.5	74.5	73.8	80.6	80.9

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	306	660	1,423	3,065
CNEL:	320	689	1,484	3,197

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: w/o Veterans Wy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	60,378 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,038 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	91.90%
Medium Trucks:	70.5%	7.7%	21.8%	3.19%
Heavy Trucks:	59.9%	10.3%	29.9%	4.91%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.15	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.45	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.58	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.3	71.9	69.8	67.8	75.0	75.3
Medium Trucks:	70.5	68.2	64.6	64.4	71.4	71.7
Heavy Trucks:	76.8	73.7	72.1	72.0	78.6	78.9
Vehicle Noise:	79.3	76.6	74.6	73.9	80.7	81.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	311	670	1,444	3,112
CNEL:	325	699	1,507	3,246

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: e/o Frederick St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	67,938 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,794 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.45%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.69	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.00	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.54	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.8	72.4	70.3	68.3	75.5	75.9
Medium Trucks:	71.0	68.6	65.0	64.8	71.9	72.1
Heavy Trucks:	76.8	73.8	72.1	72.0	78.7	78.9
Vehicle Noise:	79.6	76.9	74.8	74.1	81.0	81.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	322	694	1,496	3,223
CNEL:	336	724	1,561	3,362

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: e/o Graham St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	61,705 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	6,171 vehicles
Vehicle Speed:	50 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	60.0 feet
Centerline Dist. to Observer:	60.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	69.1%	10.6%	20.2%	92.45%
Medium Trucks:	70.5%	7.7%	21.8%	3.15%
Heavy Trucks:	59.9%	10.3%	29.9%	4.40%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	Grade Adjustment:	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	70.20	5.27	0.13	-1.20	-4.69	0.000	0.000
Medium Trucks:	81.00	-9.41	0.15	-1.20	-4.88	0.000	0.000
Heavy Trucks:	85.38	-7.96	0.15	-1.20	-5.34	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	74.4	72.0	69.9	67.9	75.1	75.4
Medium Trucks:	70.5	68.2	64.6	64.4	71.5	71.7
Heavy Trucks:	76.4	73.4	71.7	71.6	78.2	78.5
Vehicle Noise:	79.2	76.5	74.4	73.7	80.5	80.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	302	651	1,403	3,022
CNEL:	315	679	1,464	3,153

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Cactus Av.
Road Segment: e/o Heacock St.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	37,884	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	3,788	vehicles
Vehicle Speed:	50	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	10.6%	20.2%	92.41%
Medium Trucks:	70.5%	7.7%	21.8%	3.17%
Heavy Trucks:	59.9%	10.3%	29.9%	4.42%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	70.20	3.15	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	81.00	-11.50	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	85.38	-10.06	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	72.3	69.9	67.8	65.8	73.0	73.3
Medium Trucks:	68.5	66.1	62.5	62.3	69.4	69.6
Heavy Trucks:	74.3	71.2	69.6	69.5	76.1	76.4
Vehicle Noise:	77.0	74.3	72.3	71.6	78.4	78.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	219	471	1,015	2,187
CNEL:	228	492	1,059	2,282

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FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: HY 2040 With Project
Road Name: Van Buren Bl.
Road Segment: w/o Meridian Pkwy.
Project Name: K4 Parcel
Job Number: 11743

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	66,555	vehicles
Peak Hour Percentage:	10%	
Peak Hour Volume:	6,655	vehicles
Vehicle Speed:	55	mph
Near/Far Lane Distance:	72	feet

Site Data

Barrier Height:	**0.0**	**feet**
Barrier Type (0-Wall, 1-Berm):	0.0	
Centerline Dist. to Barrier:	60.0	feet
Centerline Dist. to Observer:	60.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Height (Above Pad):	5.0	feet
Pad Elevation:	0.0	feet
Road Elevation:	0.0	feet
Road Grade:	0.0%	
Left View:	-90.0	degrees
Right View:	90.0	degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	69.1%	10.6%	20.2%	92.33%
Medium Trucks:	70.5%	7.7%	21.8%	3.21%
Heavy Trucks:	59.9%	10.3%	29.9%	4.46%

Noise Source Elevations (in feet)

Autos:	0.000		
Medium Trucks:	2.297		
Heavy Trucks:	8.004	*Grade Adjustment:*	0.0

Lane Equivalent Distance (in feet)

Autos:	48.260
Medium Trucks:	48.076
Heavy Trucks:	48.094

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	71.78	5.18	0.13	-1.20	*-4.69*	0.000	0.000
Medium Trucks:	82.40	-9.42	0.15	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	86.40	-7.98	0.15	-1.20	*-5.34*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	75.9	73.5	71.4	69.4	76.6	76.9
Medium Trucks:	71.9	69.6	66.0	65.8	72.9	73.1
Heavy Trucks:	77.4	74.3	72.7	72.6	79.2	79.5
Vehicle Noise:	80.4	77.7	75.6	74.9	81.7	82.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	363	781	1,684	3,627
CNEL:	379	816	1,757	3,785

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APPENDIX 9.1:

OPERATIONAL STATIONARY-SOURCE NOISE CALCULATIONS

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STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R1** *Project Name:* K4 Parcel
Source: Unloading/Docking Activity *Job Number:* 11743
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	335.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	335.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	335.0	-21.0	-21.0	-21.0	-21.0	-21.0	-21.0
Shielding (Barrier Attenuation)	335.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		46.2	-21.0	-21.0	-21.0	-21.0	-21.0
60 Minute Hourly Adjustment		**46.2**	**-21.0**	**-21.0**	**-21.0**	**-21.0**	**-21.0**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R1** *Project Name:* K4 Parcel
Source: Roof-Top Air Conditioning Unit *Job Number:* 11743
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	458.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	458.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	458.0	-39.2	-39.2	-39.2	-39.2	-39.2	-39.2
Shielding (Barrier Attenuation)	458.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		38.0	-39.2	-39.2	-39.2	-39.2	-39.2
39 Minute Hourly Adjustment		**36.1**	**-41.1**	**-41.1**	**-41.1**	**-41.1**	**-41.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R1** *Project Name:* K4 Parcel
Source: Parking Lot Vehicle Movements *Job Number:* 11743
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	408.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	408.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	408.0	-24.2	-24.2	-24.2	-24.2	-24.2	-24.2
Shielding (Barrier Attenuation)	408.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		28.0	-24.2	-24.2	-24.2	-24.2	-24.2
60 Minute Hourly Adjustment		**28.0**	**-24.2**	**-24.2**	**-24.2**	**-24.2**	**-24.2**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R2** *Project Name:* K4 Parcel
Source: Unloading/Docking Activity *Job Number:* 11743
Condition: Operational *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	540.0 feet	***Barrier Height:***	**30.0 feet**
Noise Distance to Barrier:	10.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	530.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	540.0	-25.1	-25.1	-25.1	-25.1	-25.1	-25.1
Shielding (Barrier Attenuation)	10.0	-17.6	-17.6	-17.6	-17.6	-17.6	-17.6
Raw (Distance + Barrier)		24.5	-42.7	-42.7	-42.7	-42.7	-42.7
60 Minute Hourly Adjustment		**24.5**	**-42.7**	**-42.7**	**-42.7**	**-42.7**	**-42.7**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R2**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	568.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	568.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	568.0	-41.1	-41.1	-41.1	-41.1	-41.1	-41.1
Shielding (Barrier Attenuation)	568.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		36.1	-41.1	-41.1	-41.1	-41.1	-41.1
39 Minute Hourly Adjustment		**34.2**	**-43.0**	**-43.0**	**-43.0**	**-43.0**	**-43.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	317.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	317.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	317.0	-22.5	-22.5	-22.5	-22.5	-22.5	-22.5
Shielding (Barrier Attenuation)	317.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.7	-22.5	-22.5	-22.5	-22.5	-22.5
60 Minute Hourly Adjustment		**29.7**	**-22.5**	**-22.5**	**-22.5**	**-22.5**	**-22.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R3**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	811.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	811.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	811.0	-28.6	-28.6	-28.6	-28.6	-28.6	-28.6
Shielding (Barrier Attenuation)	811.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		38.6	-28.6	-28.6	-28.6	-28.6	-28.6
60 Minute Hourly Adjustment		**38.6**	**-28.6**	**-28.6**	**-28.6**	**-28.6**	**-28.6**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R3**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,021.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,021.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,021.0	-46.2	-46.2	-46.2	-46.2	-46.2	-46.2
Shielding (Barrier Attenuation)	1,021.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		31.0	-46.2	-46.2	-46.2	-46.2	-46.2
39 Minute Hourly Adjustment		**29.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**	**-48.1**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R3**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,046.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,046.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,046.0	-30.3	-30.3	-30.3	-30.3	-30.3	-30.3
Shielding (Barrier Attenuation)	1,046.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		21.9	-30.3	-30.3	-30.3	-30.3	-30.3
60 Minute Hourly Adjustment		**21.9**	**-30.3**	**-30.3**	**-30.3**	**-30.3**	**-30.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R4**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,262.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,262.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,262.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	2,262.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.7	-37.5	-37.5	-37.5	-37.5	-37.5
60 Minute Hourly Adjustment		**29.7**	**-37.5**	**-37.5**	**-37.5**	**-37.5**	**-37.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R4**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,673.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,673.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0	feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,673.0	-54.6	-54.6	-54.6	-54.6	-54.6	-54.6
Shielding (Barrier Attenuation)	2,673.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		22.6	-54.6	-54.6	-54.6	-54.6	-54.6
39 Minute Hourly Adjustment		**20.7**	**-56.5**	**-56.5**	**-56.5**	**-56.5**	**-56.5**

STATIONARY SOURCE NOISE PREDICTION MODEL 12/5/2018

Observer Location: **R4**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	2,250.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	2,250.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	2,250.0	-35.3	-35.3	-35.3	-35.3	-35.3	-35.3
Shielding (Barrier Attenuation)	2,250.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		16.9	-35.3	-35.3	-35.3	-35.3	-35.3
60 Minute Hourly Adjustment		**16.9**	**-35.3**	**-35.3**	**-35.3**	**-35.3**	**-35.3**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R5**
Source: Unloading/Docking Activity
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	935.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	935.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	30.0	67.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	935.0	-29.9	-29.9	-29.9	-29.9	-29.9	-29.9
Shielding (Barrier Attenuation)	935.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		37.3	-29.9	-29.9	-29.9	-29.9	-29.9
60 Minute Hourly Adjustment		**37.3**	**-29.9**	**-29.9**	**-29.9**	**-29.9**	**-29.9**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R5**
Source: Roof-Top Air Conditioning Unit
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,237.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,237.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	30.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,237.0	-47.9	-47.9	-47.9	-47.9	-47.9	-47.9
Shielding (Barrier Attenuation)	1,237.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		29.3	-47.9	-47.9	-47.9	-47.9	-47.9
39 Minute Hourly Adjustment		**27.4**	**-49.8**	**-49.8**	**-49.8**	**-49.8**	**-49.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

12/5/2018

Observer Location: **R5**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: K4 Parcel
Job Number: 11743
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	738.0	feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	738.0	feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0	feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0	feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0	feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0	feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	10.0	52.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	738.0	-28.0	-28.0	-28.0	-28.0	-28.0	-28.0
Shielding (Barrier Attenuation)	738.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		24.2	-28.0	-28.0	-28.0	-28.0	-28.0
60 Minute Hourly Adjustment		**24.2**	**-28.0**	**-28.0**	**-28.0**	**-28.0**	**-28.0**

K4 Parcel

TRAFFIC IMPACT ANALYSIS

MARCH JOINT POWERS AUTHORITY (MARCH JPA)

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
E+P	Existing Plus Project
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
LOS	Level of Service
March JPA	March Joint Powers Authority
MOE	Measures of Effectiveness
MUTCD	Manual on Uniform Traffic Control Devices
NP	No Project (or Without Project)
PCE	Passenger Car Equivalents
PeMS	Caltrans Performance Measurement System
PHF	Peak Hour Factor
Project	K4 Parcel
RCALUC	Riverside County Airport Land Use Commission
RCTC	Riverside County Transportation Commission
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SHS	State Highway System
sf	Square Feet
SPA	Specific Plan Update
TIA	Traffic Impact Analysis
TOD	Transit-Oriented Development
TSF	Thousand Square Feet
TUMF	Transportation Uniform Mitigation Fee
v/c	Volume-to-capacity
WP	With Project
WRCOG	Western Riverside Council of Governments

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1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) prepared for the proposed K4 Parcel ("Project"), which is located on the south side of Cactus Avenue between Veterans Way and Frederick Street, within the jurisdiction of the March Joint Powers Authority (March JPA) as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential circulation system deficiencies that could result from the development of the proposed Project, and if necessary to recommend mitigation to achieve acceptable circulation system performance. As directed by March JPA staff, this traffic study has been prepared in accordance with the March JPA *Final Traffic Impact Study Preparation Guide* (August 3, 2011), the California Department of Transportation (Caltrans) *Guide for the Preparation of Traffic Impact Studies* (December 2002), and consultation with March JPA and City of Moreno Valley staff during the scoping process. (1) (2) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

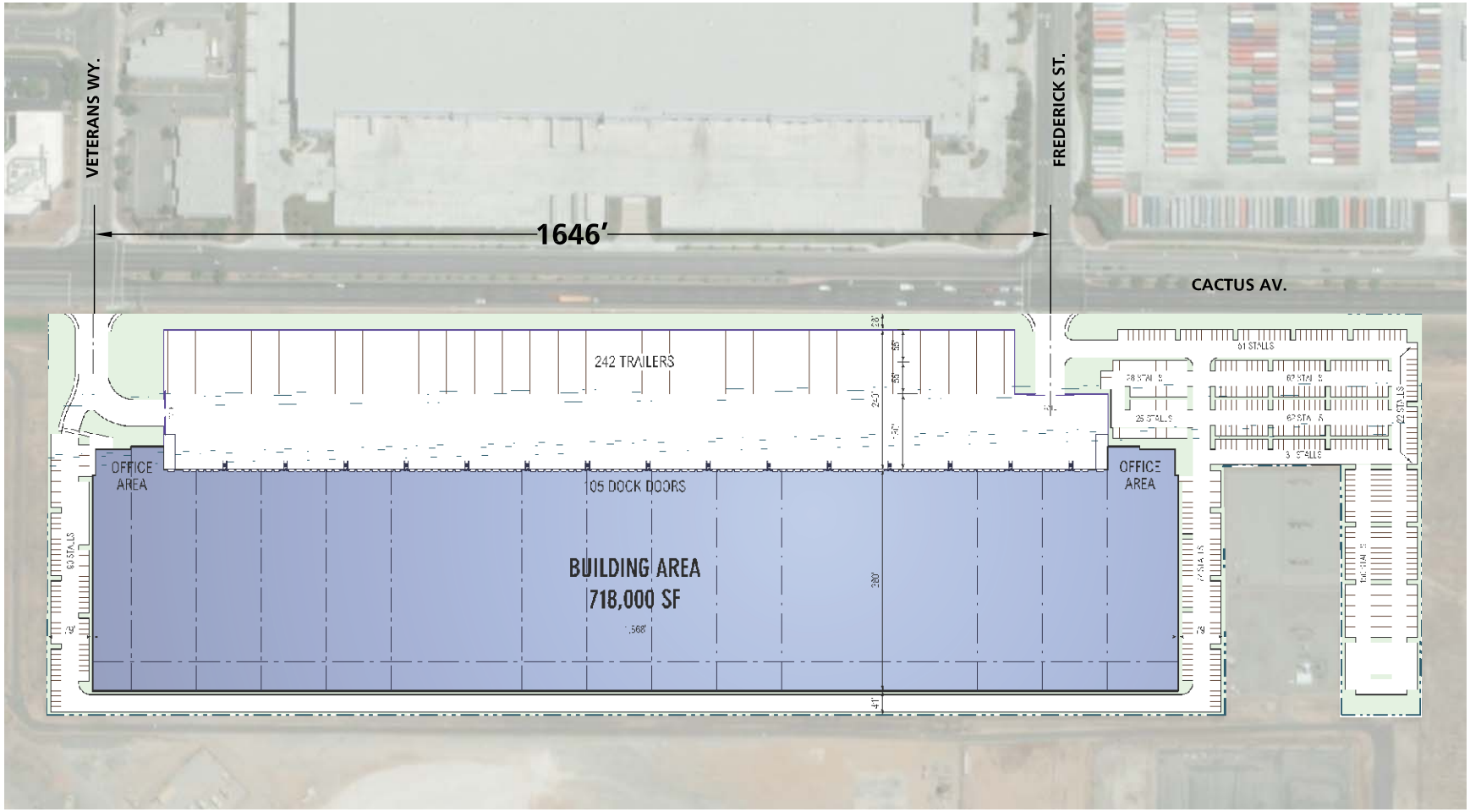
1.1 PROJECT DESCRIPTION

The proposed Project involves the development of the approximately 35.4-acre site with a 718,000 square foot High-Cube Warehouse building (see Exhibit 1-1). A total of 598 automobile parking stalls and 242 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. Vehicles would access the Project site via Cactus Avenue, a designated truck route, and new driveways aligned with the termination of Veterans Way on the west end of the Project site and the terminus of Frederick Street towards the eastern end of the Project site. Once constructed, the Project site would be used up to 7 days per week and 24 hours per day.

Additionally, the Project would include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The current drainage ditch is planned to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District and the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan.

The High-Cube Fulfillment Center Warehouse use has been analyzed in the TIA as it represents the worst-case scenario in terms of traffic generation. Similar land uses such as High-Cube Transload and Short-Term Storage Warehouse would generate fewer trips with the same square footage.

EXHIBIT 1-1: PRELIMINARY SITE PLAN



Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition, 2017. (3) The Project is estimated to generate a net total of 5,873 trip-ends per day (in actual vehicles) with 425 AM peak hour trips and 983 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in Section 4.1 *Project Trip Generation* of this report.

The ITE Trip Generation Manual (2017) trip generation rates for high-cube fulfillment center use (ITE land use code 155) are based on limited data (i.e., one to two surveyed sites) and the ITE Trip Generation Manual recommends the use of local data sources where available. As such, Project trip generation has been calculated based on the trip-generation statistics published in the TUMF High-Cube Warehouse Trip Generation Study (WSP, January 29, 2019) which was commissioned by Western Riverside Council of Governments (WRCOG) in support of the Transportation Uniform Mitigation Fee (TUMF) update WRCOG TUMF High-Cube Warehouse Trip Generation Study). The WRCOG trip generation rates are based on data collected at 11 local high-cube fulfillment center sites in Riverside and San Bernardino Counties. This is the exact type of local data source that the ITE Manual recommends be used. The WRCOG TUMF High-Cube Warehouse Trip Generation Study was not adopted by WRCOG when the data for this report was prepared but going forward it will be the more appropriate rate to use to study warehouse uses in the region. As shown in Table 4-3, using the ITE land use code 155 generates far more trips than using the WRCOG rates. The WRCOG data is far more accurate for estimating the number of trips that the proposed Project will generate. The proposed Project's impacts were conservatively analyzed using the ITE land use code 155 which vastly overstates the proposed project's contribution to traffic, as well as impacts from traffic such as air quality, noise, greenhouse gas, and health risks.

1.2 ANALYSIS SCENARIOS

For the purposes of this traffic study, potential impacts to traffic and circulation have been assessed for each of the following conditions:

- Existing (2018)
- Existing plus Project (E+P)
- Opening Year Cumulative (2023) Without Project
- Opening Year Cumulative (2023) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.2.1 EXISTING (2018) CONDITIONS

Information for Existing (2018) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

Consistent with the March JPA traffic study guidelines, the Existing Plus Project (E+P) analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions. The E+P analysis is intended to identify the project-specific traffic impacts associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing conditions. As such, E+P traffic conditions were evaluated for each phase of development to determine the project-specific traffic impacts associated with each phase.

1.2.3 OPENING YEAR CUMULATIVE CONDITIONS

To account for growth in traffic between Existing Conditions (2018) and the Project Opening Year Cumulative (2023)[1], a compounded annual traffic growth rate of 2.0 percent was assumed (10.41 percent aggregate growth in background traffic for the period from 2018 through 2023). The 2.0 percent annual growth rate is intended to capture non-specific ambient traffic growth. Conservatively, the TIA estimates area-wide traffic growth, then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed annual 2.0 percent ambient growth in traffic noted above; and in some instances, these related projects would likely not be implemented and operational within the 2023 Opening Year Cumulative time frame assumed for the Project. The resulting traffic growth rate used in the TIA (2.0 percent compounded annual ambient growth plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic impacts under 2023 traffic conditions.

1.2.4 HORIZON YEAR (2040) CONDITIONS

The Horizon Year (2040) Without Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions. The Horizon Year With Project traffic forecasts were determined by adding the Project traffic to the Horizon Year Without Project traffic forecasts from the RivTAM model. The Horizon Year traffic forecasts used in the traffic analysis were refined with existing peak hour traffic count data collected at intersection analysis locations. The initial estimate of the future peak hour turning movements have, therefore, been reviewed for reasonableness. The reasonableness checks performed include a review of traffic flow conservation in addition to a comparison with the Existing and Opening Year Cumulative traffic volumes. Where necessary, the Horizon Year volumes have been adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes.

The Horizon Year Without and With Project traffic conditions analyses will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the Transportation Uniform Mitigation Fee (TUMF) and Development Impact Fee (DIF) programs, or

[1] The opening year for the project is 2020. However, 2023 is used as the opening year for the purposes of traffic analysis as per City of Moreno Valley's policy of minimum 5 years of growth as stated in the Traffic Impact Analysis Preparation Guide (August 2007) Exhibit B Section V.

other approved funding mechanism can accommodate the long-range cumulative traffic at the target Level of Service (LOS) identified in the March JPA General Plan. (4) If the "funded" improvements can provide the target LOS, then the Project's payment into TUMF and/or DIF will be considered as long-range cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) are identified as such. Post-processing worksheets for Horizon Year (2040) Without Project traffic conditions are provided in Appendix 4.1.

1.3 STUDY AREA

To ensure that this TIA satisfies the March JPA's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by March JPA staff and their traffic consultant prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The Agreement approved by the March JPA is included in Appendix 1.1.

1.3.1 INTERSECTIONS

The following 25 study area intersections listed in Table 1-1 and shown on Exhibit 1-2 were selected for this TIA based on consultation with March JPA and City of Moreno Valley staff.

The study area was determined based on consultation with March JPA and City of Moreno Valley staff. In general, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside
2	Trautwein Rd. & Alessandro Bl.	Riverside
3	Mission Grove Pkwy. & Alessandro Bl.	Riverside
4	Barton St. & Alessandro Bl.	Riverside/JPA
5	San Gorgonio Dr. & Alessandro Bl.	Riverside/JPA
6	Sycamore Canyon Bl. & Alessandro Bl.	Riverside/JPA
7	Meridian Pkwy. & Cactus Av.	JPA
8	Meridian Pkwy. & Innovation Dr.	JPA
9	Meridian Pkwy. & Opportunity Wy.	JPA
10	Meridian Pkwy. & Van Buren Bl.	JPA/County
11	Innovation Dr. & Cactus Av.	JPA
12	I-215 SB Ramps & Alessandro Bl.	Caltrans/Riverside/County
13	I-215 SB Ramps & Cactus Av.	Caltrans/JPA/County
14	I-215 NB Ramps & Alessandro Bl.	Caltrans/Riverside/County
15	Old 215 Frontage Rd. & Alessandro Bl.	MV/Riverside/County
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	Caltrans/JPA

17	Day St. & Alessandro Bl.	MV
18	Elsworth St. & Alessandro Bl.	MV
19	Elsworth St. & Cactus Av.	MV/JPA
20	Veterans Wy. & Alessandro Bl.	MV
21	Veterans Wy. & Cactus Av.	MV/JPA
22	Frederick St. & Alessandro Bl.	MV
23	Frederick St. & Cactus Av.	MV/JPA
24	Graham St./Riverside Dr. & Cactus Av.	MV/JPA
25	Heacock St. & Cactus Av.	MV/JPA

1.3.2 FREEWAY MAINLINE SEGMENTS

The study area freeway mainline analysis locations include the following freeway segments for each direction of flow as shown on Table 1-2:

TABLE 1-2: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS

ID	Freeway Mainline Segments
1	I-215 Freeway – Southbound, North of Cactus Av.
2	I-215 Freeway – Southbound, South of Cactus Av.
3	I-215 Freeway – Northbound, North of Cactus Av.
4	I-215 Freeway – Northbound, South of Cactus Av.

The analysis performed for the basic freeway segments utilizes actual vehicles, where heavy trucks are accounted for as a percentage of total traffic. (2)

1.3.3 FREEWAY MERGE/DIVERGE RAMP JUNCTIONS

The study area freeway merge/diverge ramp junction analysis locations include the following freeway ramp junctions for each direction of flow as shown on Table 1-3:

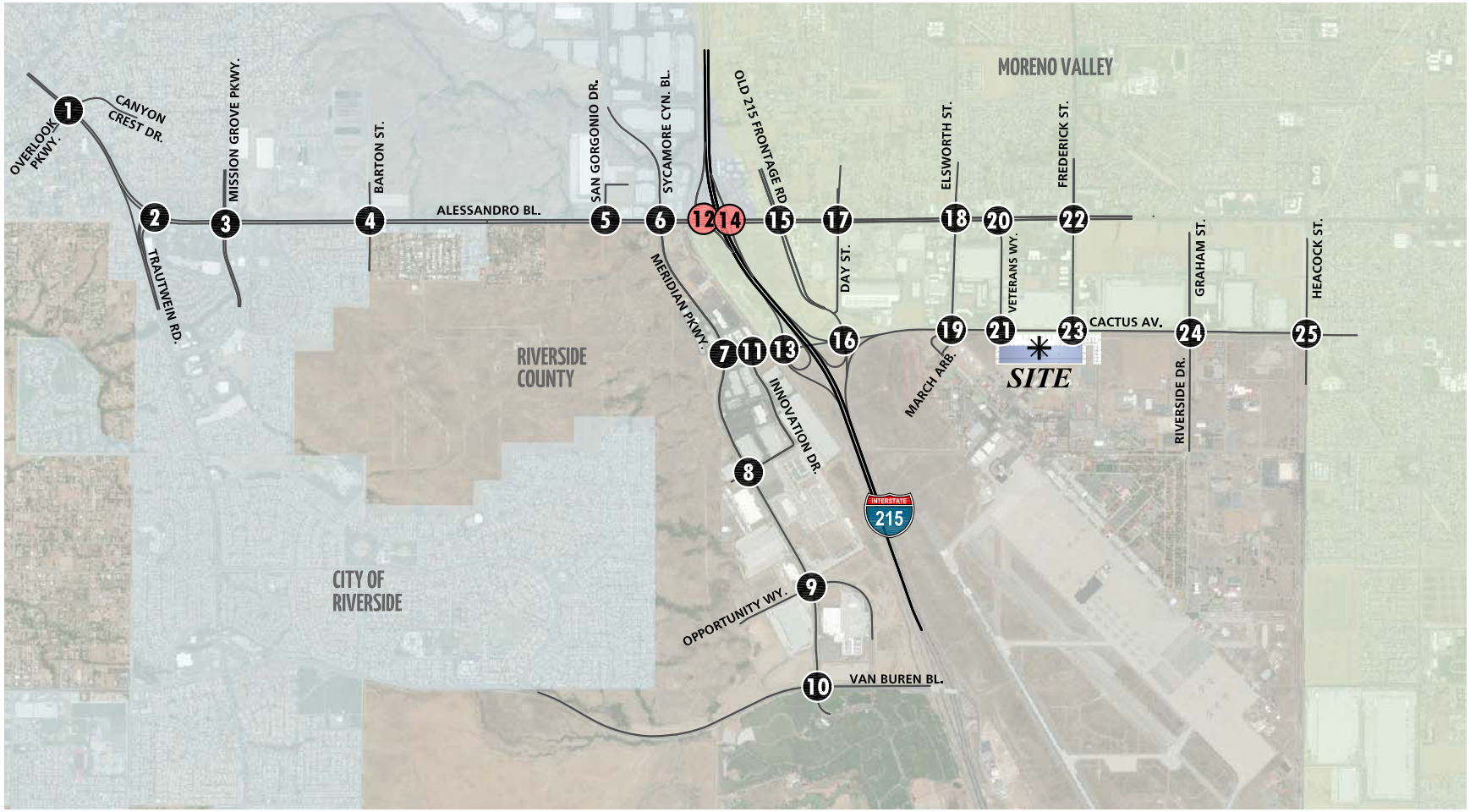
TABLE 1-3: FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS LOCATIONS

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Cactus Av. (Diverge)
2	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Av. (Diverge)
3	I-215 Freeway – Southbound, On-Ramp at Cactus Av. (Merge)
4	I-215 Freeway – Northbound, On-Ramp at Cactus Av. (Merge)
5	I-215 Freeway – Northbound, Loop On-Ramp at Cactus Av. (Merge)
6	I-215 Freeway – Northbound, Off-Ramp at Cactus Av. (Diverge)

1.4 SUMMARY OF FINDINGS

This section provides a summary of the analysis results for Existing (2018), E+P, Opening Year Cumulative (2023), and Horizon Year (2040) traffic conditions.

EXHIBIT 1-2: STUDY AREA



LEGEND:

0 = EXISTING INTERSECTION ANALYSIS LOCATION

0 = CMP INTERSECTION

N

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2018)	E+P	Opening Year (2023) Without Project	Opening Year (2023) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
1	Overlook Pkwy. / Canyon Crest & Alessandro Bl.	F	F	F	F	F	F
2	Trautwein Rd. & Alessandro Bl.	A-D	A-D	A-D	A-D	A-D	A-D
3	Mission Grove Pkwy. & Alessandro Bl.	E	E	F	F	F	F
4	Barton St. & Alessandro Bl.	A-D	A-D	A-D	A-D	A-D	A-D
5	San Gorgonio Dr. & Alessandro Bl.	A-D	A-D	A-D	A-D	A-D	A-D
6	Sycamore Canyon Bl. & Alessandro Bl.	E	F	F	F	F	F
7	Meridian Pkwy. & Cactus Av.	A-D	A-D	E	F	F	F
8	Meridian Pkwy. & Innovation Dr.	A-D	A-D	A-D	A-D	A-D	A-D
9	Meridian Pkwy. & Opportunity Wy.	A-D	A-D	A-D	A-D	A-D	A-D
10	Meridian Pkwy. & Van Buren BL.	A-D	A-D	F	F	F	F
11	Innovation Dr. & Cactus Av.	A-D	A-D	F	F	E	E
12	I-215 SB Ramps & Alessandro Bl.	A-D	A-D	A-D	A-D	A-D	A-D
13	I-215 SB Ramps & Cactus Av.	A-D	A-D	A-D	A-D	F	F
14	I-215 NB Ramps & Alessandro Bl.	A-D	A-D	A-D	A-D	E	E
15	Old 215 Frontage Rd. & Alessandro Bl.	A-D	A-D	A-D	A-D	F	F
16	Old 215 Frontage Rd. / I-215 NB Ramps & Cactus Av.	A-D	A-D	F	F	F	F
17	Day St. & Alessandro Bl.	A-D	A-D	A-D	A-D	E	E
18	Elsworth St. & Alessandro Bl.	A-D	A-D	A-D	A-D	F	F
19	Elsworth St. & Cactus Av.	F	F	F	F	F	F
20	Veterans Wy. & Alessandro Bl.	A-D	A-D	A-D	A-D	A-D	A-D
21	Veterans Wy. & Cactus Av.	A-D	A-D	A-D	A-D	A-D	A-D
22	Frederick St. & Alessandro Bl.	A-D	A-D	A-D	A-D	F	F
23	Frederick St. & Cactus Av.	A-D	A-D	A-D	A-D	A-D	A-D
24	Graham St. / Riverside Dr. & Cactus Av.	A-D	A-D	A-D	A-D	F	F
25	Heacock St. & Cactus Av.	A-D	A-D	E	E	E	F

LEGEND:

- AM PEAK HOUR
- PM PEAK HOUR
- LOS A-D
- LOS E
- LOS F

1.4.1 EXISTING (2018) CONDITIONS

Intersection Operations Analysis

A summary of LOS results for Existing traffic conditions are presented in Exhibit 1-3. As shown, a total of 4 intersections within the study area are currently operating at a deficient LOS.

Off-Ramp Queuing Analysis

A queuing analysis was performed for the I-215 Freeway off-ramps at Cactus Avenue for Existing (2018) traffic conditions. The analysis indicates there are currently no queuing issues that may potentially "spill back" onto the I-215 Freeway mainline at the I-215 Cactus Avenue interchange.

Freeway Facilities

There are no freeway segments or merge and diverge ramp junction areas that are currently operating at an unacceptable LOS under Existing (2018) traffic conditions based on reported traffic levels and lane geometry. However, observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks. As such, the following freeway segments have been identified as operating at unacceptable LOS under Existing (2018) traffic conditions during the peak hours:

- I-215 Freeway – Southbound, North of Cactus Avenue (#1) – LOS F PM peak hour only
- I-215 Freeway – Southbound, South of Cactus Avenue (#2) – LOS F PM peak hour only
- I-215 Freeway – Northbound, North of Cactus Avenue (#3) – LOS F AM and PM peak hours
- I-215 Freeway – Northbound, South of Cactus Avenue (#4) – LOS F AM and PM peak hours

The following merge and diverge ramp junction areas are identified as operating at an unacceptable LOS under Existing (2018) traffic conditions:

- I-215 Freeway – Southbound, Off-Ramp at Cactus Avenue (#1) – LOS F PM peak hour only
- I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue (#2) – LOS F PM peak hour only
- I-215 Freeway – Southbound, On-Ramp at Cactus Avenue (#3) – LOS F PM peak hour only
- I-215 Freeway – Northbound, On-Ramp at Cactus Avenue (#4) – LOS F AM and PM peak hours
- I-215 Freeway – Northbound, Loop On-Ramp at Cactus Avenue (#5) – LOS F AM and PM peak hours
- I-215 Freeway – Northbound, Off-Ramp at Cactus Avenue (#6) – LOS F AM and PM peak hours

1.4.2 E+P CONDITIONS

Intersection Operations Analysis

The addition of Project traffic is not anticipated to result in any new LOS deficiencies under E+P traffic conditions (see Exhibit 1-3).

Off-Ramp Queuing Analysis

A queuing analysis was performed for the I-215 Freeway off-ramps at Cactus Avenue for E+P traffic conditions. The analysis indicates there are no additional queuing issues that may potentially "spill back" onto the I-215 Freeway mainline at the I-215 Cactus Avenue interchange under E+P traffic conditions.

Freeway Facilities

There are no additional freeway segments or merge and diverge ramp junction areas that are anticipated to operate at an unacceptable LOS under E+P traffic conditions in addition to the locations previously identified under Existing (2018) traffic conditions.

Impacts and Mitigation Measures

Based on the applicable jurisdiction's significance criteria, the following study area intersection was found to be significantly impacted by the Project for E+P traffic conditions:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1)
- Elsworth St. & Cactus Av. (#19)

The following improvements are recommended to improve each impacted intersection's LOS back to pre-project conditions, or better:

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 1.1 – Elsworth Street & Cactus Avenue (#19)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches and restriping of the northbound shared left-through-right turn lane and southbound shared left-through lane.

Mitigation Measure 13.1 – Traffic Signal Synchronization

- Provide traffic signal synchronization for the signalized intersections on Cactus Avenue in the vicinity of the Project to improve the peak period traffic flow along the corridor.

The locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such, the impacts are considered significant and unavoidable.

Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the March JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. As such, no improvements have been recommended, and the impact to the freeway facility is significant and unavoidable.

1.4.3 OPENING YEAR CUMULATIVE (2023) CONDITIONS

Intersection Operations

As shown on Exhibit 1-3, there are 9 study area intersections that are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2023) Without Project traffic conditions during one or both peak hours. With the addition of Project traffic, there are no additional study area intersections anticipated to operate at a deficient LOS.

Off-Ramp Queuing Analysis

A queuing analysis was performed for the I-215 Freeway off-ramps at Cactus Avenue for Opening Year Cumulative (2023) traffic conditions. The analysis indicates there are no additional queuing issues that may potentially "spill back" onto the I-215 Freeway mainline at the I-215 Cactus Avenue interchange under Opening Year Cumulative (2023) traffic conditions.

Freeway Facilities

There are no additional freeway segments or merge and diverge ramp junction areas that are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2023) Without and With Project traffic conditions in addition to the locations previously identified under Existing (2018) traffic conditions.

Impacts and Mitigation Measures

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects or if the project is anticipated to contribute traffic to a deficient intersection under pre-project conditions. The Project's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the Project adds significant traffic to the forecasted deficiency.

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for Opening Year Cumulative (2023) traffic conditions:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1)
- Sycamore Canyon Bl. & Alessandro Bl. (#6)

- Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av. (#16)
- Elsworth St. & Cactus Av. (#19)
- Heacock St. & Cactus Av. (#25)

In conjunction with Mitigation Measure 1.1 identified previously for E+P traffic conditions, the following additional improvements are recommended to improve the impacted intersection's LOS back to pre-project conditions, or better:

Mitigation Measure 2.1 – Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- Contribute fair share towards the restriping of the SB shared left-through lane as a 3rd left turn lane and the SB right turn lane as a shared through-right turn lane, and the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches.

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 3.1 – Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue (#16)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches, a 2nd northbound left turn lane, a 3rd westbound through lane, and a westbound right turn lane.

Mitigation Measure 4.1 – Heacock Street & Cactus Avenue (#25)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

The locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such, the impacts are considered significant and unavoidable.

Off-Ramp Queuing Analysis

With the proposed intersection improvements at Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue, the analysis indicates there are no queuing issues anticipated that may potentially "spill back" onto the I-215 Freeway mainline during the peak hours for Opening Year Cumulative (2023) With Project traffic conditions.

Freeway Facilities

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the March JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. As such, no improvements have been recommended, and the impact to the freeway facility is significant and unavoidable.

1.4.4 HORIZON YEAR (2040) CONDITIONS

Intersection Operations

As shown on Exhibit 1-3, there are 17 study area intersections that are anticipated to operate at an unacceptable LOS under Horizon Year (2040) traffic conditions during one or both peak hours. With the addition of Project traffic, there are no additional study area intersections anticipated to operate at a deficient LOS.

Off-Ramp Queuing Analysis

A queuing analysis was performed for the I-215 Freeway off-ramps at Cactus Avenue for Horizon Year (2040) traffic conditions. The analysis indicates there are no additional queuing issues that may potentially "spill back" onto the I-215 Freeway mainline at the I-215 Cactus Avenue interchange under Horizon Year (2040) traffic conditions.

Freeway Facilities

There are no additional freeway segments or merge and diverge ramp junction areas that are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without and With Project traffic conditions in addition to the locations previously identified under Existing (2018) traffic conditions.

Impacts and Mitigation Measures

Cumulative traffic impacts are deficiencies that are not directly caused by the Project, but occur as a result of regional growth combined with that or other nearby cumulative development projects or if the project is anticipated to contribute traffic to a deficient intersection under pre-project conditions. The Project's contribution to a particular cumulative transportation deficiency is deemed cumulatively considerable if the Project adds significant traffic to the forecasted deficiency.

Based on the applicable jurisdiction's significance criteria, the following study area intersections were found to be significantly impacted by the Project for Horizon Year (2040) traffic conditions:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1)
- Sycamore Canyon Bl. & Alessandro Bl. (#6)
- I-215 Southbound Ramps & Cactus Av. (#13)
- I-215 NB Ramps & Alessandro Bl. (#14)
- Old 215 Frontage Rd. & Alessandro Bl. (#15)
- Old 215 Frontage Rd./I-215 Northbound Ramps & Cactus Av. (#16)
- Day St. & Alessandro Bl. (#17)
- Elsworth St. & Alessandro Bl. (#18)
- Elsworth St. & Cactus Av. (#19)
- Frederick St. & Alessandro Bl. (#22)
- Graham St./Riverside Dr. & Cactus Av. (#24)
- Heacock St. & Cactus Av. (#25)

In conjunction with Mitigation Measures 1.1 through 4.1 identified previously for E+P and Opening Year Cumulative (2023) traffic conditions, the following additional improvements are recommended to improve the impacted intersection's LOS back to pre-project conditions, or better:

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 5.1 – Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- Contribute fair share towards a 2nd northbound left turn lane and the modification of the traffic signal to implement protected left turn phasing on the southbound, eastbound, and westbound approaches.

Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 6.1 – I-215 Southbound Ramps & Cactus Avenue (#13)

- Contribute fair share towards a 3rd eastbound through lane, a 2nd westbound left turn lane, and a 3rd westbound through lane.

Mitigation Measure 7.1 – I-215 NB Ramps & Alessandro Boulevard (#14)

- Contribute fair share towards a 2nd northbound left turn lane.

Mitigation Measure 8.1 – Old 215 Frontage Road & Alessandro Boulevard (#15)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

Mitigation Measure 3.2 – Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue (#16)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the southbound approaches, a 2nd northbound through lane, 2 southbound right turn lanes, a 2nd eastbound left turn lane, a 3rd eastbound through lane, an eastbound right turn lane, and a 4th westbound through lane.

Mitigation Measure 9.1 – Frederick Street & Alessandro Boulevard (#17)

- Contribute fair share towards a 3rd westbound through lane.

Mitigation Measure 10.1 – Elsworth Street & Alessandro Boulevard (#18)

- Contribute fair share towards a 2nd northbound left turn lane.

Mitigation Measure 1.2 – Elsworth Street & Cactus Avenue (#19)

- Contribute fair share towards a 2nd northbound left turn lane, a 4th eastbound through lane, and a 4th westbound through lane.

Mitigation Measure 11.1 – Frederick Street & Alessandro Boulevard (#22)

- Contribute fair share towards a 3rd eastbound through lane.

Mitigation Measure 12.1 – Graham Street/Riverside Drive & Cactus Avenue (#24)

- Contribute fair share towards a 2nd eastbound left turn lane.

Mitigation Measure 4.2 – Heacock Street & Cactus Avenue (#25)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

The locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such the impacts are considered significant and unavoidable.

Off-Ramp Queuing Analysis

With the proposed intersection improvements at Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue, the analysis indicates there are no queuing issues anticipated that may

potentially "spill back" onto the I-215 Freeway mainline during the peak hours for Horizon Year (2040) With Project traffic conditions.

Freeway Operations Analyses

The Project Study Report/Project Development Support in Riverside County on I-215 and SR-60 between Nuevo Road (I-215) & I-215/SR-60 Junction and Box Springs Road (I-215) & Day Street (SR-60) (prepared by Caltrans in April 2008), also known as the I-215 North Project, includes the construction of an HOV lane in each direction of the I-215 Freeway between Nuevo Road and Box Springs Road within the existing median. (5) According to the Riverside County Transportation Commission (RCTC) and Caltrans websites, the I-215 North Project is a longer term project, as priority has been given to the southern and central projects along the I-215 corridor.

The following freeway segments are anticipated to continue to operate at an unacceptable LOS with the addition of the planned freeway improvements under Horizon Year (2040) traffic conditions during the peak hours:

- I-215 Freeway – Northbound, South of Cactus Avenue (#4) – LOS E AM peak hour only

The following merge and diverge ramp junction areas are anticipated to continue to operate at an unacceptable LOS under Horizon Year (2040) traffic conditions:

- I-215 Freeway – Southbound, On-Ramp at Cactus Avenue (#3) – LOS F PM peak hour only
- I-215 Freeway – Northbound, Loop On-Ramp at Cactus Avenue (#5) – LOS F PM peak hour only
- I-215 Freeway – Northbound, Off-Ramp at Cactus Avenue (#6) – LOS F AM and PM peak hours

The Project is anticipated to have a cumulatively considerable impact to the identified freeway mainline segments and merge/diverge ramp junctions, however, no mitigation measures have been identified as no other improvements beyond those planned by the I-215 North Project have been evaluated. Neither Caltrans or the State have adopted a fee program that can ensure that locally-contributed impact fees will be tied to improvements to freeway mainlines, and only Caltrans has the jurisdiction over mainline improvements. Because Caltrans has exclusive control over state highway improvements, ensuring that fair share contributions to mainline improvements are actually part of a program tied to implementation is within the jurisdiction of Caltrans. As such, the impacts are considered significant and unavoidable.

1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the March JPA are funded through a combination of direct Project mitigation, TUMF fees, or fair share contributions. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

1.5.1 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

In 2002, the TUMF program was initiated in Western Riverside County. March JPA participates in the TUMF program. Under the TUMF, developers of residential, industrial and commercial property are required to pay a development fee to fund regional transportation projects, which mitigates cumulative impacts to the intersections included in the TUMF program. The TUMF funds both local and regional arterial projects. The applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of required Western Riverside County TUMF and other applicable fair share contributions, as directed by the March JPA. These fees are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected vehicle trip increases.

The TUMF program is administered by WRCOG based upon a regional Nexus Study completed in early 2003 and updated in 2016 to address major changes in right of way acquisition and improvement cost factors. TUMF identifies a network of backbone and local roadways that are needed to accommodate growth through 2040. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region.

As shown in Table 1-4, a few of the facilities anticipated to be cumulatively impacted by the Project are planned for improvements through the TUMF Program. The Project Applicant will be subject to the TUMF fee program, and will pay the requisite TUMF fees at the rates then in effect. The Project Applicant's payment of the requisite TUMF fees at the rates then in effect pursuant to the TUMF Program will mitigate its impacts to TUMF-funded facilities.

1.5.2 FAIR SHARE CONTRIBUTION

The Project's mitigation will include fee payments to TUMF and construction of specific improvements to facilitate site access. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the March JPA's discretion). In the event a particular facility is not included in a pre-existing fee program, fair share calculations have been provided on Table 1-5.

1.6 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. Vehicular and truck traffic access will be provided via the following driveways:

- Veteran's Way/Driveway 1 & Cactus Avenue – Full access driveway (both passenger cars and trucks)
- Frederick Street/Driveway 2 & Cactus Avenue – Full access driveway (both passenger cars and trucks)

Regional access to the Project site is provided via the I-215 Freeway at Alessandro Boulevard and Cactus Avenue interchanges.

1.6.1 SITE ADJACENT ROADWAY IMPROVEMENTS

Since Cactus Avenue is built out to its ultimate cross-section, according to the March JPA and City of Moreno Valley General Plans, there are no roadway widening recommendations. However, additional curb, gutter, and sidewalk improvements are recommended, as needed for site access along the Project's frontage consistent with March JPA standards.

1.6.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-4 illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

Veteran's Way/Driveway 1 & Cactus Avenue (#21) – Modify the traffic signal to include the fourth leg and construct the intersection with the following geometrics:

Northbound Approach: One left turn lane and one shared through-right turn lane.

Southbound Approach: One left turn lane, one through lane, and one right turn lane.

Eastbound Approach: One left turn lane, two through lanes, and one shared through-right turn lane.

Westbound Approach: One left turn lane, three through lanes, and one right turn lane.

Frederick Street/Driveway 2 & Cactus Avenue (#23) – Modify the traffic signal to include the fourth leg and construct the intersection with the following geometrics:

Northbound Approach: One left turn lane, one through lane, and one right turn lane.

Southbound Approach: Two left turn lanes and one shared through right turn lane.

Eastbound Approach: One left turn lane, two through lanes, and one shared through-right turn lane.

Westbound Approach: One left turn lane, three through lanes, and one right turn lane.

1.6.3 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted for the Project driveways for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate near-term and long-range 95th percentile queues.

The minimum storage length for turn pockets to accommodate the 95th percentile queues at the intersections of Veterans Way/Driveway 1 & Cactus Avenue and Frederick Street/Driveway 2 & Cactus Avenue were previously shown on Exhibit 1-4. Queuing worksheets are included in Appendix 1.2.

Table 1-4

Summary of Improvements by Analysis Scenario and Rough Order of Magnitude Costs

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1, 13]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside	- None	- Restripe the SB shared left-through lane as a 3rd left turn lane and the SB right turn lane as a shared through-right turn lane.	- Same	No	$43,733	0.65%	$286
				- Modify the TS to implement protected left turn phasing on the NB	- Same	No	$131,198		$857
						Total	**$174,931**		**$1,143**
6	Sycamore Canyon Bl. & Alessandro Bl.	County, Riverside	- None	- None	- 2nd NB left turn lane	No	$87,465	1.11%	$970
					- Modify the TS to implement overlap phasing on the SB, EB, and WB right turn lane	No	$131,198		$1,455
						Total	**$218,663**		**$2,425**
13	I-215 SB Ramps & Cactus Av.	March JPA, Riverside County, Caltrans	- None	- None	- 3rd EB through lane	Yes (TUMF)	NA[9]	5.35%	$0
					- 2nd WB left turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 3rd WB through lane	Yes (TUMF)	NA[9]		$0
						Total	**$0**		**$0**
14	I-215 NB Ramps & Alessandro B	March JPA, Riverside County, Caltrans	- None	- None	- 2nd NB left turn lane	No	$87,465	1.71%	$1,493
						Total	**$87,465**		**$1,493**
15	Old 215 Frontage Rd. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd EB through lane	Yes (TUMF)	NA[9]	1.80%	$0
					- 3rd WB through lane	Yes (TUMF)	NA[9]		
						Total	**$0**		**$0**
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	March JPA, Riverside County, Caltrans	- None	- 2nd NB left turn lane	- Same	Yes (TUMF)[12]	NA[9]	5.42%	$0
				- 3rd WB through lane	- Same	Yes (TUMF)	NA[9]		$0
				- WB right turn lane	- Same	Yes (TUMF)[12]	NA[9]		$0
					- 2nd NB through lane	Yes (TUMF)[12]	NA[9]		$0
					- 1st and 2nd SB right turn lanes	Yes (TUMF)[12]	NA[9]		$0
					- 2nd EB left turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 3rd EB through lane	Yes (TUMF)[12]	NA[9]		$0
					- EB right turn lane	Yes (TUMF)[12]	NA[9]		$0
					- 4th WB through lane	Yes (TUMF)[12]	NA[9]		$0
					- WB right turn lane	Yes (TUMF)[12]	NA[9]		$0
					- Modify the TS to implement overlap phasing on the SB right turn lane	Yes (TUMF)[12]	NA[9]		$0
						Total	**$0**		**$0**
17	Day St. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd WB through lane	Yes (TUMF)	NA[9]	1.93%	$0
						Total	**$0**		**$0**
18	Elsworth St. & Alessandro Bl.	Moreno Valley	- None	- None	- 2nd NB left turn lane	No	$87,465	2.05%	$1,789
						Total	**$87,465**		**$1,789**
19	Elsworth St. & Cactus Av.	March JPA, Moreno Valley	- Modify the TS to implement protected left turn phasing on the NB and SB approaches	- Same	- Same	No	$131,198	6.99%	$9,168
					- 2nd NB left turn lane	No	$87,465		$6,112
					- 4th WB through lane	No	$314,874		$22,002
					- 4th EB through lane	No	$314,874		$22,002
						Total	**$848,411**		**$59,283**

Table 1-4
Page 2 of 2
Summary of Improvements by Analysis Scenario and Rough Order of Magnitude Costs

#	Intersection Location	Jurisdiction	E+P	2023 With Project	Horizon Year (2040) With Project	Improvements in TUMF?[1, 13]	Total Cost[2,3,4]	Fair Share %[4]	Fair Share Cost[5]
21	Veterans Wy. & Cactus Av.	March JPA, Moreno Valley	- NB left turn lane[6] - NB shared through-right turn lane[6] - WB left turn lane[6] - Restripe the SB shared left-right turn lane as a through lane[6]	- Same - Same - Same - Same	- Same - Same - Same - Same	No No No **Total**	$87,465 $314,874 $87,465 $43,733 **$533,537**	100.00%	$87,465 $314,874 $87,465 $43,733 **$533,537**
22	Frederick St. & Alessandro Bl.	Moreno Valley	- None	- None	- 3rd EB through lane	Yes (TUMF) **Total**	$0 **$0**	3.57%	$0 **$0**
23	Frederick St. & Cactus Av.	March JPA, Moreno Valley	- NB left turn lane[6] - NB through lane[6] - NB right turn lane[6] - WB left turn lane[6] - Restripe the SB right turn lane as a shared through-right turn lane[6]	- Same - Same - Same - Same - Same	- Same - Same - Same - Same - Same	No No No No No **Total**	$87,465 $314,874 $87,465 $87,465 $43,733 **$621,002**	100.00%	$87,465 $314,874 $87,465 $87,465 $43,733 **$621,002**
24	Graham St./Riverside Dr. &	March JPA, Moreno Valley	- None	- None	- 2nd EB left turn lane	No **Total**	$87,465 **$87,465**	5.02%	$4,391 **$4,391**
25	Heacock St. & Cactus Av.	March JPA, Moreno Valley	- None	- 3rd EB through lane - 3rd WB through lane	- Same - Same	Yes (TUMF) No **Total**	$0 $314,874 **$314,874**	4.19%	$0 $13,208 **$13,208**
						Total Project Fair Share Contribution to the March JPA (non-TUMF)[7]	**$1,648,716**		**$1,021,105**
						Total Project Fair Share Contribution to the City of Riverside[8]	**$240,530**		**$1,870**
						Total Project Fair Share Contribution to the County of Riverside[9]	**$153,064**		**$1,697**
						Total Project Fair Share Contribution to the City of Moreno Valley[10]	**$844,039**		**$212,105**
						Total Project Fair Share Contribution to Caltrans[11]	**$87,465**		**$1,493**
						Total	**$2,973,813**		**$1,238,270**

[1] Improvements included in TUMF fee program. Although identified as a TUMF facility, the improvement is not currently identified on the Northwest Zone 5-Year Transportation Improvement Program Amendment (adopted January 6, 2014).

[2] Costs have been estimated using the data provided in Appendix "G" of the CMP (2003 Update) for preliminary construction costs.

[3] Appendix "G" costs escalated by a factor of 1.484 except Traffic Signals. This is consistent with the methodology used by other near-by agencies.

[4] Program improvements constructed by Project may be eligible for fee credit, at discretion of the March JPA. See Table 1-5 for Fair Share Calculations.

[5] Rough order of magnitude cost estimate.

[6] Improvements are Project design features as they are either site adjacent roadway improvements or needed for site access.

[7] Total project fair share contribution consists of the improvements which are not already included in the County TUMF for those intersections wholly or partially within the March JPA.

[8] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Riverside.

[9] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the County of Riverside.

[10] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Moreno Valley.

[11] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

[12] The TUMF nexus study identifies I-215/Cactus overcrossing ($22,280,0000). Although the individual improvements are not specifically identified in the nexus study, they are likely to be part of the overall interchange improvements.

[13] Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such the impacts are considered significant and unavoidable.

Table 1-5

Project Fair Share Calculations for Intersections

#	Intersection		Existing	Project	2040 With Project Volume	Project % of Total Traffic[1]
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.					
		AM:	5,382	25	8,024	0.31%
		PM:	5,822	58	8,879	0.65%
2	Trautwein Rd. & Alessandro Bl.					
		AM:	5,505	25	7,304	0.34%
		PM:	6,066	58	8,122	0.71%
3	Mission Grove Pkwy. & Alessandro Bl.					
		AM:	4,019	33	5,835	0.57%
		PM:	4,485	77	6,480	1.19%
4	Barton St. & Alessandro Bl.					
		AM:	3,600	41	5,237	0.78%
		PM:	4,178	97	6,313	1.54%
5	San Gorgonio Dr. & Alessandro Bl.					
		AM:	3,712	42	5,532	0.76%
		PM:	4,275	97	6,593	1.47%
6	Sycamore Canyon Bl. & Alessandro Bl.					
		AM:	5,152	42	7,658	0.55%
		PM:	5,649	97	8,748	1.11%
7	Meridian Pkwy. & Cactus Av.					
		AM:	2,059	21	3,954	0.53%
		PM:	2,387	49	4,259	1.15%
10	Meridian Pkwy. & Van Buren Bl.					
		AM:	3,083	21	5,280	0.40%
		PM:	3,337	49	6,434	0.76%
11	Innovation Dr. & Cactus Av.					
		AM:	1,885	21	3,267	0.64%
		PM:	1,683	49	3,139	1.56%
13	I-215 SB Ramps & Cactus Av.					
		AM:	2,949	110	4,763	2.31%
		PM:	2,694	250	4,673	5.35%
14	I-215 NB Ramps & Alessandro Bl.					
		AM:	3,565	42	5,292	0.79%
		PM:	3,573	97	5,684	1.71%
15	Old 215 Frontage Rd. & Alessandro Bl.					
		AM:	3,135	42	4,820	0.87%
		PM:	3,234	97	5,403	1.80%
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.					
		AM:	3,661	130	6,799	1.91%
		PM:	3,214	394	7,273	5.42%
17	Day St. & Alessandro Bl.					
		AM:	2,449	42	4,357	0.96%
		PM:	2,794	97	5,037	1.93%

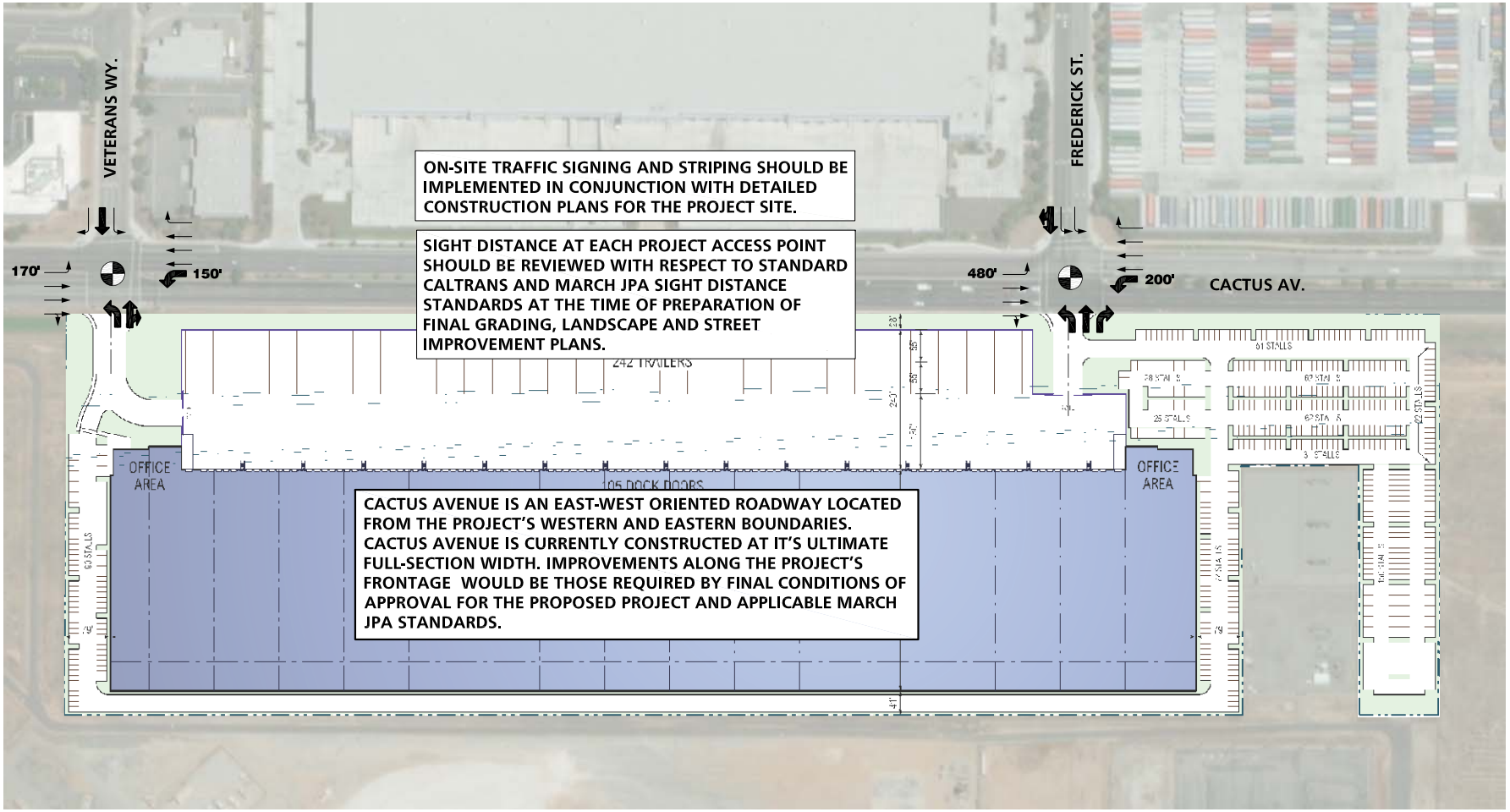
Table 1-5

Project Fair Share Calculations for Intersections

#	Intersection		Existing	Project	2040 With Project Volume	Project % of Total Traffic[1]
18	Elsworth St. & Alessandro Bl.					
		AM:	2,617	42	3,925	1.07%
		PM:	3,076	97	4,743	2.05%
19	Elsworth St. & Cactus Av.					
		AM:	3,840	197	6,290	3.13%
		PM:	3,707	450	6,440	6.99%
22	Frederick St. & Alessandro Bl.					
		AM:	3,080	80	4,269	1.87%
		PM:	3,691	185	5,186	3.57%
24	Graham St./Riverside Dr. & Cactus Av.					
		AM:	3,535	125	5,236	2.39%
		PM:	3,905	291	5,797	5.02%
25	Heacock St. & Cactus Av.					
		AM:	3,651	105	5,057	2.08%
		PM:	4,072	243	5,793	4.19%

[1] Project's percentage of total future Horizon Year (2040) traffic.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



LEGEND:

- = TRAFFIC SIGNAL
- = LANE IMPROVEMENT
- = EXISTING LANE
- 100' = MINIMUM TURN POCKET LENGTH

N

1.7 TRUCK ACCESS AND CIRCULATION

A truck turning template has been overlaid on the site plan at Veteran's Way/Driveway 1 on Cactus Avenue and Frederick Street/Driveway 2 on Cactus Avenue, which are anticipated to be utilized by heavy trucks, in order to determine the appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers. For the purposes of this evaluation, the WB-67 class truck template has been utilized. WB-67 class trucks are approximately 73.5 feet in length.

Exhibit 1-5 illustrates the proposed truck access for the site and circulation for Driveway 1 and Driveway 2. The recommended curb radii as shown on Exhibit 1-5 are anticipated to accommodate the ingress and egress of trucks.

1.8 PARKING EVALUATION

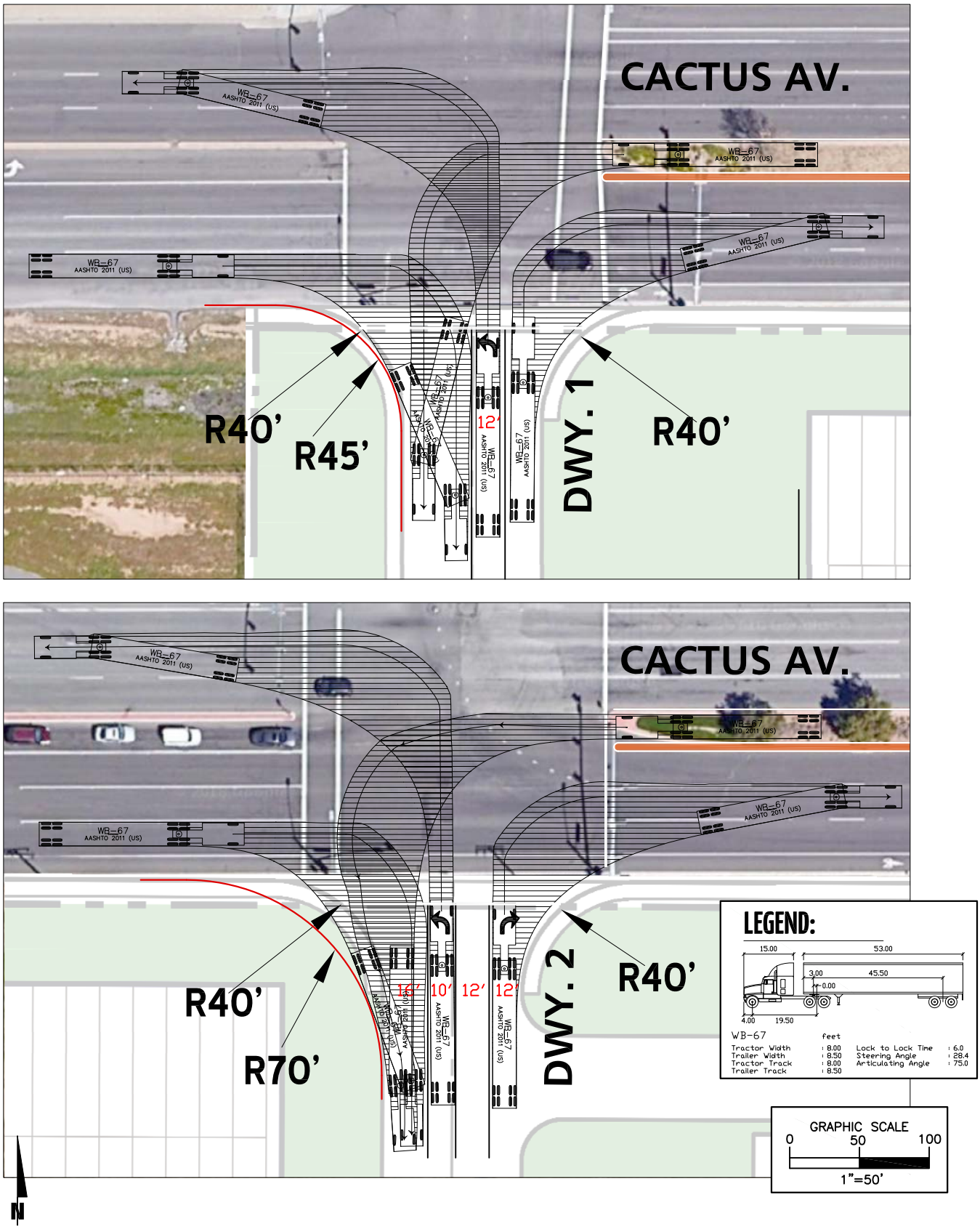
March JPA Development Code (Table 9.11040C-12) provides the following off-street parking requirements for warehouse and distribution land uses:

- 0 – 50,000 sq. ft.: 1/1,000 sq. ft. of gross floor area
- 50,000 – 200,000 sq. ft.: 50 spaces + (0.33 per ksf > 50,000 sq. ft.)
- 200,00 sq. ft. or greater: 100 spaces + (0.20 per ksf > 200,000 sq. ft.)

Per the March JPA Development Code, 260 passenger car stalls would be required. However, a total of 598 automobile parking stalls and 242 truck trailer parking stalls are proposed to be provided to accommodate higher parking demands for a fulfilment center use. The proposed 598 passenger car stalls are anticipated to be adequate to support the expected 900 employees with 2 shifts. However, if there are parking issues during peak season (i.e., October to January), it is recommended that a third shift be added to reduce the peak parking demand.

Transportation demand management (i.e., carpool, public transit) would further reduce parking demand, but have not been considered in order to present a conservative analysis.

EXHIBIT 1-5: TRUCK ACCESS



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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with March JPA traffic study guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (6) The HCM uses different procedures depending on the type of intersection control. Study area intersections located within the March JPA, City of Riverside, and City of Moreno Valley have been analyzed using the software package Synchro (Version 10).

2.2.1 SIGNALIZED INTERSECTIONS

March Joint Powers Authority, City of Riverside, City of Moreno Valley, County of Riverside

The March JPA, City of Riverside, City of Moreno Valley, and County of Riverside require signalized intersection operations analysis based on the methodology described in the HCM. (6) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up	F	F

Source: HCM

Study area intersections located within the March JPA, City of Riverside, and City of Moreno Valley have been analyzed using the software package Synchro (Version 10).

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. It is unlikely that the PHF would decrease from their current values and would more likely increase. However, in an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic impacts, existing PHFs have been used for all analysis scenarios.

California Department of Transportation (Caltrans)

Per the Caltrans *Guide for the Preparation of Traffic Impact Studies*, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. I-215 Freeway ramps at Alessandro Boulevard, I-215 Freeway ramps at Cactus Avenue). (2) Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. Signal timing for the freeway arterial-to-ramp intersections have been obtained from Caltrans District 8 and were utilized for the purposes of this analysis.

2.2.2 UNSIGNALIZED INTERSECTIONS

The March JPA, City of Riverside, City of Moreno Valley, and County of Riverside require the operations of unsignalized intersections be evaluated using the methodology described the HCM. (6) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TIA includes the freeway-to-arterial interchange of the I-215 Freeway at Cactus Avenue off-ramps. Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing impacts at the freeway ramp intersections on Cactus Avenue. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-215 Freeway mainline from the off-ramps.

2.4 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TIA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD) for all unsignalized study area intersections. (7)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (7) Specifically, this TIA utilizes the Peak Hour

Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TIA because it provides specialized warrant criteria for intersections with urban characteristics (e.g. located in communities with populations of more than 10,000 persons or with adjacent major streets operating below 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future unsignalized intersections, that currently do not exist, have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

As shown on Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections operating at LOS E or F during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
8	Meridian Pkwy. & Innovation Dr.	March JPA

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Analysis,* Section 6 *Opening Year Cumulative (2023) Traffic Analysis,* and Section 7 *Horizon Year (2040) Traffic Analysis* of this report.

It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.5 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent March JPA guidance, past experiences with projects relating to freeway mainline segment analysis, and because impacts to freeway segments dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry is not required.

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TIA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using HCS7 software. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-4 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis.

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in May 2018. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative Without and With Project, and Horizon Year Without and With Project traffic conditions.

The I-215 mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments along the I-215 Freeway. The data was obtained from May 2018. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. As such, actual vehicles (as opposed to passenger-car-equivalent (PCE) volumes) have been utilized for the purposes of the basic freeway segment analysis. (8)

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS

Level of Service	Description	Density Range (pc/mi/ln)[1]
A	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0 – 11.0
B	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1 – 18.0
C	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1 – 26.0
D	Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1 – 35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1 – 45.0
F	Breakdown in vehicle flow.	>45.0

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in three existing on and off ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS7 software. The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at

the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-5 presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS

Level of Service	Density Range (pc/mi/ln)[1]
A	≤10.0
B	10.0 – 20.0
C	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM

Similar to the basic freeway segment analysis, the I-215 Freeway mainline volume data were obtained from the Caltrans PeMS website for the segments of the I-215 Freeway, between Cactus Avenue and Van Buren Boulevard. The ramp data (per the count data presented in Appendix 3.1, then adjusted for flow conservation) were then utilized to flow conserve the mainline volumes to determine the remaining I-215 Freeway mainline segment volumes near the interchange. Flow conservation checks ensure that traffic flows from east to west and north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from May 2018. (8) In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. As such, actual vehicles (as opposed to PCE volumes) have been utilized.

2.7 MINIMUM LEVEL OF SERVICE (LOS)

The definition of an intersection deficiency has been obtained from each of the applicable surrounding jurisdictions.

2.7.1 MARCH JOINT POWERS AUTHORITY

As identified in the March JPA Traffic Impact Study Preparation Guide (August 3, 2011) all intersections within the March JPA Planning Area shall operate at LOS D or better with limiting circumstances of LOS E to occur. LOS E may also be allowed to the extent that would support transit-oriented development (TOD) and walkable communities. (1) LOS E is also acceptable during peak hours at interchange ramp intersections where ramp metering occurs. The Project is not proposed to be a TOD and neither the Alessandro Boulevard nor Cactus Avenue on-ramps are currently metered; as such, the minimum LOS utilized for the purposes of this analysis is LOS D.

2.7.2 CITY OF RIVERSIDE

The City of Riverside General Plan states the City will strive to maintain LOS D or better on arterial streets wherever possible. At some key locations, such as City arterial roadways, which are used as freeway bypass by regional through traffic and at heavily traveled freeway intersections, LOS E may be acceptable as determined on a case-by-case basis. Locations that may warrant the LOS E standard include portions of Arlington Avenue/Alessandro Boulevard, Van Buren Boulevard throughout the City, portions of La Sierra Avenue, and selected freeway interchanges. A higher standard, such as LOS C or better, may be adopted for Local and Collector streets in residential areas. The City recognizes that along key free-way feeder segments during peak commute hours, LOS F may be expected due to regional travel patterns. A minimum LOS utilized for the purposes of this analysis is LOS D.

2.7.3 CITY OF MORENO VALLEY

The Minimum LOS for the City of Moreno Valley is LOS D for intersections that are adjacent to freeway on/off ramps, and/or adjacent to employment generating land uses. LOS C is applicable to all other intersections. Boundary intersections are assumed to be LOS D.

2.7.4 COUNTY OF RIVERSIDE

County of Riverside General Plan Policy C 2.1 states that the following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County:

- LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non- Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.
- LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans. LOS E may be allowed by the Board of Supervisors within designated areas where transit oriented development and walkable communities are proposed.

Notwithstanding the forgoing minimum LOS targets, the Board of Supervisors may, on occasion by virtue of their discretionary powers, approve a project that fails to meet these LOS targets in order to balance congestion management considerations in relation to benefits, environmental impacts and costs, provided an Environmental Impact Report, or equivalent, has been completed to fully evaluate the impacts of such approval. Any such approval must incorporate all feasible mitigation measures, make specific findings to support the decision, and adopt a statement of overriding considerations.

2.7.5 CALTRANS

Based on recent guidance from Caltrans District 8, the LOS for operating State highway facilities is based on Measures of Effectiveness (MOE) identified in the Highway Capacity Manual (HCM). Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State highway facilities; however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. If an existing State highway facility is operating at less than this target LOS< the existing MOE should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadways segments, and intersections is D. For undeveloped or not densely developed locations, the goal may be to achieve LOS C.

2.8 THRESHOLDS OF SIGNIFICANCE

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.8.1 INTERSECTIONS

Direct impacts are those impacts for which the addition of project-only trips result in an identifiable degradation in LOS to unacceptable LOS on freeway segments or intersections from the Existing condition thereby triggering the need for specific project-related improvement strategies through a comparison of Existing and E+P traffic conditions.

For the study area intersections that lie within March JPA, to determine whether the addition of project traffic (as defined through the comparison of Existing to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, both of the following conditions must occur:

- Peak hour project traffic plus existing traffic causes an intersection to operate at LOS E or F; and
- Peak hour project traffic comprises 2% or more of the total peak hour traffic on the intersection for LOS E and 2% or more for LOS F.

For the study area intersections that lie within the City of Riverside, to determine whether the addition of Project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D (i.e., unacceptable LOS) or increases to the peak hour delay as defined in Table 2-6, a deficiency is deemed to occur.

TABLE 2-6: THRESHOLDS OF SIGNIFICANCE

Pre-Project LOS	Project-Related Delay Increase	Mitigation Measure
A/B	10.0 Seconds or More	Achieve Pre-project delay or better
C	8.0 Seconds or More	Achieve Pre-project delay or better
D	5.0 Seconds or More	Achieve Pre-project delay or better
E	2.0 Seconds or More	Achieve Pre-project delay or better
F	1.0 Second or More	Achieve Pre-project delay or better

For the study area intersections that lie within the County of Riverside, to determine whether the addition of project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

For the study area intersections that lie within the City of Moreno Valley, March JPA or County of Riverside thresholds of significance apply as the City of Moreno Valley does not have its own threshold criteria.

However, when the pre-Project condition is already below LOS D (i.e., unacceptable LOS), the Project will be responsible for mitigating its impact to a level of service equal to or better than it was without the Project for intersections that receive 50 or more peak hour project-related trips. This is a standard protocol in many urban jurisdictions because to require a Project to mitigate to LOS D or better would in effect force the Project to mitigate beyond its Project impacts, which is prohibited under California law. Thus, for intersections currently operating at unacceptable LOS during either the AM and/or PM peak hour under Existing traffic conditions, improvements have been identified to mitigate the impacts of the Project to an intersection LOS that is equal to or better than pre-Project conditions.

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring additional improvements to maintain acceptable level of service operations with or without the Project. A Project's contribution to a significant cumulative impact can be reduced to less-than-

significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact.

2.8.2 CALTRANS FACILITIES

To determine that the addition of project traffic to the SHS freeway segments would result in a deficiency, both of the following must be found:

- The traffic study finds that the LOS of a segment will degrade from D or better to E or F.
- The traffic study finds that the project will exacerbate an already deficient condition by contributing 50 or more peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.9 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TIA identifies that the Project would contribute additional traffic volumes to cumulative traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to total future (Horizon Year) traffic:

Project Fair Share % = Project Traffic / 2040 Total Traffic

2.10 SB 743 REQUIREMENTS

In the fall of 2013, Senate Bill 743 (SB 743) was passed by the legislature and signed into law by the governor. For some parts of California (and eventually the entire state), this legislation will eventually change the way that transportation studies are conducted for environmental documents. In the areas where SB 743 is implemented, delay-based metrics such as roadway capacity and level of service will no longer be the performance measures used for the determination of the transportation impacts of projects in studies conducted under the California Environmental Quality Act (CEQA). Instead, new performance measures such as vehicle miles travelled (VMT) or other similar measures will be used.

During the preparation of this traffic impact study, guidelines for the implementation of SB 743 were not yet incorporated into CEQA. Therefore, this traffic impact study follows current practice regarding state and local guidance as of the date of preparation.

In December 2018 CEQA Guidelines were updated to include a threshold for evaluating traffic impacts using the VMT methodology. This new methodology is required to be used statewide after July 2020. As such, and because March JPA as the lead agency has not yet adopted VMT thresholds, the analysis for this project utilizes the LOS methodology.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the March JPA General Plan Circulation Network, and a review of existing peak hour intersection operations, freeway mainline operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with March JPA staff (Appendix 1.1), the study area includes a total of 25 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the March JPA. However, the study area includes intersections that share borders with the neighboring jurisdictions of the County of Riverside, the City of Riverside, the City of Moreno Valley, and Caltrans.

3.2.1 MARCH JPA

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the March JPA General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the March JPA General Plan Circulation Element, and Exhibit 3-3 illustrates the March JPA General Plan roadway cross-sections. It is our understanding that the March JPA is currently undergoing a General Plan Update, however, the work effort associated with the General Plan Update had not been completed at the time this TIA was prepared. JPA Resolution 16-05 had minor amendments to General Plan Transportation Element. The roadway system and cross-sections from Meridian General Plan Amendment (JPA#16-05) is shown on Exhibit 3-3 A.

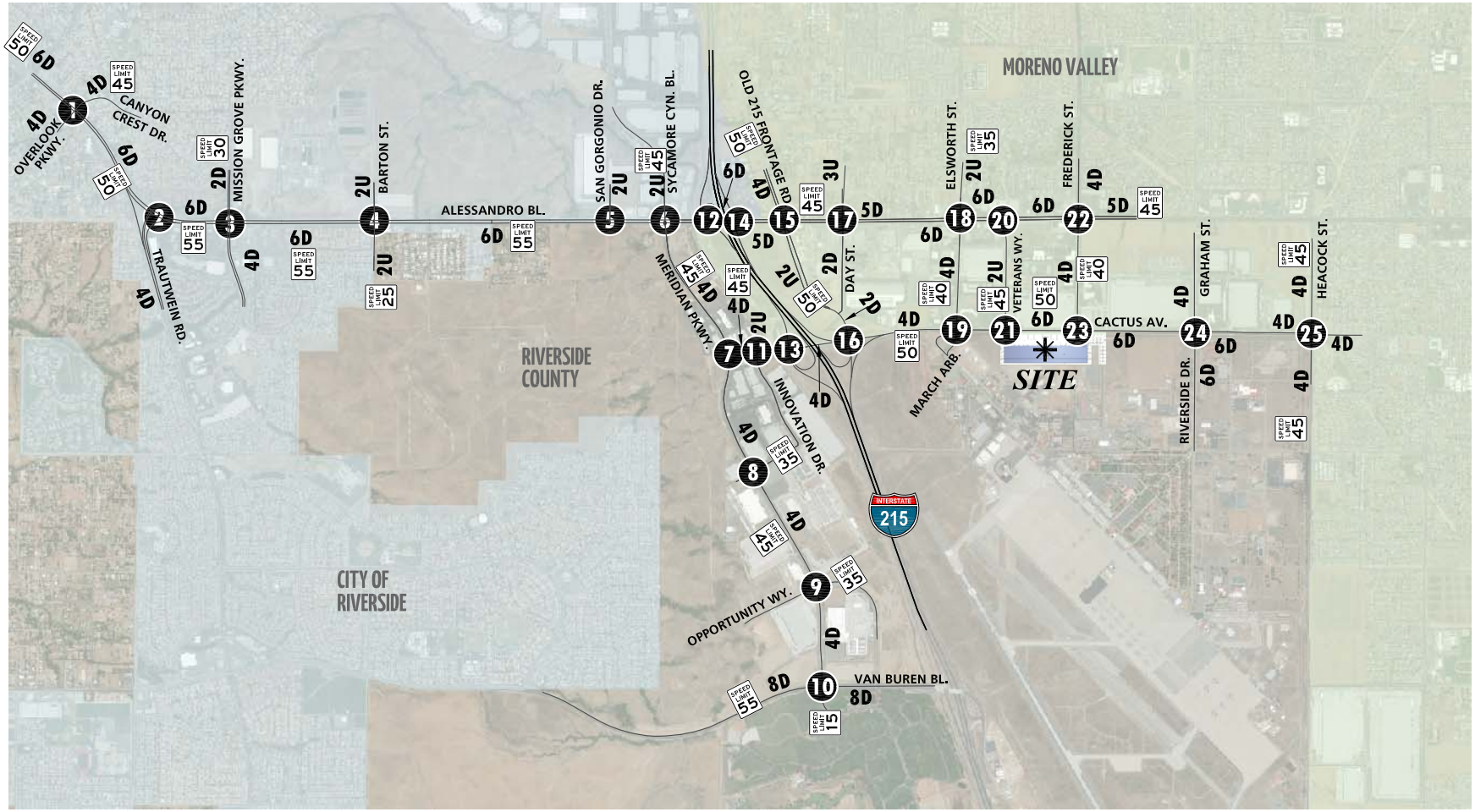
3.2.2 COUNTY OF RIVERSIDE

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the County of Riverside General Plan Circulation Element are shown on Exhibit 3-4 and Exhibit 3-5 illustrates the County of Riverside General Plan roadway cross-sections.

3.2.3 CITY OF RIVERSIDE

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Riverside General Plan Circulation Element are shown on Exhibit 3-6 and Exhibit 3-7 illustrates the City of Riverside General Plan roadway cross-sections.

EXHIBIT 3-1 (1OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



LEGEND:

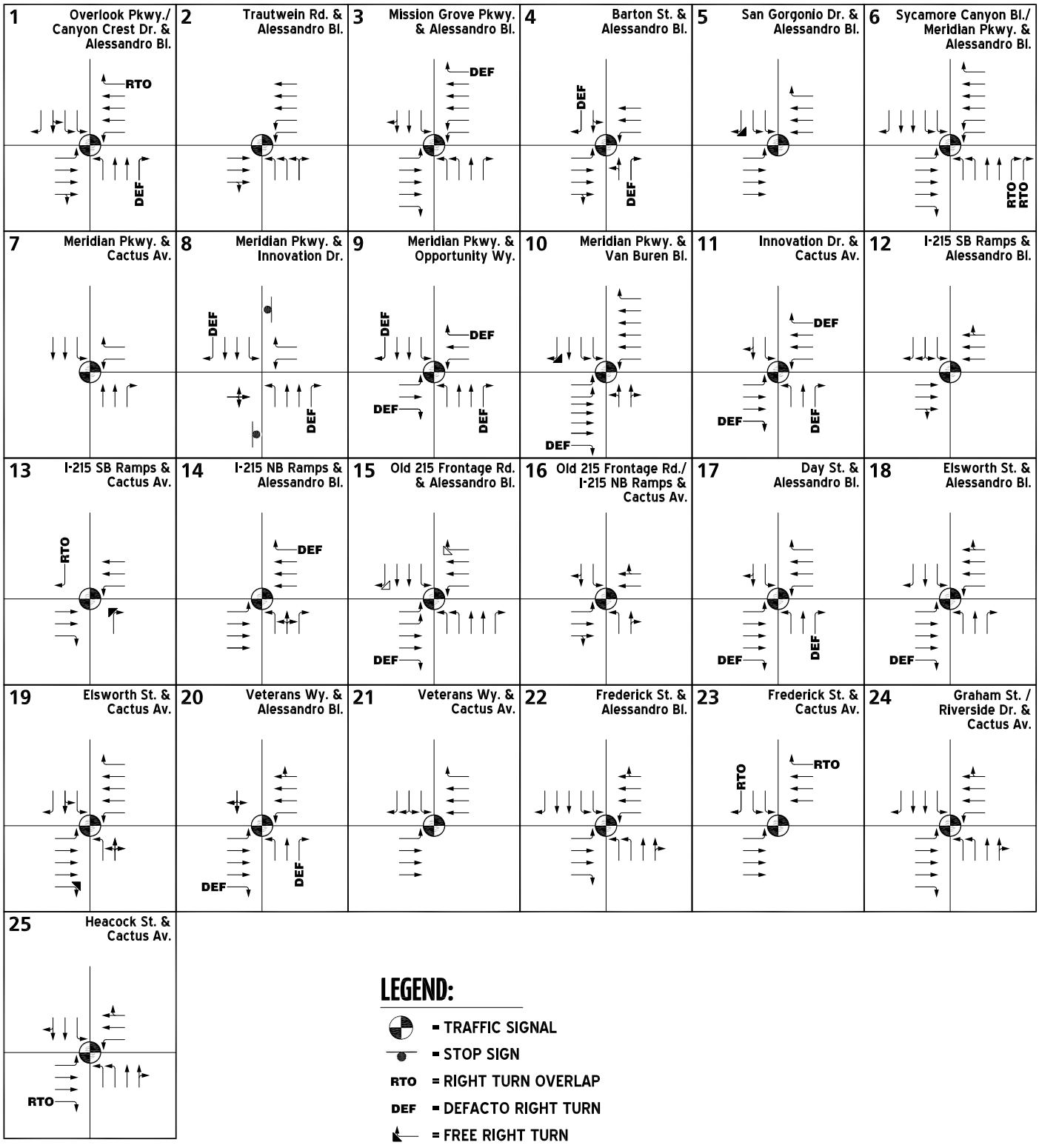
- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- SPEED LIMIT 25 = SPEED LIMIT (MPH)

N

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URBAN CROSSROADS

EXHIBIT 3-1 (2OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



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EXHIBIT 3-2: MARCH JOINT POWERS AUTHORITY GENERAL PLAN CIRCULATION ELEMENT



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EXHIBIT 3-3: MARCH JOINT POWERS AUTHORITY GENERAL PLAN ROADWAY CROSS-SECTIONS

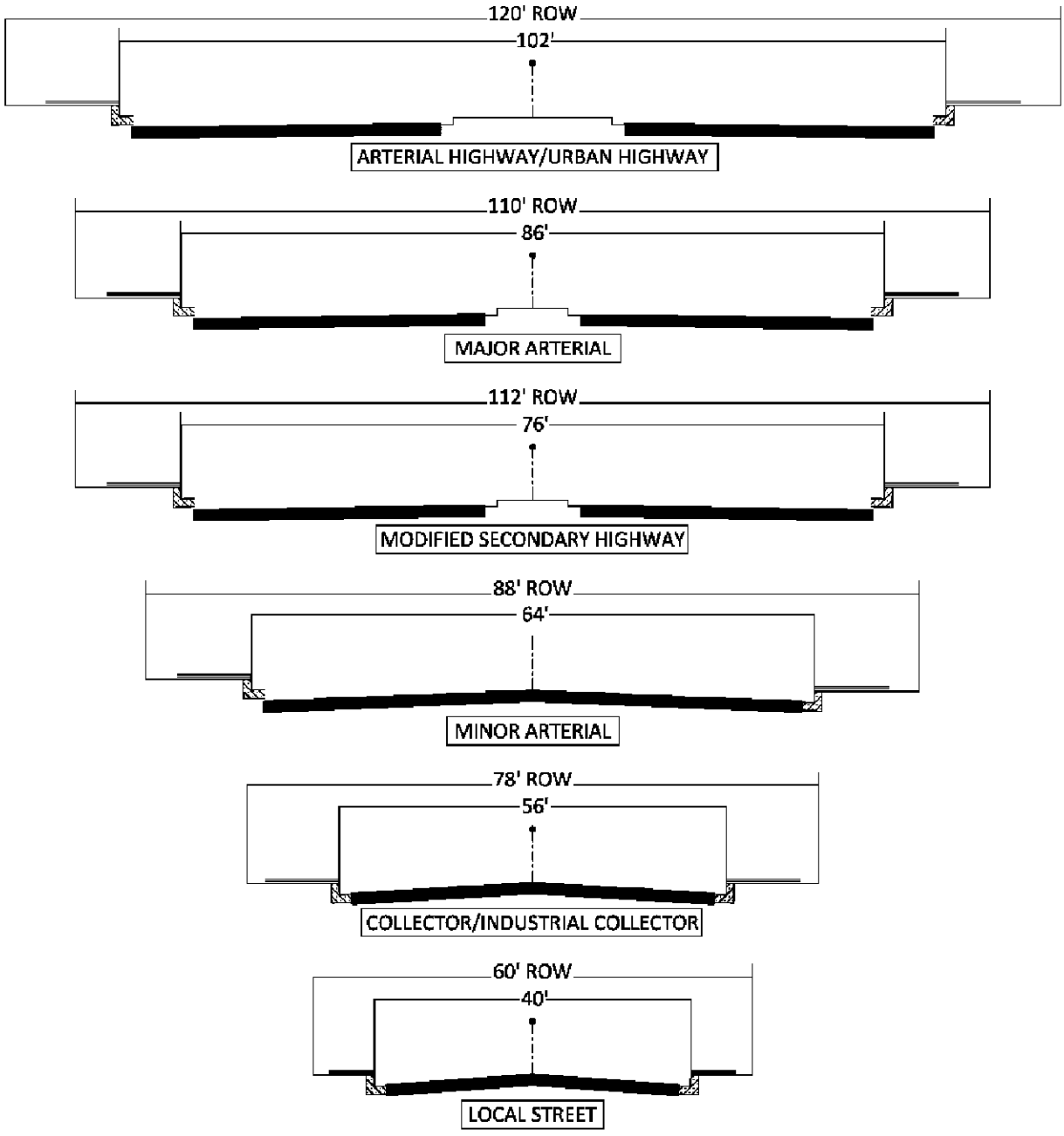
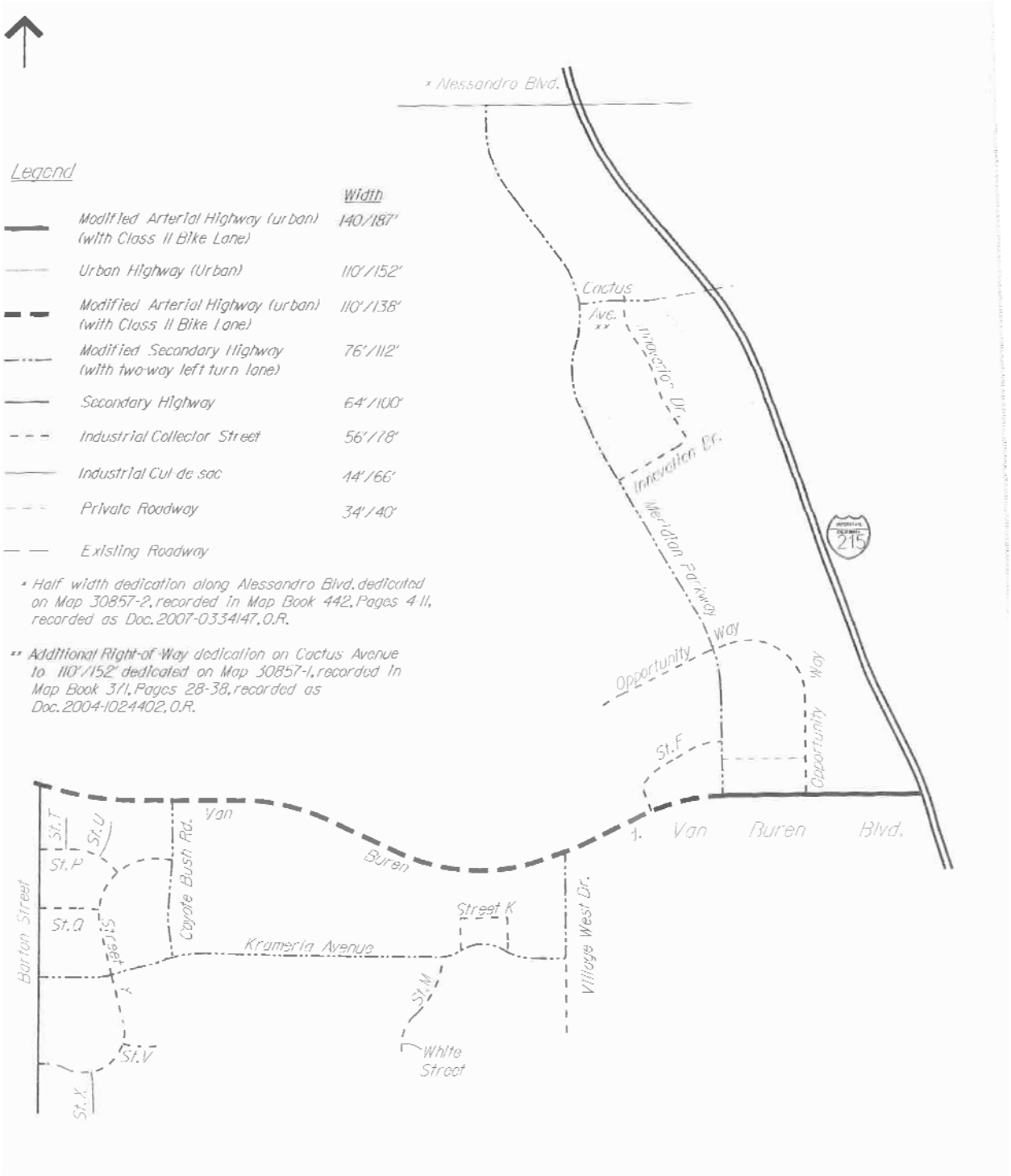


EXHIBIT 3-3.A: MERIDIAN GENERAL PLAN AMENDMENT ROADWAY SYSTEM



3.2.4 CITY OF MORENO VALLEY

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Moreno Valley General Plan Circulation Element are shown on Exhibit 3-8 and Exhibit 3-9 illustrates the City of Moreno Valley General Plan roadway cross-sections.

3.3 TRUCK ROUTES

The March JPA designated truck route map is shown on Exhibit 3-10. The I-215 Freeway, Alessandro Boulevard (west of the I-215 Freeway), Meridian Parkway, Innovation Drive, Van Buren Boulevard, and Cactus Avenue are identified as designated truck routes. It is our understanding that truck traffic westbound onto Alessandro Boulevard from Meridian Parkway is limited to local deliveries.

3.4 TRANSIT SERVICE

The study area within the March JPA and the surrounding Cities of Riverside and Moreno Valley are currently served by the Riverside Transit Authority (RTA), a public transit agency serving various jurisdictions within Riverside County. The existing bus routes provided within the area by RTA are shown on Exhibit 3-11. RTA Route 11 could potentially serve the Project as it currently operates along Cactus to the north of the Project site. Transit service is reviewed and updated by RTA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

It should also be noted that the Moreno Valley/March Field Metrolink Station is located on Meridian Parkway.

3.5 BICYCLE & PEDESTRIAN FACILITIES

Field observations conducted in May 2018 indicate nominal pedestrian and bicycle activity within the study area. Existing pedestrian facilities within the study area are shown on Exhibit 3-12. There are currently Class II bike lanes along Alessandro Boulevard, Meridian Parkway, and Van Buren Boulevard within the study area. Class II bikeways are bike lanes which are established adjacent to traffic lanes and shared the same roadway. Existing sidewalks are currently in place along the Cactus Avenue on the north side of the street.

EXHIBIT 3-4: COUNTY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT

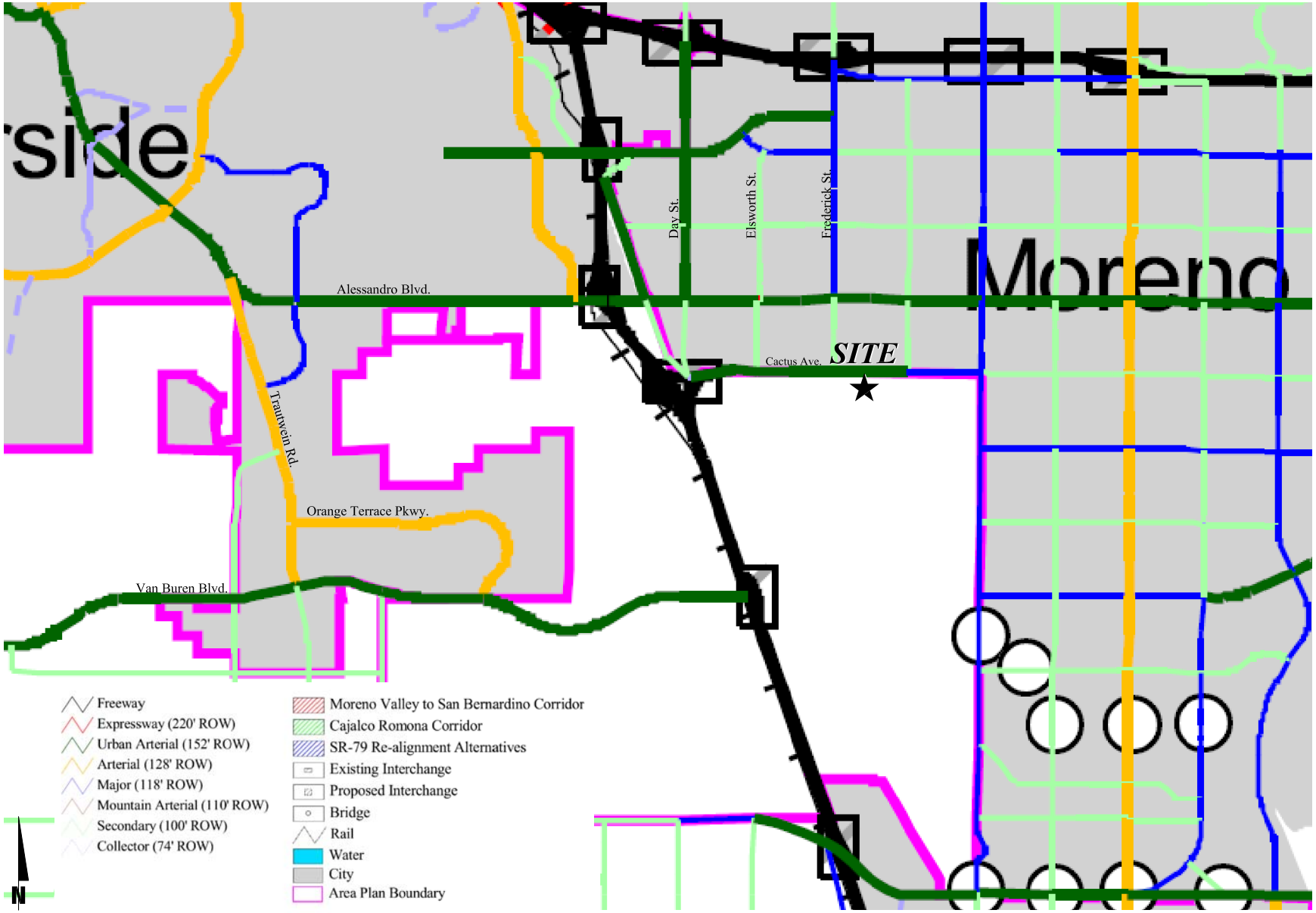
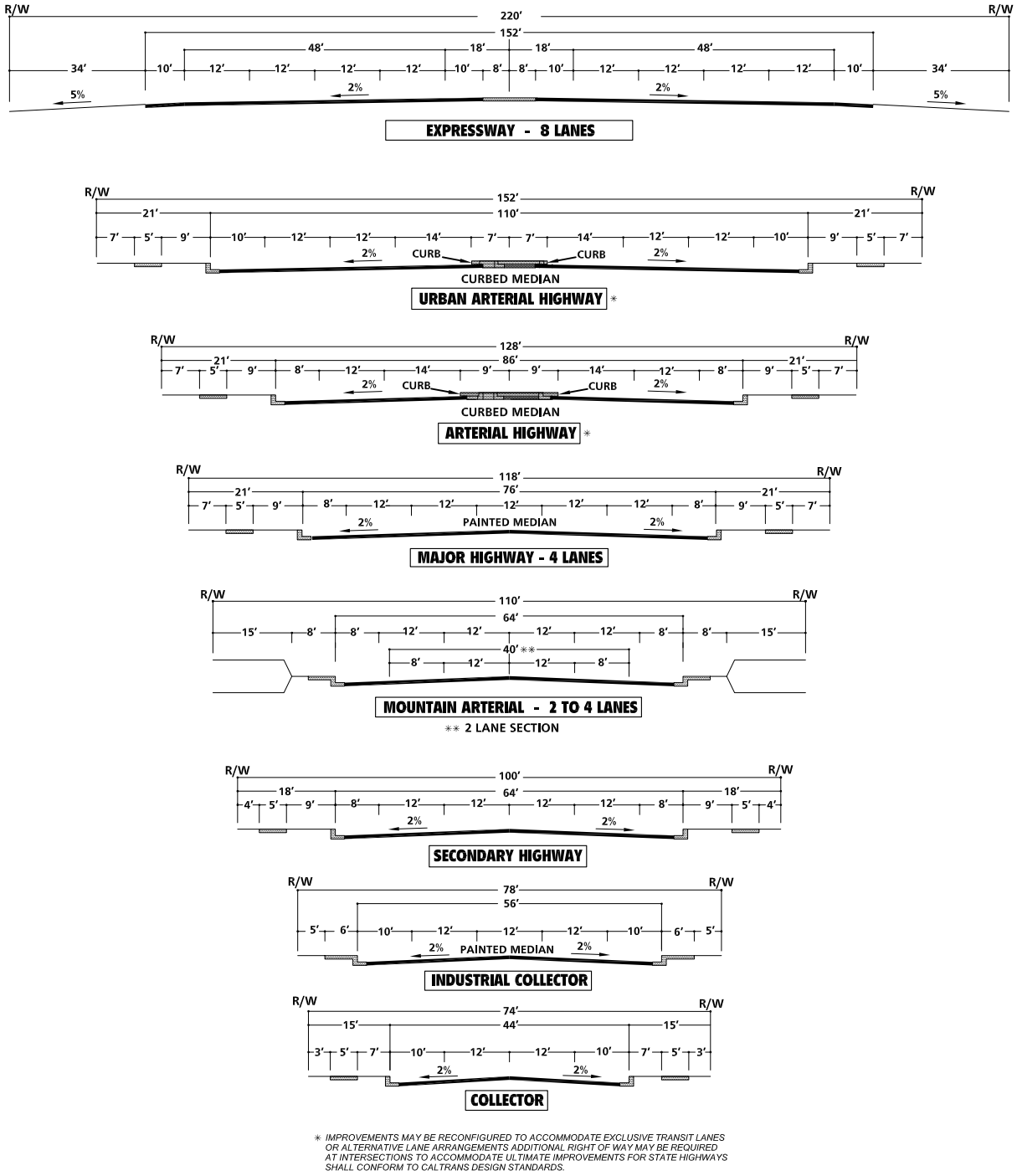


EXHIBIT 3-5: COUNTY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS

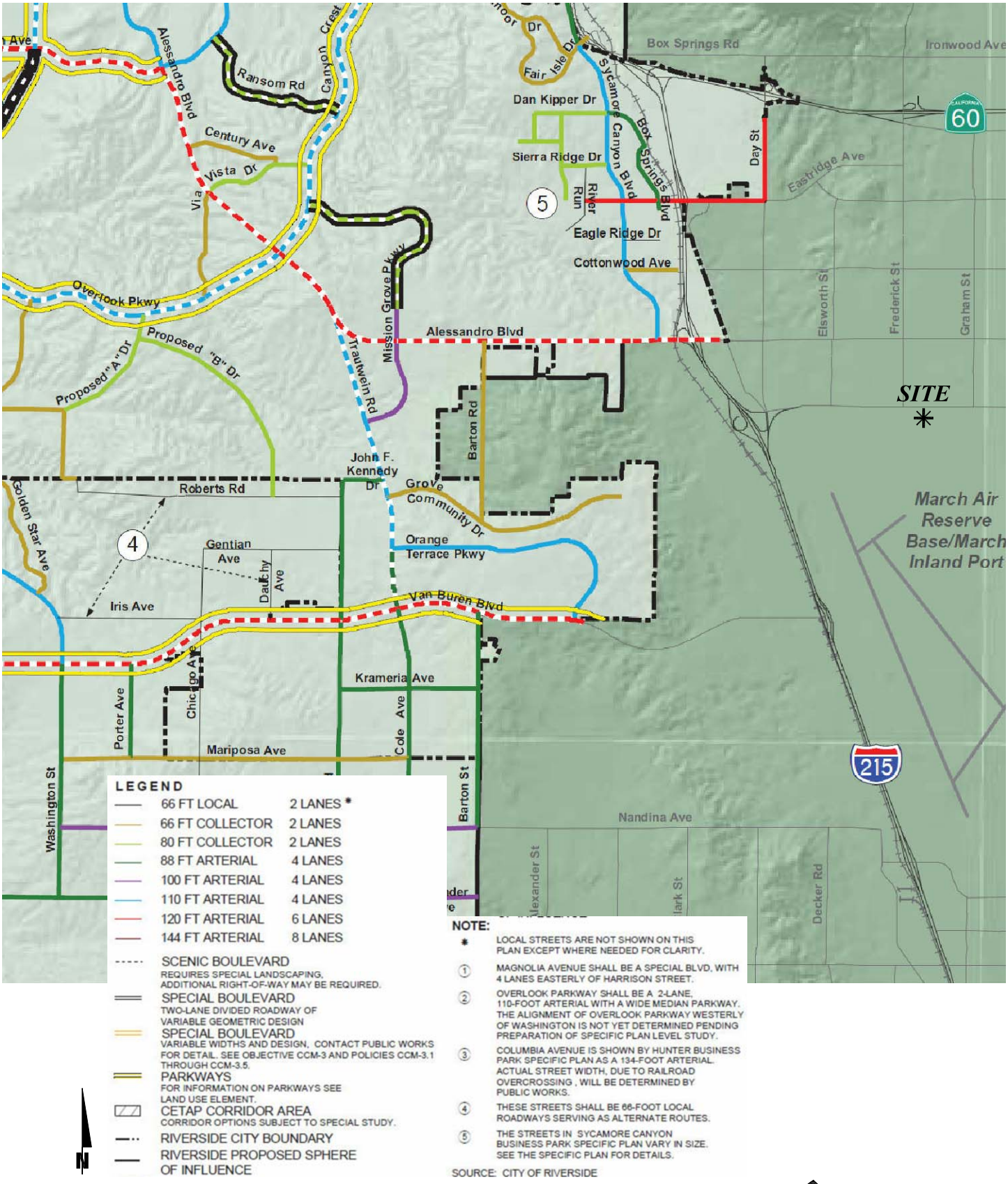


* *IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.*

NOT TO SCALE

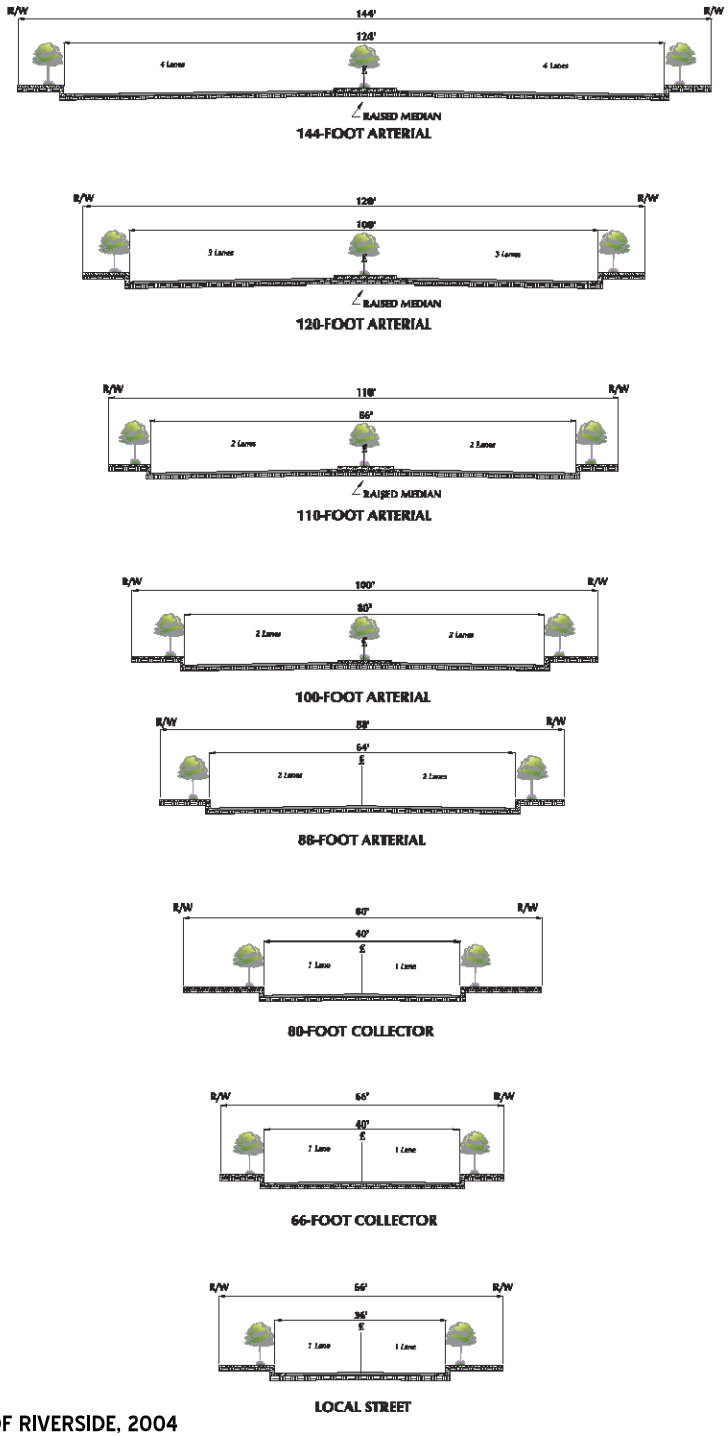
SOURCE: COUNTY OF RIVERSIDE

EXHIBIT 3-6: CITY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT



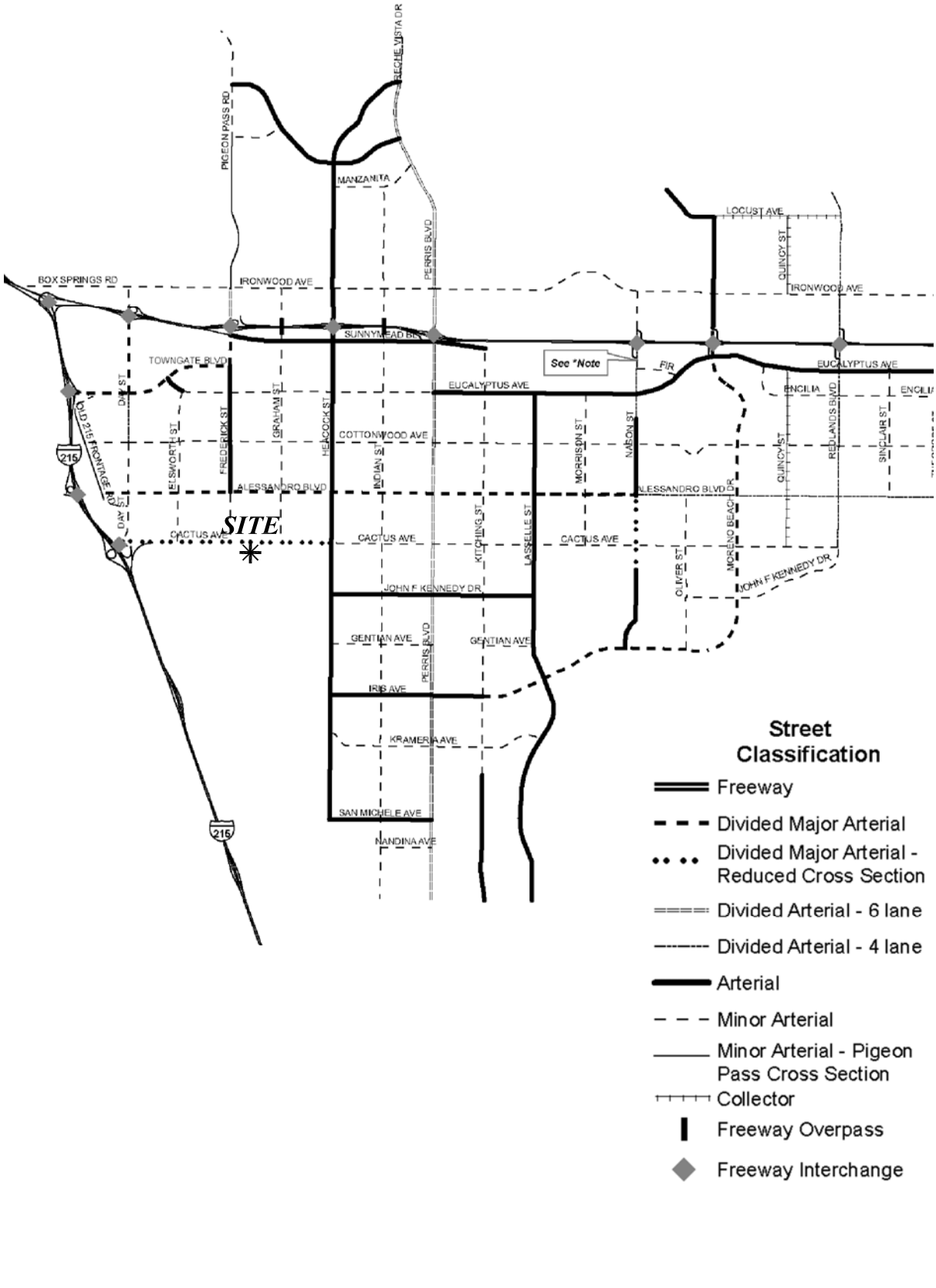
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EXHIBIT 3-7: CITY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS



SOURCE: CITY OF RIVERSIDE, 2004

EXHIBIT 3-8: CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT



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EXHIBIT 3-9: CITY OF MORENO VALLEY GENERAL PLAN ROADWAY CROSS-SECTIONS

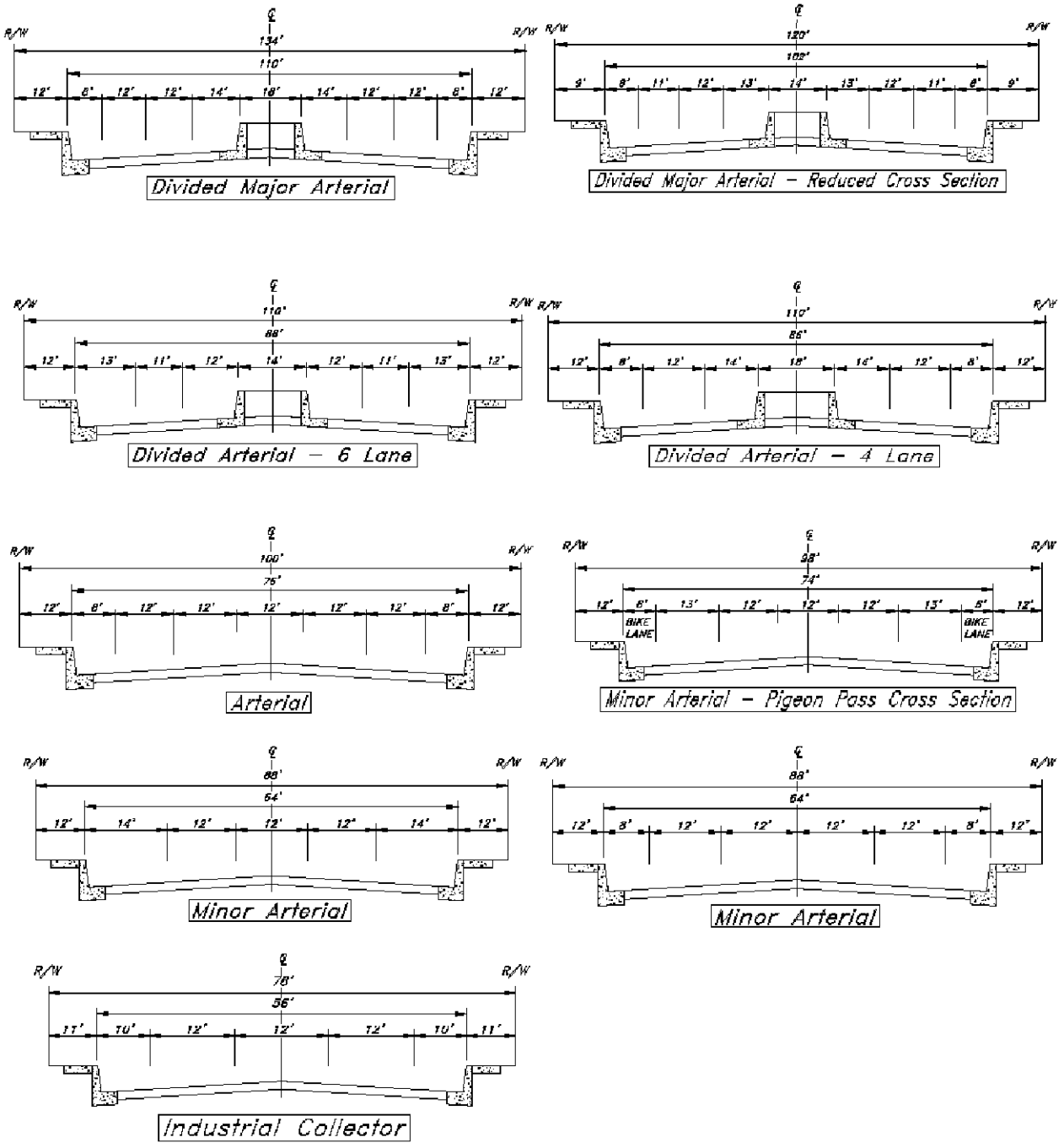


EXHIBIT 3-10: MARCH JOINT POWERS AUTHORITY TRUCK ROUTES

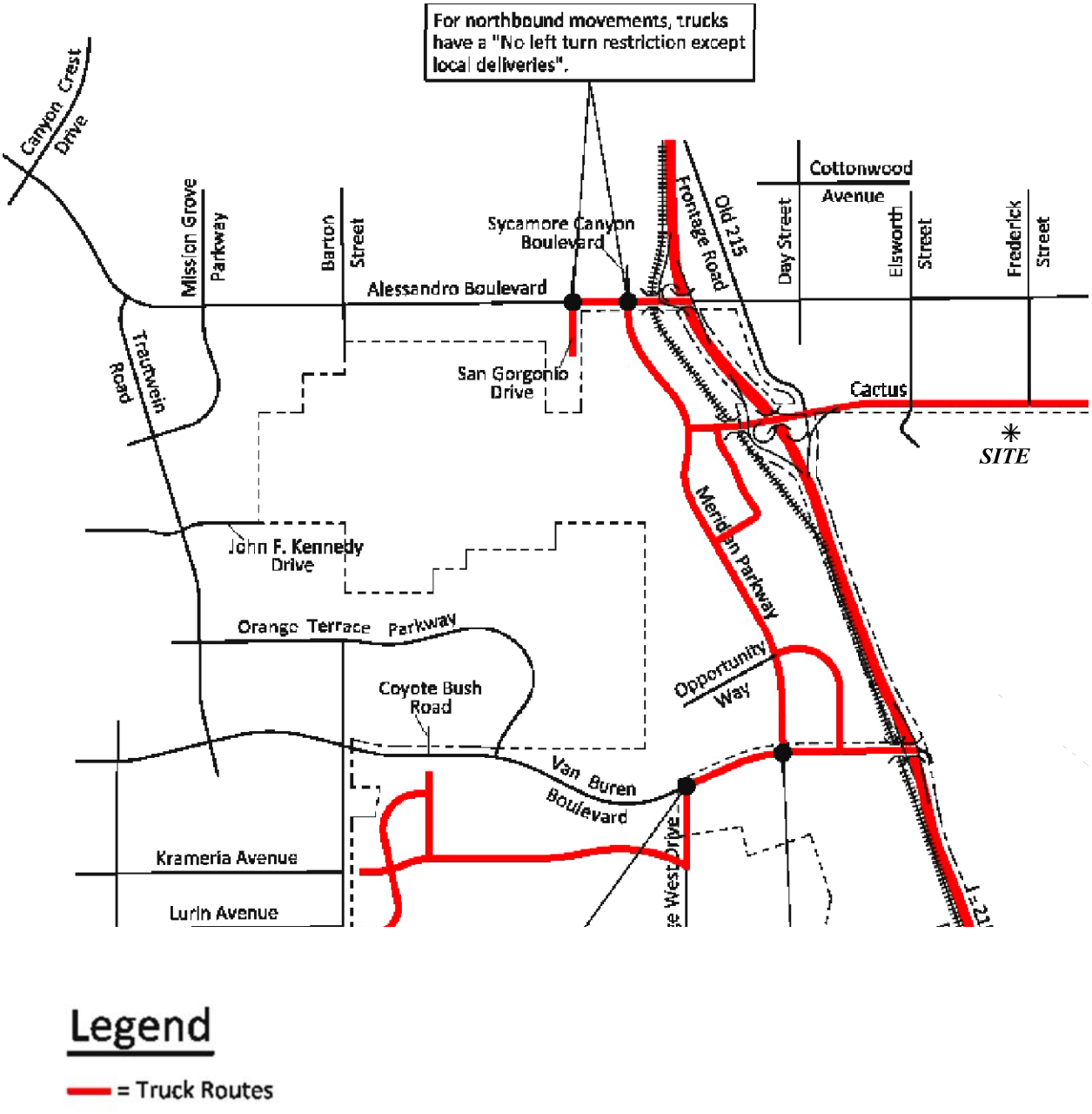
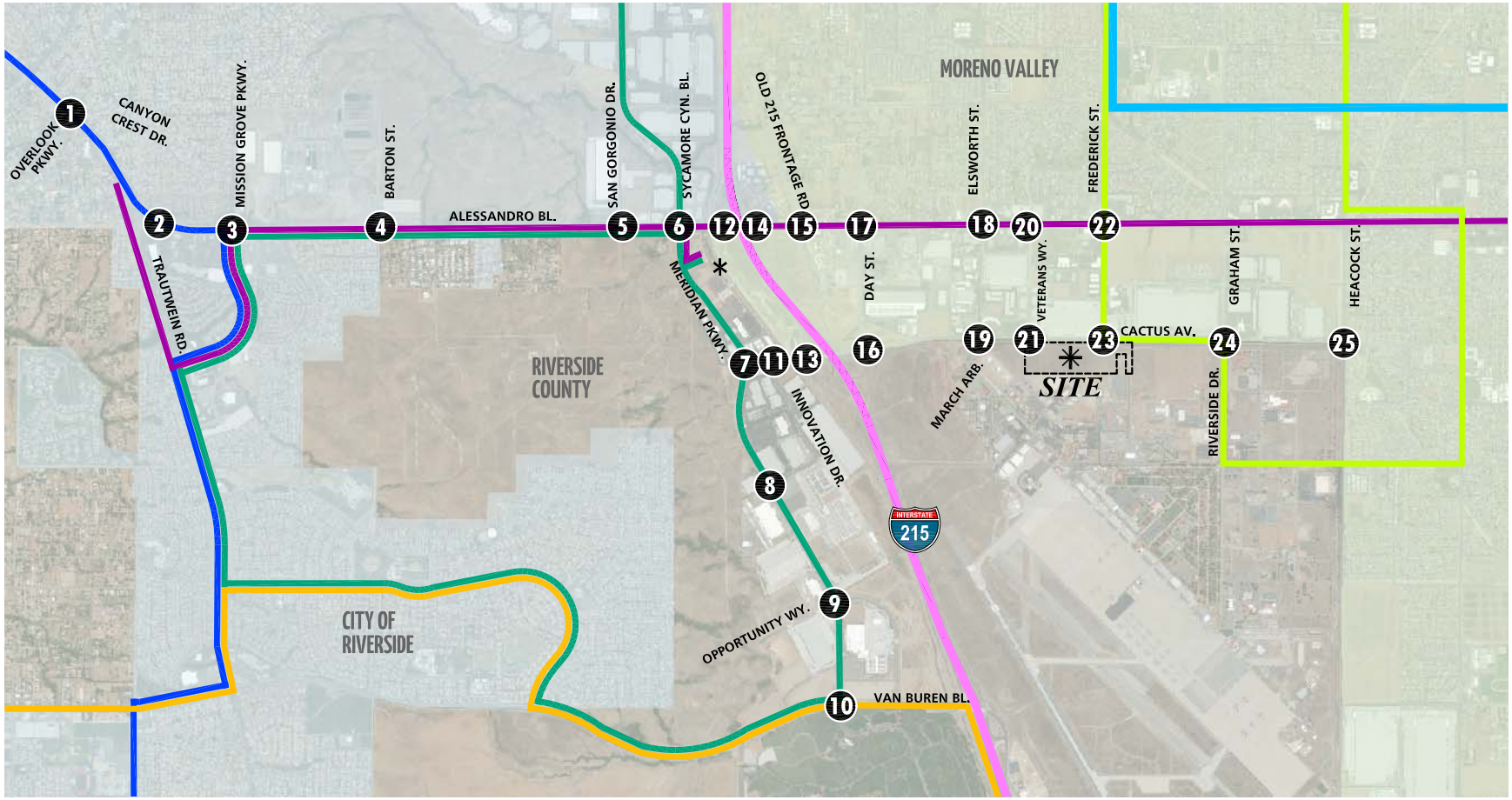


EXHIBIT 3-11: EXISTING TRANSIT ROUTES



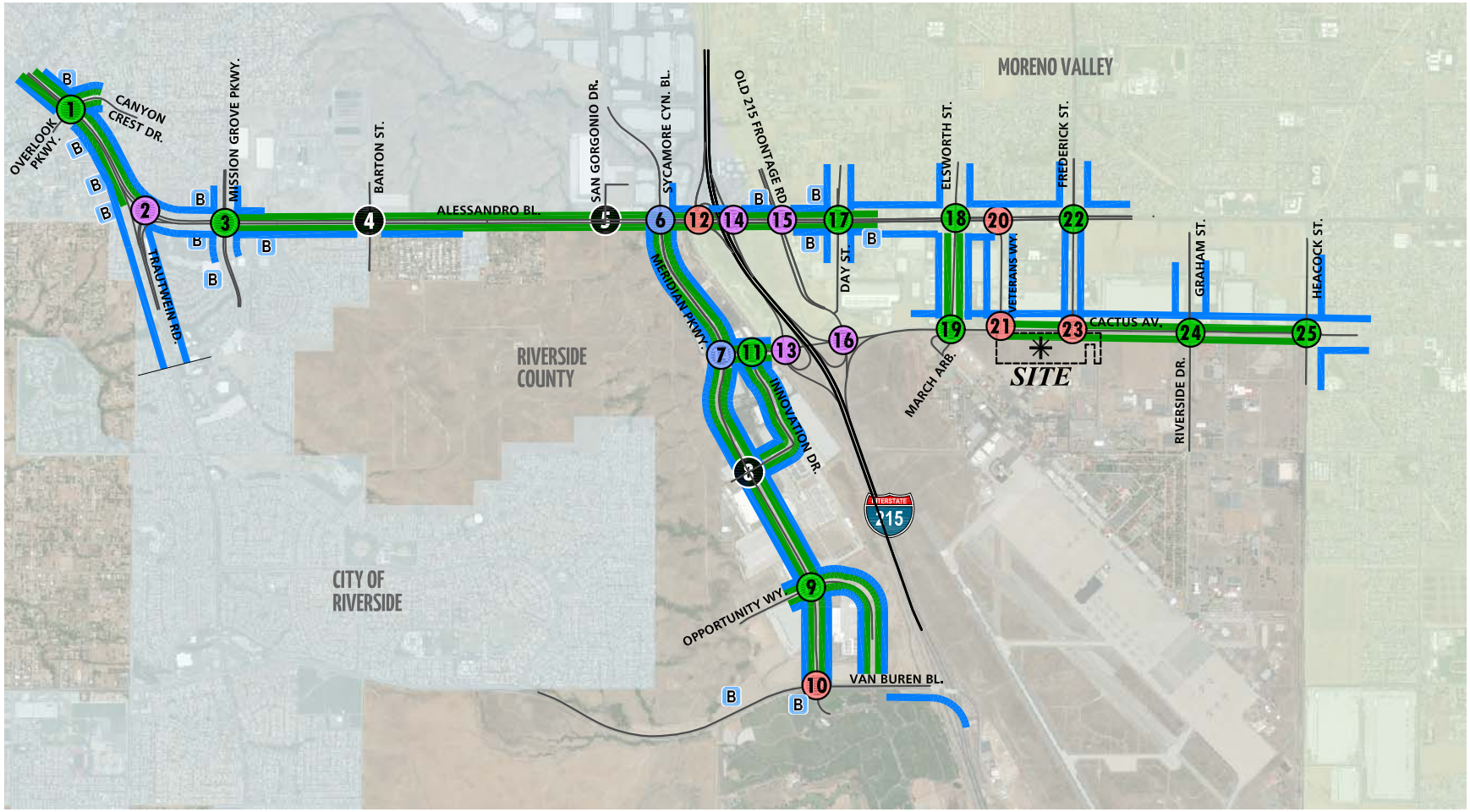
LEGEND:

- = RTA ROUTE 22
- = RTA ROUTE 20
- = RTA ROUTE 26
- = RTA ROUTE 11
- = RTA ROUTE 27
- = RTA ROUTE 11
- = RTA ROUTE 208/212

* MORENO VALLEY/MARCH FIELD METROLINK STATION.

N

EXHIBIT 3-12: EXISTING PEDESTRIAN FACILITIES



LEGEND:

- = SIDEWALK
- = BIKE LANE
- B = BUS STOP
- 0 = NO CROSSWALK
- 0 = CROSSWALK ON ALL APPROACHES
- 0 = CROSSWALK ON THREE APPROACHES
- 0 = CROSSWALK ON TWO APPROACHES
- 0 = CROSSWALK ON ONE APPROACH

N

3.6 EXISTING (2018) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2018. Consistent with standard traffic engineering practice, these traffic counts were conducted either on Tuesday, Wednesday, or Thursday due to potential fluctuations in traffic that typically occur on Mondays, Fridays, Holidays, or weekends. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes, and nearby schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.). The traffic counts include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4 or More Axle Trucks.

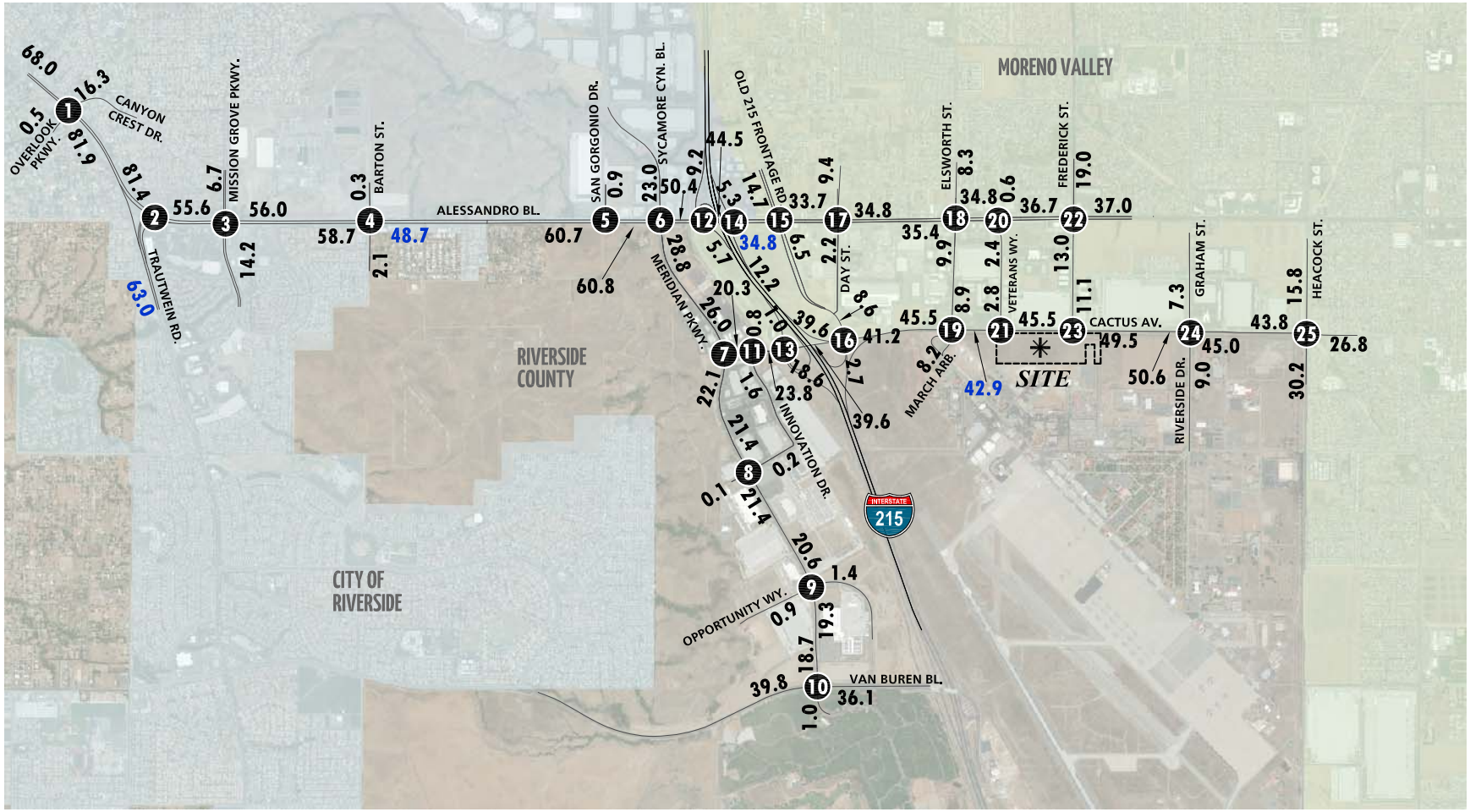
To represent the impact large trucks, buses and recreational vehicles have on traffic flow, truck traffic has been accounted for in the analysis as a percentage of total traffic at the study area intersections. The actual vehicle mix (passenger cars vs. trucks) was taken into consideration at the ramp-to-arterial junctions for the purposes of conducting the freeway mainline analysis and all study area intersections for the peak hour operations analysis. In other words, the traffic volumes utilized for intersections, basic freeway segment, and merge/diverge ramp junction analyses utilize the actual vehicle traffic flow and trucks are reflected in the analysis as a percentage of the total traffic flow, not PCE.

Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-13. Where 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 14.32 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 6.98 percent. As such, the above equation utilizing a factor of 14.32 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 6.98 percent (i.e., 1/0.0698 = 14.32) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in actual vehicles) are shown on Exhibit 3-14.

EXHIBIT 3-13: EXISTING (2018) AVERAGE DAILY TRAFFIC (ADT)



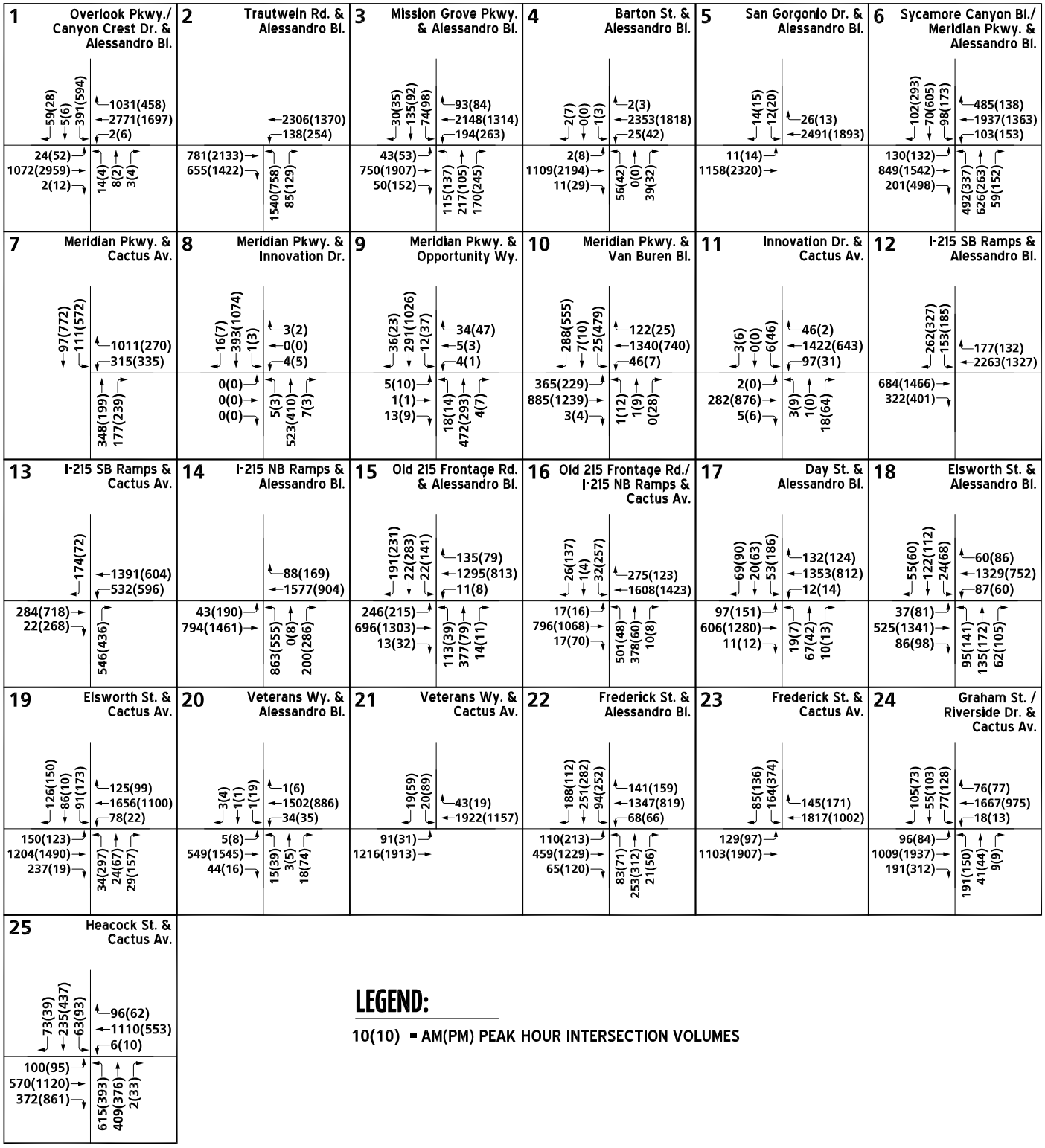
LEGEND:

10.0 = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)

N

EXHIBIT 3-14: EXISTING (2018) TRAFFIC VOLUMES



3.7 EXISTING (2018) CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing (2018) peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1 which indicates that the Existing study area intersections are all currently operating at acceptable LOS during the peak hours, with the exception of the following locations:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1) – LOS F AM and PM peak hours
- Mission Grove Pkwy. & Alessandro Bl. (#3) – LOS E AM peak hour only
- Sycamore Canyon Bl. & Alessandro Bl. (#6) – LOS E AM peak hour only
- Elsworth St. & Cactus Av. (#19) – LOS F AM and PM peak hours

As the deficiencies at Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard are caused by minimum green times necessary for pedestrian crossing time, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-15. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

3.8 EXISTING (2018) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes and conducted for unsignalized intersections operating at LOS E or F. For Existing traffic conditions, there are no unsignalized study area intersections that currently operate at an unacceptable LOS.

3.9 EXISTING (2018) CONDITIONS OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway at Cactus Avenue interchange to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 3-2. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-2, there are no existing queuing issues. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.4.

EXHIBIT 3-15: EXISTING (2018) SUMMARY OF LOS

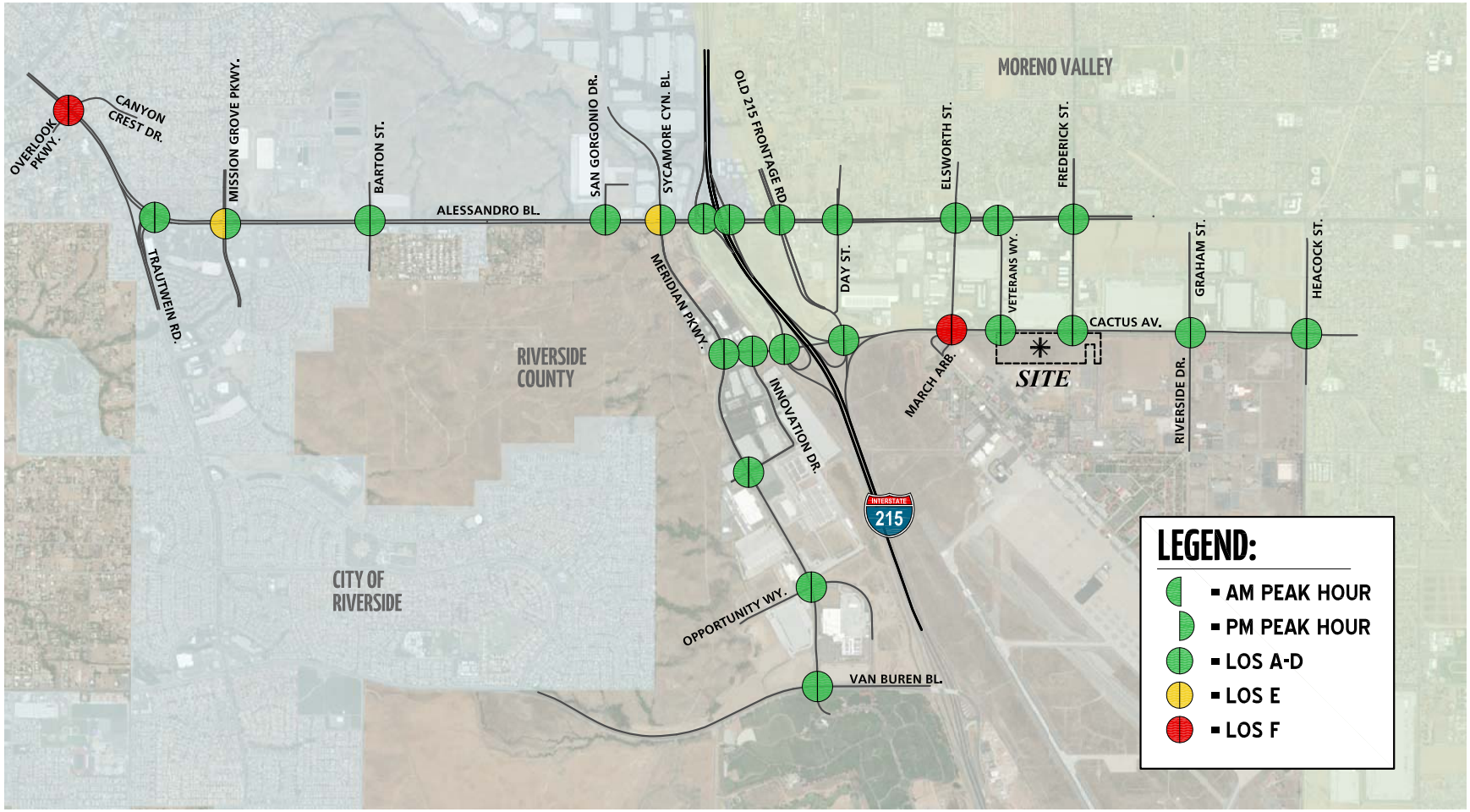


Table 3-1

Intersection Analysis for Existing (2018) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service		Acceptable LOS	Jurisdiction
			Northbound			Southbound			Eastbound			Westbound								
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM		
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	TS	1	2	d	2	1	1	1	3	0	1	3	1>	**356.3**	**81.5**	**F**	**F**	D	Riverside
2	Trautwein Rd. & Alessandro Bl.	TS	2	0	1	0	0	0	0	3	0	2	3	0	36.1	25.5	D	C	D	Riverside
3	Mission Grove Pkwy. & Alessandro Bl.	TS	2	1	1	1	2	0	1	3	1	2	3	d	**76.6**	22.6	**E**	C	D	Riverside
4	Barton St. & Alessandro Bl.	TS	0	1	d	0	1	d	1	3	0	1	3	d	25.5	22.8	C	C	D	Riverside/JPA
5	San Gorgonio Dr. & Alessandro Bl.	TS	0	0	0	2	0	1>>	1	3	0	0	3	1	17.0	15.5	B	B	D	Riverside/JPA
6	Sycamore Canyon Bl. & Alessandro Bl.	TS	2	2	2>	2	2	1	1	3	1	2	3	1	**79.4**	47.6	**E**	D	D	Riverside/JPA
7	Meridian Pkwy. & Cactus Av.	TS	0	2	1	1	2	0	0	0	0	1	0	1	45.0	36.7	D	D	D	JPA
8	Meridian Pkwy. & Innovation Dr.	CSS	1	2	d	1	2	d	0	1	0	1	0	1	24.4	24.9	C	C	D	JPA
9	Meridian Pkwy. & Opportunity Wy.	TS	1	2	d	1	2	d	1	1	d	1	1	d	10.0	23.1	A	C	D	JPA
10	Meridian Pkwy. & Van Buren Bl.	TS	0	2	0	2	1	1>>	2	4	d	1	4	1	44.6	41.2	D	D	D	JPA
11	Innovation Dr. & Cactus Av.	TS	1	1	d	1	1	0	1	2	d	1	2	d	18.6	18.1	B	B	D	JPA
12	I-215 SB Ramps & Alessandro Bl.	TS	0	0	0	1	1	1	0	3	0	0	3	0	5.5	8.9	A	A	D	Caltrans/Riverside/County
13	I-215 SB Ramps & Cactus Av.	TS	0	0	1>>	0	0	1>	0	2	1	1	2	0	4.3	9.1	B	A	D	Caltrans/JPA/County
14	I-215 NB Ramps & Alessandro Bl.	TS	1	1	1	0	0	0	1	3	0	0	3	d	21.1	20.4	C	C	D	Caltrans/Riverside/County
15	Old 215 Frontage Rd. & Alessandro Bl.	TS	2	2	1	1	2	1	2	2	d	1	2	1	22.0	32.9	C	C	D	MV/Riverside/County
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	TS	1	1	0	1	1	0	1	2	0	0	2	0	52.4	20.2	D	C	D	Caltrans/JPA
17	Day St. & Alessandro Bl.	TS	1	1	d	1	1	0	1	3	d	1	2	1	23.4	16.1	C	B	D	MV
18	Elsworth St. & Alessandro Bl.	TS	1	1	1	1	1	1	1	3	d	1	3	0	20.7	25.5	C	C	D	MV
19	Elsworth St. & Cactus Av.	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	**189.6**	**99.1**	**F**	**F**	D	MV/JPA
20	Veterans Wy. & Alessandro Bl.	TS	1	1	d	0	1	0	1	3	d	1	3	0	19.0	19.8	B	B	D	MV
21	Veterans Wy. & Cactus Av.	TS	0	0	0	1	1	1	1	3	0	0	3	1	7.1	7.7	A	A	D	MV/JPA
22	Frederick St. & Alessandro Bl.	TS	2	2	0	2	2	1	1	2	1	1	3	0	38.5	50.8	A	D	D	MV
23	Frederick St. & Cactus Av.	TS	0	0	0	2	0	1>	1	3	0	0	3	1>	21.7	22.1	C	C	D	MV/JPA
24	Graham St./Riverside Dr. & Cactus Av.	TS	2	2	0	1	2	1	1	3	1	1	3	0	47.1	40.5	D	D	D	MV/JPA
25	Heacock St. & Cactus Av.	TS	2	2	0	1	2	0	1	2	1>	1	2	0	45.4	28.2	D	C	D	MV/JPA

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free-Right Turn Lane; d= Defacto Right Turn Lane

[2] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal

Table 3-2

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2018) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps & Cactus Av.	SBR	1,115	128	0	Yes	Yes
	NBR	1,850	0	0	Yes	Yes
I-215 NB Ramps & Cactus Av.	NBL	145	541[2]	45	Yes[4]	Yes
	NBT/R	1,650	294	54	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

3.10 EXISTING (2018) CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS

Existing mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 3-16. As shown on Table 3-3, the basic freeway segments analyzed for this study were found to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the PM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Existing basic freeway segment analysis worksheets are provided in Appendix 3.4.

3.11 EXISTING (2018) CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing conditions and the results of this analysis are presented in Table 3-4. As shown in Table 3-4, the freeway ramp merge and diverge areas currently operate at LOS D or better. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Existing freeway ramp junction operations analysis worksheets are provided in Appendix 3.5.

EXHIBIT 3-16: EXISTING (2018) FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

Table 3-3

Basic Freeway Segment Analysis for Existing (2018) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	Volume		Truck %		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Cactus Av.	4	3,766	3,120	3%	3%	15.1	--[5]	B	**F**
		South of Cactus Av.	4	3,600	3,476	2%	2%	14.3	--[5]	B	**F**
	NB	North of Cactus Av.	4	1,954	3,377	3%	3%	--[5]	--[5]	**F**	**F**
		South of Cactus Av.	4	3,446	3,606	2%	2%	--[5]	--[5]	**F**	**F**

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[4] LOS = Level of Service

[5] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

Table 3-4

Freeway Ramp Junction Merge/Diverge Analysis for Existing (2018) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]
I-215	Southbound	Off-Ramp at Cactus Av.	4	15.4	B	--[5]	**F**
		Loop Off-Ramp at Cactus Av.	4	16.1	C	--[5]	**F**
		On-Ramp at Cactus Av.	3	21.0	C	--[5]	**F**
	Northbound	On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**
		Loop On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**
		Off-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

[4] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The proposed Project involves the development of the approximately 35.4-acre site with a 718,000 square foot building. A total of 289 automobile parking stalls and 317 truck trailer parking stalls would be provided. The building would include a total of 105 loading dock positions for trucks. The Project is located within Zone D of the Riverside County Airport Land Use Commission (RCALUC) Plan. Due to the proximity of the Project to the airport, there are occupancy restrictions that are applicable for the industrial uses. As such, there are generally no incompatible industrial uses with Zone D of the RCALUC.

The Project site plan proposes access along Cactus Avenue. Cactus Avenue is assumed to allow full-access turning movements. Regional access to the project site is provided via the I-215 Freeway at Alessandro Boulevard and Cactus Avenue interchanges.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development.

Trip generation rates for the Project in actual vehicles are shown in Table 4-1.

The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project are shown on Table 4-2 based on actual vehicles. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their *Trip Generation* manual, 10th Edition, 2017. (3) For purposes of this analysis, ITE land use code 155 (High-Cube Fulfillment Center Warehouse) have been used to derive site-specific trip generation estimates. In order to accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation. As noted on Table 4-1, refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips by vehicle mix. Total vehicle mix percentages were also obtained from the ITE Trip Generation manual in conjunction with the SCAQMD recommended truck mix, by axle type.

As shown on Table 4-2, the proposed Project is anticipated to generate a net total of 5,873 trip-ends per day with 425 AM peak hour trips and 983 PM peak hour trips (actual vehicles as opposed to PCE).

For the purposes of this analysis, it is proposed that the actual vehicles be utilized in order to most accurately reflect the effects of heavy trucks in the analysis. Trucks will be accounted for in the analysis as a percentage of total traffic, which will be input into the analysis software (Synchro, Version 10).

Table 4-1

Project Trip Generation Rates

Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Trip Generation Rates (Actual Vehicles)[1]									
High-Cube Fulfillment Center Warehouse[3]	155	TSF	0.454	0.136	0.590	0.384	0.986	1.370	8.180
Passenger Cars (AM-97.2%; PM-98.2%; Daily-91.2%)			0.442	0.132	0.573	0.377	0.969	1.345	7.460
2-Axle Trucks (AM-0.47%; PM-0.30%; Daily-1.47%)			0.002	0.001	0.003	0.001	0.003	0.004	0.120
3-Axle Trucks (AM-0.58%; PM-0.37%; Daily-1.82%)			0.003	0.001	0.003	0.001	0.004	0.005	0.149
4+-Axle Trucks (AM-1.75%; PM-1.13%; Daily-5.50%)			0.008	0.002	0.010	0.004	0.011	0.015	0.451

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = Thousand Square Feet; VFP = Vehicle Fuelling Positions

[3] Vehicle Mix Source: ITE High Cube Warehouse Vehicle Trip Generation Analysis, October 2016 and SCAQMD

Table 4-2

Project Trip Generation Summary

Project	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
High-Cube Fulfillment Center Warehouse	718.000	TSF							
Passenger Cars:			317	95	412	270	695	965	5,356
Truck Trips:									
2-axle:			2	0	2	1	2	3	86
3-axle:			2	1	3	1	3	4	107
4+-axle:			6	2	8	3	8	11	324
- Net Truck Trips (Actual Trucks)			*10*	*3*	*13*	*5*	*13*	*18*	*517*
Grand Total			**327**	**98**	**425**	**275**	**708**	**983**	**5,873**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = Thousand Square Feet

[3] TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Trucks).

The ITE Trip Generation Manual (2017) trip generation rates for high-cube fulfillment center use (ITE land use code 155) are based on limited data (i.e., one to two surveyed sites) and the ITE Trip Generation Manual recommends the use of local data sources where available. As such, Project trip generation has been calculated based on the trip-generation statistics published in the TUMF High-Cube Warehouse Trip Generation Study (WSP, January 29, 2019) which was commissioned by Western Riverside Council of Governments (WRCOG) in support of the Transportation Uniform Mitigation Fee (TUMF) update. The WRCOG trip generation rates are based on data collected at 11 local high-cube fulfillment center sites in Riverside and San Bernardino Counties. As shown in Table 4-3, using the ITE land use code 155 generates far more trips than using the WRCOG rates. The WRCOG data is far more accurate for estimating the number of trips that the proposed Project will generate. However, the proposed Project's impacts were conservatively analyzed using the ITE land use code 155 which vastly overstates the proposed project's contribution to traffic, as well as impacts from traffic such as air quality, noise, greenhouse gas, and health risks.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding land uses, and the proximity to the regional freeway system. The trip distribution pattern for truck traffic is also influenced by the local truck routes approved by the March JPA, City of Riverside, City of Moreno Valley, and Caltrans. Given these differences, separate trip distributions were generated for both passenger cars and truck trips. Exhibit 4-1 illustrates the trip distribution patterns for passenger cars. Exhibits 4-2 illustrates the truck trip distribution patterns.

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes (non-truck trips only or employee trips).

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3 and 4-4, respectively.

4.5 CONSTRUCTION TRAFFIC

Project construction activities may potentially result in temporary and transient traffic deficiencies related to:

Table 4-3

High-Cube Fulfillment Center Trip Generation Comparison

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
High-Cube Fulfillment Center Warehouse[3]	TSF	--	0.094	0.028	0.122	0.046	0.119	0.165	2.129
Passenger Cars			0.079	0.024	0.103	0.040	0.104	0.144	1.750
2-4 Axle Trucks			0.006	0.002	0.008	0.003	0.008	0.011	0.162
5+-Axle Trucks			0.008	0.003	0.011	0.003	0.007	0.010	0.217

[1] Trip Generation Source: DRAFT TUMF High Cube Warehouse Trip Generation Study, WSP, January 29, 2019.

[2] TSF = thousand square feet

[3] Vehicle Mix Source: TUMF High Cube Warehouse Trip Generation Study, WSP, January 29, 2019.
Inbound and outbound split source: High Cube Warehouse Vehicle Trip Generation Analysis, October 2016, ITE.

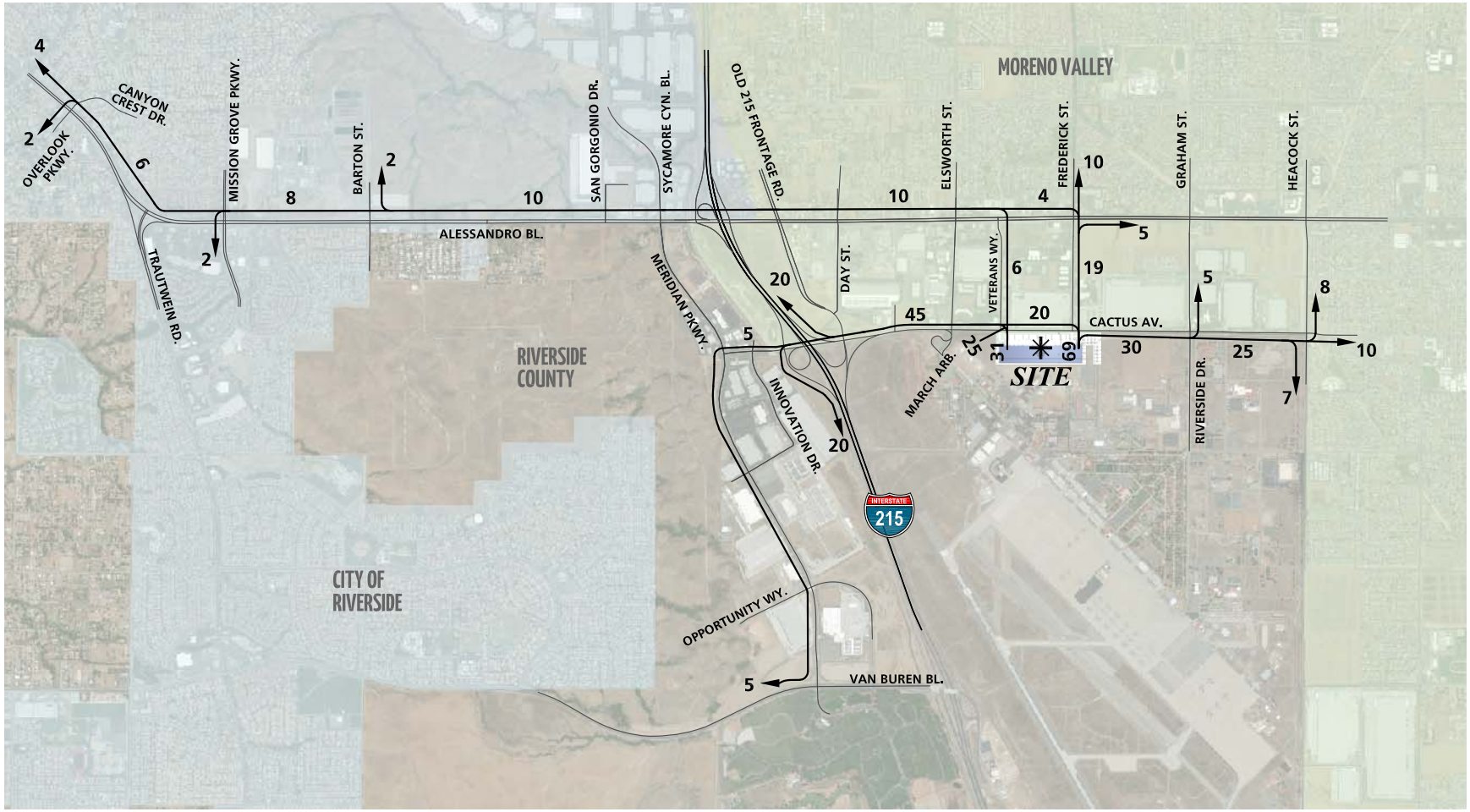
Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
High-Cube Fulfillment Center Warehouse	718.000	TSF							
Passenger Cars:			57	17	74	29	74	103	1,258
Truck Trips:									
2-4 axle:			4	1	5	2	6	8	116
5+-axle:			6	2	8	2	5	7	156
- Net Truck Trips			10	3	13	4	11	15	272
FULFILLMENT CENTER TOTAL NET TRIPS (WRCOG RATES)[2]			**67**	**20**	**87**	**33**	**85**	**118**	**1,530**
K4 TIA[3]			**327**	**98**	**425**	**275**	**708**	**983**	**5,873**
Variance (WRCOG Rates - TIA)			**-260**	**-78**	**-338**	**-242**	**-623**	**-865**	**-4,343**

[1] TSF = thousand square feet

[2] Trips based on WRCOG TUMF High Cube Warehouse Trip Generation Study, WSP, January 29, 2019..

[3] Trips evaluated in the K4 Parcel Traffic Impact Analysis.

EXHIBIT 4-1: PROJECT (PASSENGER CARS) TRIP DISTRIBUTION

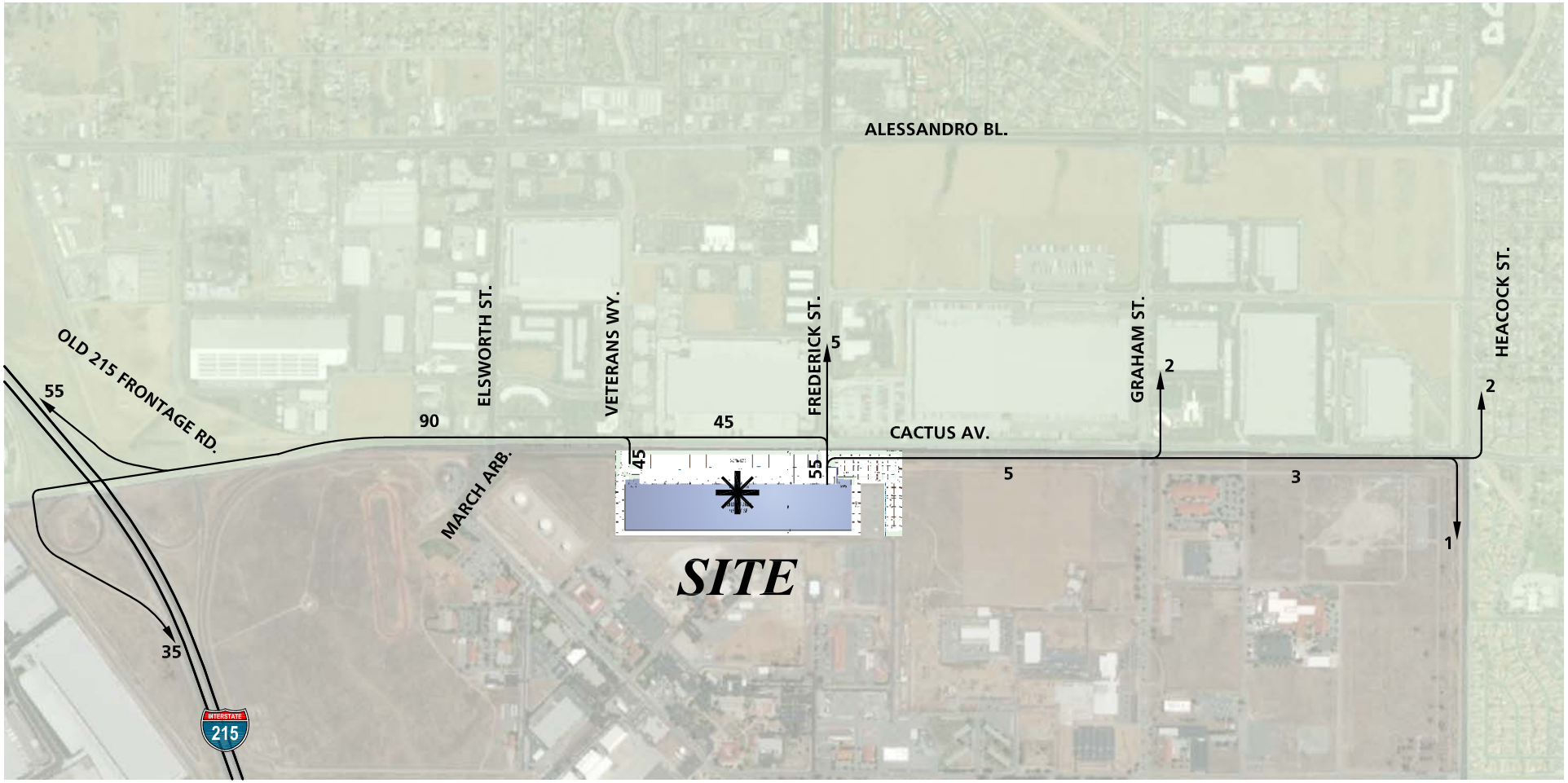


LEGEND:

10 = PERCENT TO/FROM PROJECT

N

EXHIBIT 4-2: PROJECT (TRUCKS) TRIP DISTRIBUTION



71

LEGEND:

10 = PERCENT TO/FROM PROJECT

N

- Construction employee commutes;
- Import of construction materials and soils; and
- Transport and use of heavy construction equipment.

The Applicant would be required to develop and implement a March JPA-approved Construction Traffic Management Plan addressing potential construction-related traffic detours and disruptions. In general, the Construction Traffic Management Plan would ensure that to the extent practical, construction traffic would access the Project site during off-peak hours; and that construction traffic would be routed to avoid travel through, or proximate to, sensitive land uses.

Additionally, the Project would include improvements to the Cactus Channel drainage ditch that runs along the south side of Cactus Avenue, commencing just east of Elsworth Street, then along the Project frontage, and further to the east ending at the Heacock Channel. The current drainage ditch is planned to be undergrounded in a box culvert that would run approximately 7,900 linear feet and would vary in width from an 11-foot wide box to a 9-foot wide double box (approximately 19 feet in width). This portion of the Project is being discussed with Riverside County Flood Control and Water Conservation District and the other agencies and landowners that control the land necessary to implement the length of the improvement. The box culvert would be jointly constructed with the Riverside County Flood Control District and Water Conservation District and it would function as part of the District's Master Plan and may require compliance with the Western Riverside County Multiple Species Habitat Conservation Plan.

4.6 BACKGROUND TRAFFIC

To account for growth in traffic between Existing Conditions (2018) and the Project Opening Year Cumulative (2023), a compounded annual traffic growth rate of 2.0 percent was assumed (10.41 percent aggregate growth in background traffic for the period between 2018 and 2023). The 2.0 percent annual growth rate is intended to capture non-specific ambient traffic growth.

In context, the TIA's assumed 2.0 percent compounded annual growth rate is considered a reasonable approximation of future traffic growth when compared to demographic projections reflected in other local and regional growth modeling efforts. More specifically, the Southern California Association of Governments (SCAG) 2016—2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) growth forecasts for the unincorporated County of Riverside assume the County population to increase from 359,000 in 2012 to 499,200 by the year 2040, or an approximate 1.18 percent growth rate compounded annually. The RTP/SCS assumed growth in households over the same 28-year period reflects an increase from 112,300 households to 162,900 households; a rate of 1.34 percent compounded annually. At the upper end of assumed RTP/SCS growth rates, employment over the same 28-year period is projected to increase from 70,500 jobs to 156,600 jobs; a rate of approximately 2.89 percent compounded annually. (9) The 2.0 percent compounded annual traffic growth rate used in the TIA reflects the fact that not all persons comprising population growth, household growth, or employment growth would translate on a one-to-one basis as a new vehicle trip in the region; and establishes a judicious midrange estimate lying between the RTP/SCS assumed regional

population growth rate (1.18 percent) and the RTP/SCS assumed regional employment growth rate (2.89 percent).

Conservatively, the TIA estimates of area traffic growth then add traffic generated by other known or probable related projects defined in Section 4.6 *Cumulative Development Traffic*. These related projects are at least in part already accounted for in the assumed annual 2.0 percent ambient growth in traffic noted above; and in some instances, these related projects would likely not be implemented and functional within the 2023 Opening Year Cumulative time frame assumed for the Project. The resulting traffic growth rate used in the TIA (2.0 percent annual ambient growth plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic impacts under 2023 conditions.

4.7 CUMULATIVE DEVELOPMENT TRAFFIC

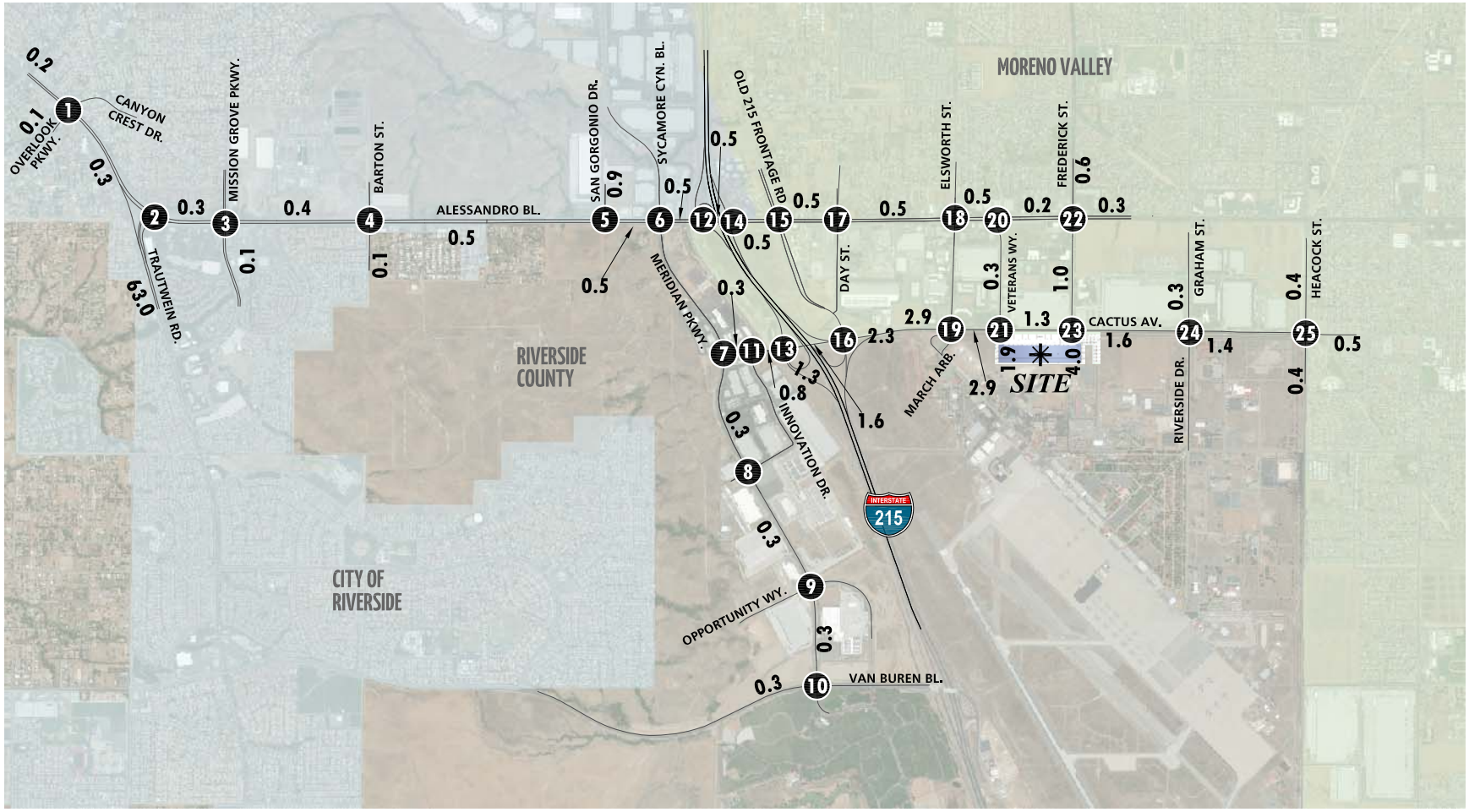
California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the March JPA. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections.

Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e. 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-5, listed on Table 4-4, and have been considered for inclusion. Based on the cumulative development traffic generation and trip distribution patterns, cumulative development ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-6 and 4-7, respectively.

Although it is unlikely that all of these cumulative projects would be fully built and occupied by Year 2023, they have been included in an effort to conduct a conservative analysis and overstate as opposed to understate potential traffic impacts.

Any other cumulative projects that are not expected to contribute measurable traffic to study area intersections have not been included since the traffic would dissipate due to the distance from the Project site and study area intersections. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*.

EXHIBIT 4-3: PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 4-4: PROJECT ONLY TRAFFIC VOLUMES

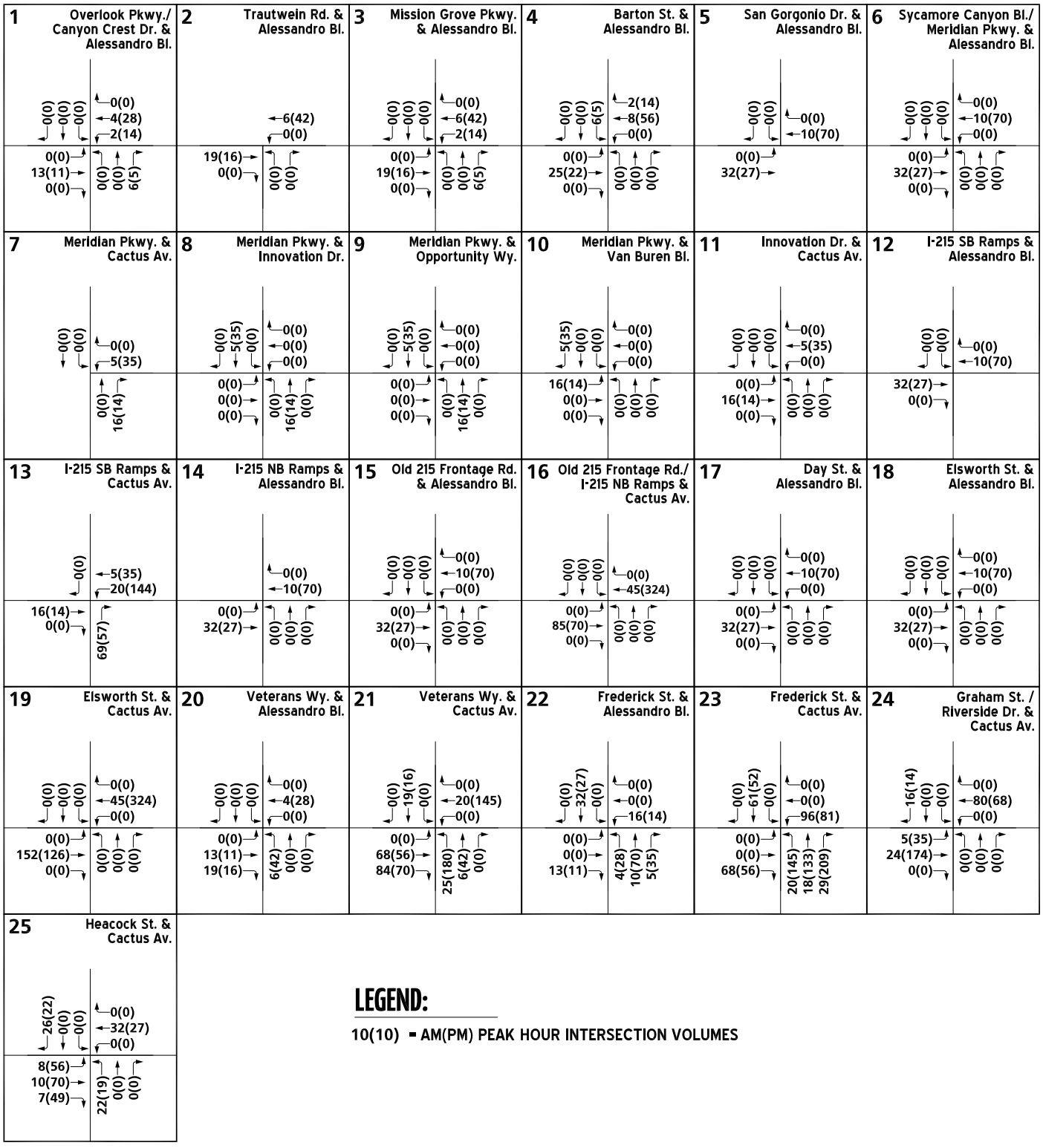
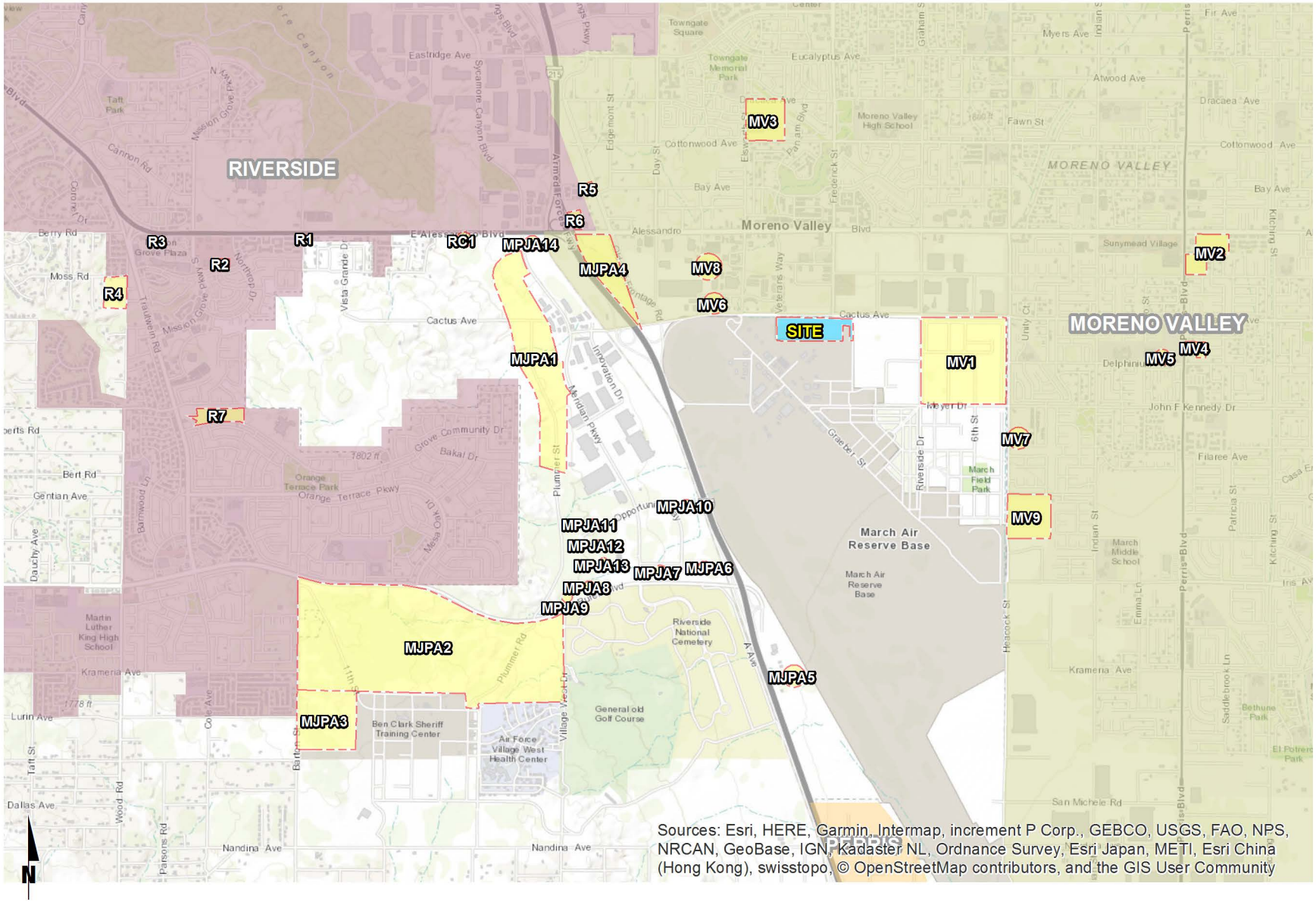


EXHIBIT 4-5: CUMULATIVE DEVELOPMENT LOCATION MAP



URBAN CROSSROADS

Table 4-4

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
March Joint Powers Authority				
MJPA1	Meridian Business Park (West Campus)	Industrial Park	2,278.852	TSF
MJPA2	Meridian South Campus	Warehouse	500.000	TSF
		General Office	338.800	TSF
		Commercial Retail	7.905	TSF
		Fast Food w/ Drive Thru	3.300	TSF
		Gas Station w/ Conv. Market	12	VFP
MJPA3	Meridian South Parcel Delivery	Warehouse	1,699	Employees
MJPA4	Freeway Business Center	Warehouse	709	TSF
MJPA5	Veteran's Industrial Plaza/VIP 215	Warehouse	2,000.000	TSF
MJPA6	Veteran's Plaza	Commercial Retail	198.000	TSF
MJPA7	MS Van Buren I	Warehouse	176.396	TSF
MJPA8	MS Van Buren II	Warehouse	162.041	TSF
MJPA9	MS Prime Six	General Office	74.922	TSF
MJPA10	Meridian Distribution Center II	Warehouse	510.000	TSF
MJPA11	Meridian Distribution Center III	Warehouse	262.269	TSF
MJPA12	Meridian Distribution Center IV	Warehouse	90.000	TSF
MJPA13	Economic Business Center	Warehouse	124.523	TSF
MJPA14	MS Alessandro	Industrial Park	157.513	TSF
City of Moreno Valley				
MV1	March Lifecare Campus Specific Plan	Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
		Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
MV2	PEN16-0039	Multifamily	272	DU
MV3	Scottish Village	Multifamily	194	DU
MV4	TM 33607	Multifamily	52	DU
MV5	TM 36708	SFDR	122	DU
MV6	Moreno Valley Cactus Center (PEN16-0131)	Warehouse	36.950	TSF
		Fast Food w/ Drive Thru	7.900	TSF
		Gas Station w/ Car Wash	28	VFP
MV7	TM 32556	SFDR	32	DU
MV8	PA 08-0047-0052 (Komar Cactus Plaza)	Hotel	110	Rooms
		Fast Food w/ Drive Thru	8.000	TSF
		Commercial	42.400	TSF
MV9	TM 34748	SFDR	135	DU

Table 4-4

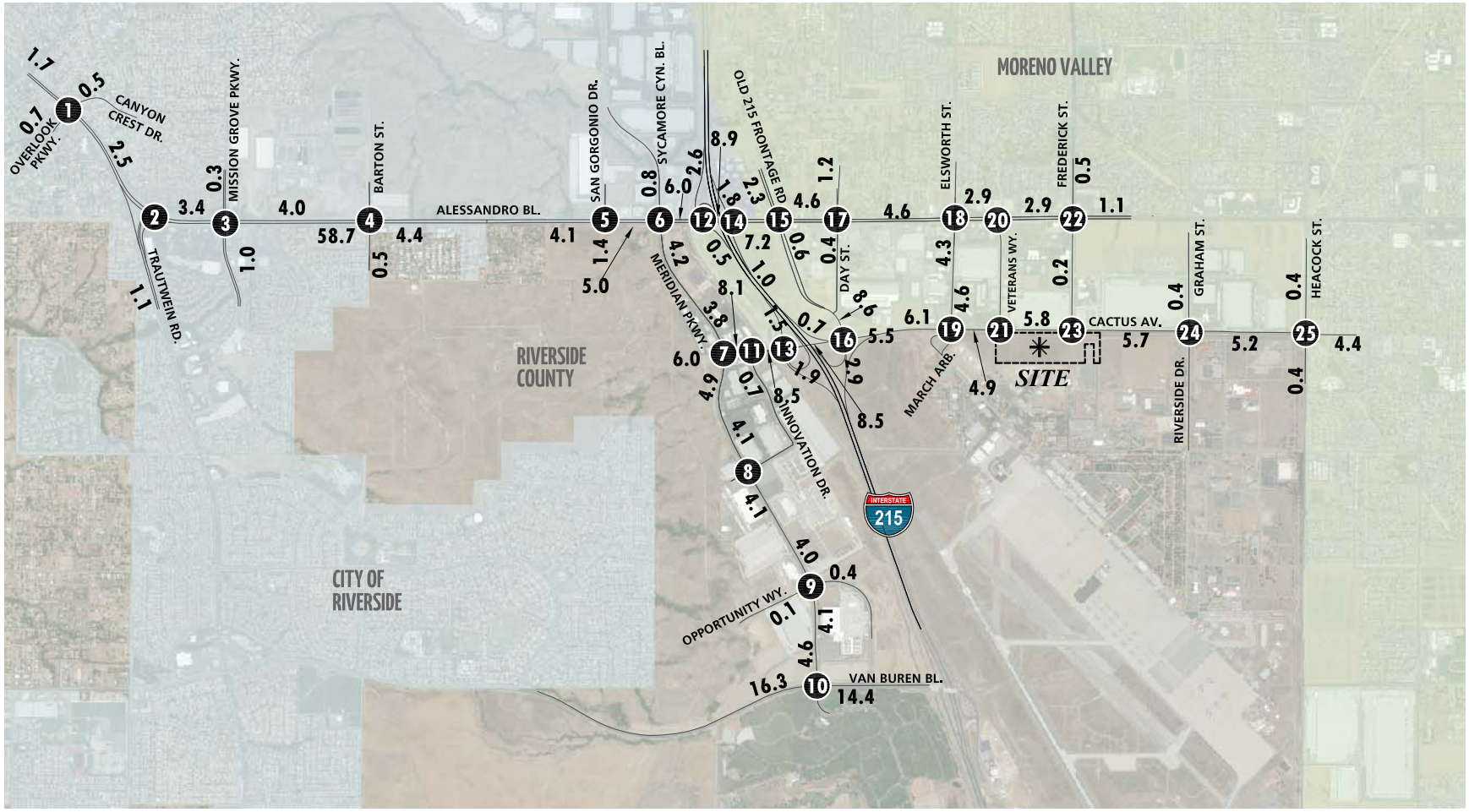
Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
City of Riverside				
R1	P17-0419/20/21	Fast Food w/ Drive Thru	1.857	TSF
R2	P16-0578	Warehouse	82.200	TSF
R3	P06-0900/P08-0269/P08-0270	SFDR	20	DU
R4	P13-0665	SFDR	8	DU
R5	P15-1035/P16-0556/P16-0567	Warehouse	176.149	TSF
R6	P14-0841 to P14-0848/P16-0472/P16-0474	Warehouse	73.200	TSF
		Commercial Retail	15.000	TSF
R7	P14-0472/P14-0473/P15-0321/P15-0322	SFDR	85	DU
County of Riverside				
RC1	PP 25422	Warehouse	814.000	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions

EXHIBIT 4-6: CUMULATIVE DEVELOPMENT ONLY AVERAGE DAILY TRAFFIC (ADT)

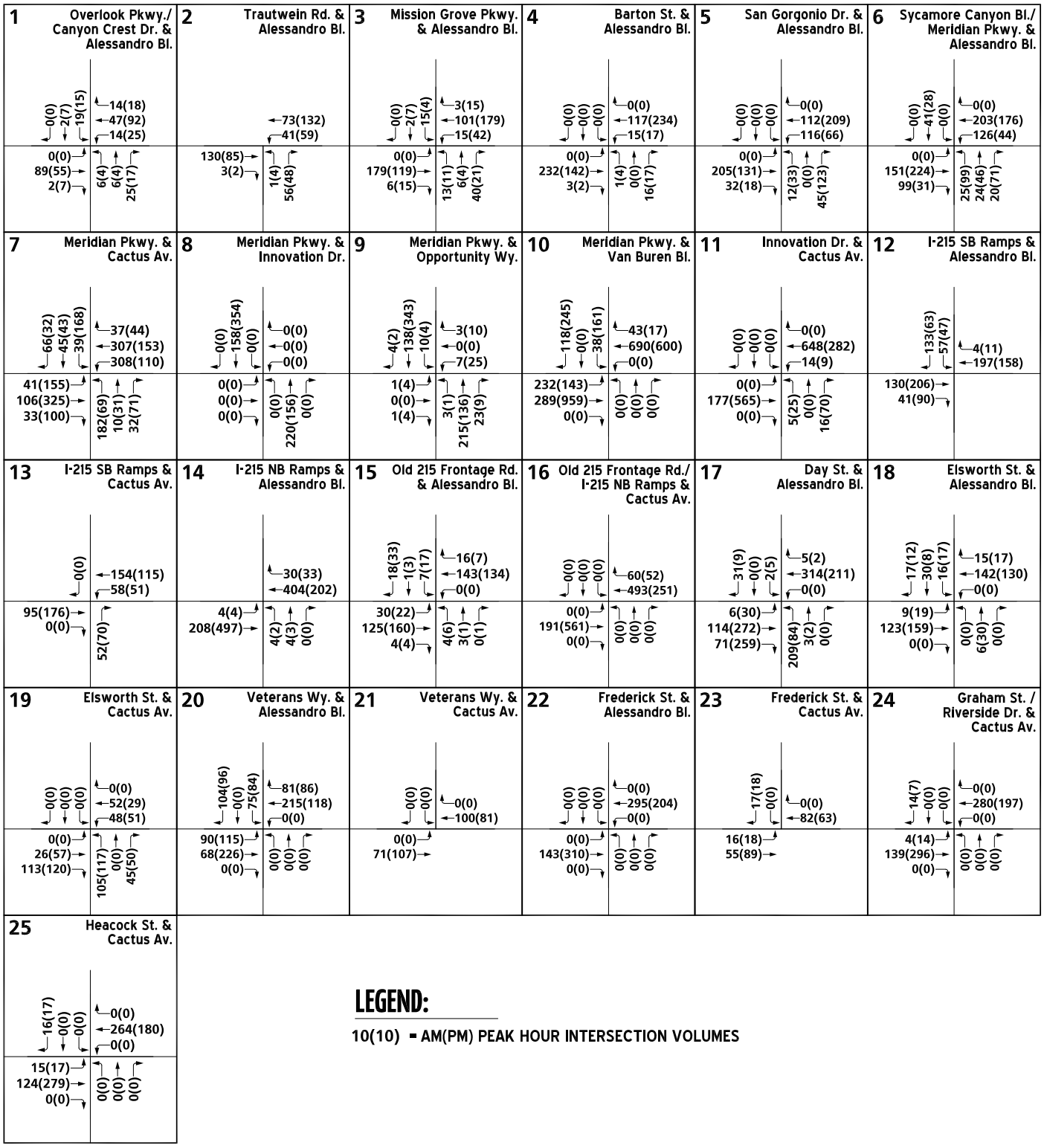


LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 4-7: CUMULATIVE DEVELOPMENT ONLY TRAFFIC VOLUMES



4.8 NEAR-TERM TRAFFIC FORECASTS

To provide a comprehensive assessment of potential transportation network deficiencies, a "buildup" analysis was performed in support of this work effort. The "buildup" method was used to approximate the Opening Year Cumulative traffic forecasts, and is intended to identify the cumulative impacts on both the existing and planned near-term circulation system. The Opening Year Cumulative traffic forecasts include background traffic, traffic generated by other cumulative development projects within the study area, and the traffic generated by the proposed Project.

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the near-term 2023 traffic conditions. An ambient growth factor of 10.41% (2023) accounts for background (area-wide) traffic increases that occur over time, up to the year 2023 from the year 2018 (compounded two percent per year growth over a 5-year period). Traffic volumes generated by the Project are then added to assess the Opening Year Cumulative traffic conditions. The 2023 roadway network is similar to the existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

As noted previously, an analysis of the proposed Project at various development tiers has been assessed for the purposes of this traffic study. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2023) Without Project
    - Existing 2018 counts
    - Ambient growth (10.41%)
    - Cumulative Development traffic
- Opening Year Cumulative (2023) With Project
    - Existing 2018 counts
    - Ambient growth (10.41%)
    - Cumulative Development traffic
    - Project traffic

4.9 HORIZON YEAR (2040) VOLUME DEVELOPMENT

The Horizon Year (2040) Without Project traffic conditions were derived from the RivTAM modified to represent Horizon Year conditions using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and Horizon Year conditions.

In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year Without Project peak hour forecasts were refined using the model derived long-range forecasts, along with existing peak hour traffic count data collected

at each analysis location in May 2018. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year Without Project peak hour forecasts.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Long Range traffic conditions. However, review of the resulting model growth indicates negative growth for several study area intersections. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. Additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year forecasts. Horizon Year turning volumes were compared to Opening Year Cumulative volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative and Horizon Year traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2018) and Horizon Year traffic conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year peak hour forecasts.

The future Horizon Year without Project peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there are no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

The truck component of RivTAM has data that is unusually low. As such, in an effort to conduct a conservative analysis, the presence of trucks has been accounted for based on the manual volume adjustments made to demonstrate growth above Opening Year Cumulative traffic forecasts, which are presented and evaluated in actual vehicles. As such, the Horizon Year forecasts are also assumed to be in actual vehicles for the purposes of this analysis.

Post-processing worksheets for Horizon Year Without Project traffic conditions are provided in Appendix 4.1.

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for E+P (Project Buildout) conditions and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project Buildout traffic. Exhibits 5-1 and 5-2 show the ADT and peak hour volumes which can be expected for E+P traffic conditions.

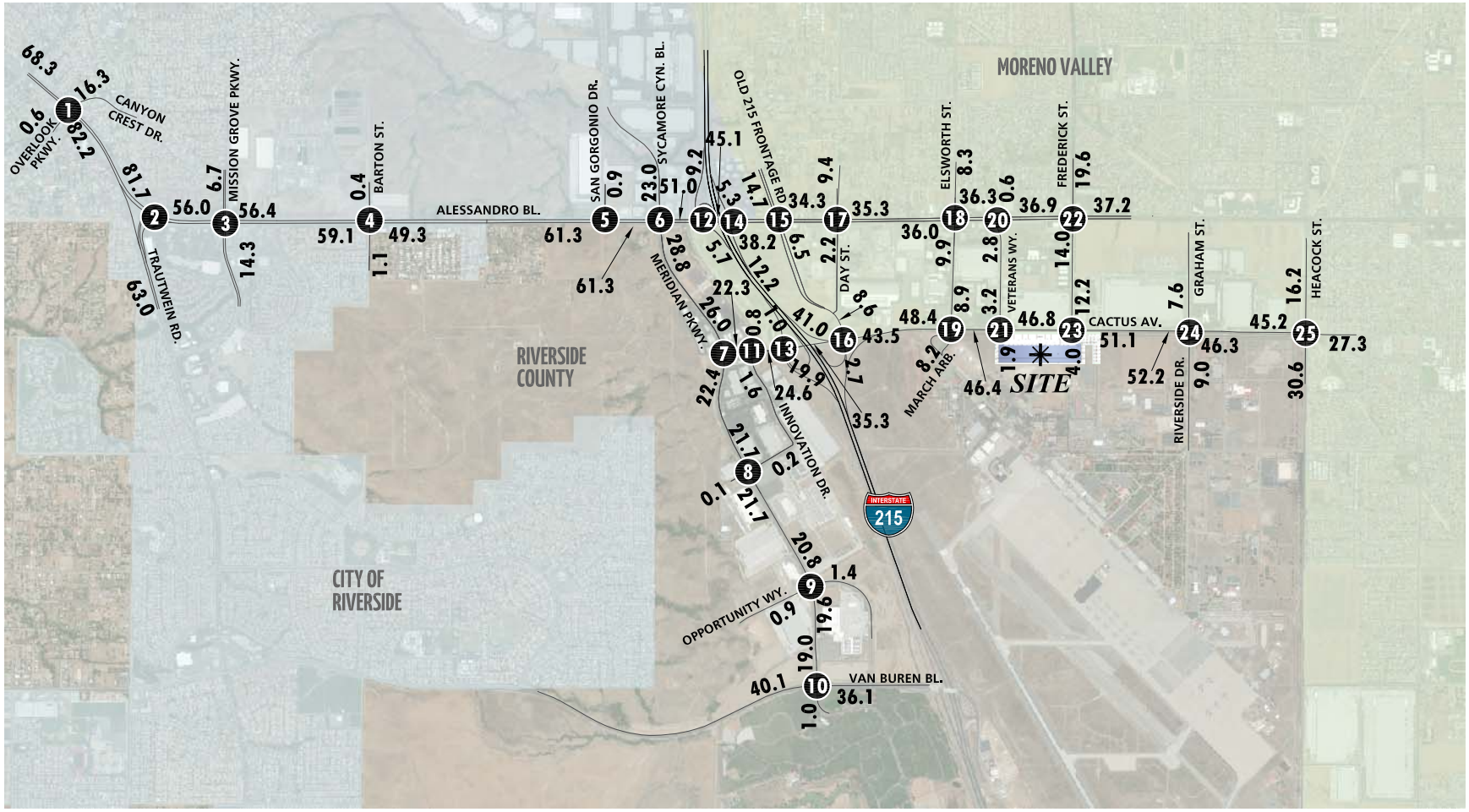
5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1, which indicates that four study area intersections are anticipated to operate at the same unacceptable LOS for E+P traffic conditions, as previously identified under Existing (2018) conditions (see Section 3.7). The significant impacts are summarized in Table 5-2, which indicates that two study area intersections are anticipated to be significantly impacted.

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the AM and PM peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. The increase in peak hour delay is anticipated to be greater than one second. Therefore, there is a significant impact based of the City of Riverside's peak hour delay criteria for intersections operating at LOS F.

As the deficiency is caused by minimum green times necessary for pedestrian crossing time, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. Potential physical improvements such as grade-separated pedestrian crossings would not be financially feasible based on the pedestrian and bicycle activity at this location. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

EXHIBIT 5-1: E+P AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 5-2: E+P TRAFFIC VOLUMES

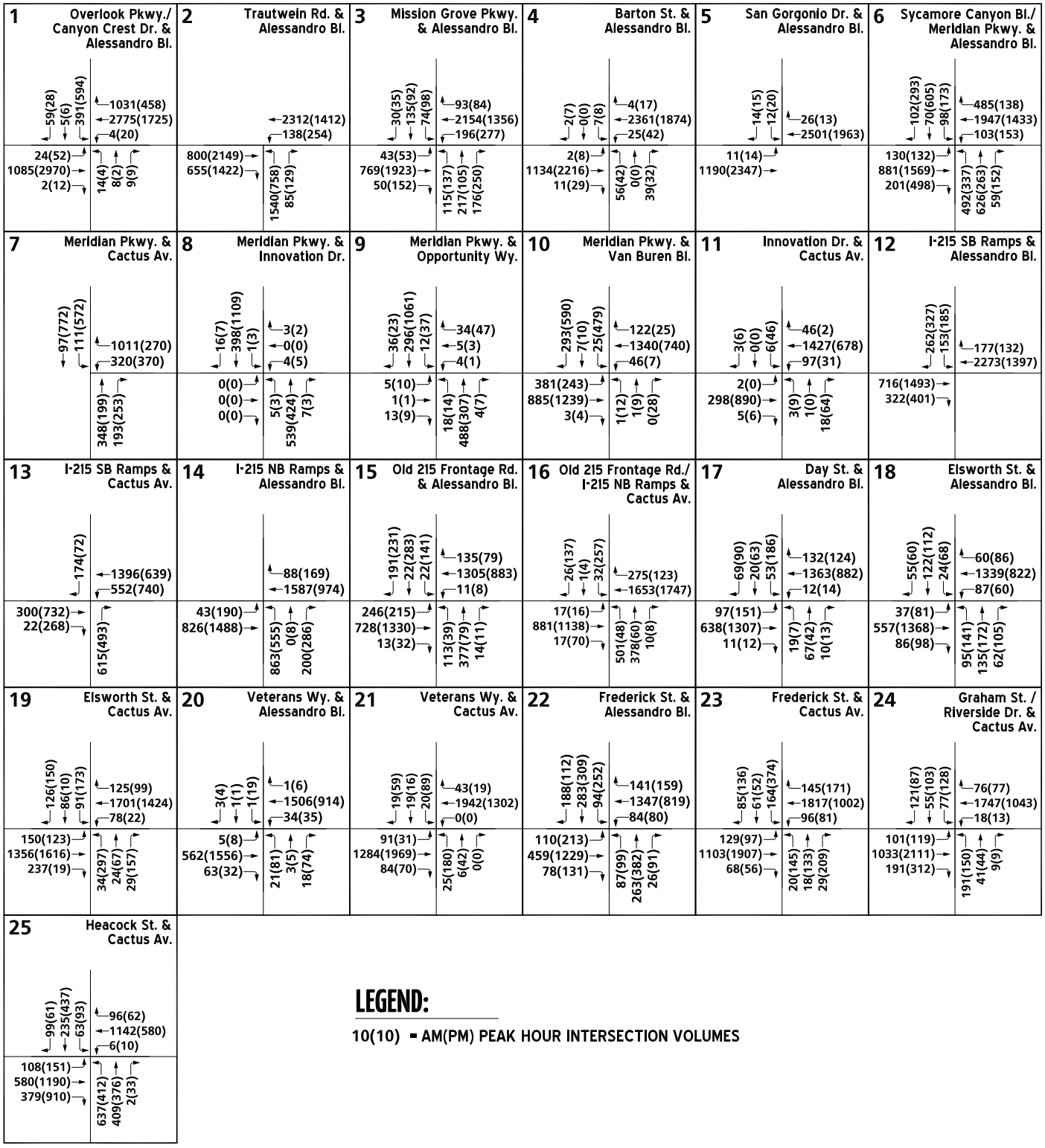


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2018) Delay[1] (secs.) AM	Existing (2018) Delay[1] (secs.) PM	Existing (2018) Level of Service AM	Existing (2018) Level of Service PM	E+P Delay[1] (secs.) AM	E+P Delay[1] (secs.) PM	E+P Level of Service AM	E+P Level of Service PM	Acceptable LOS	Jurisdiction	Significant Impact?[3]
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	TS	**356.3**	**81.5**	**F**	**F**	**393.3**	**86.3**	**F**	**F**	D	Riverside	**Yes**
2	Trautwein Rd. & Alessandro Bl.	TS	36.1	25.5	D	C	36.2	25.5	D	C	D	Riverside	No
3	Mission Grove Pkwy. & Alessandro Bl.	TS	**76.6**	22.6	**E**	C	**77.1**	23.7	**E**	C	D	Riverside	No
4	Barton St. & Alessandro Bl.	TS	25.5	22.8	C	C	25.8	23.2	C	C	D	Riverside/JPA	No
5	San Gorgonio Dr. & Alessandro Bl.	TS	17.0	15.5	B	B	17.1	15.5	B	B	D	Riverside/JPA	No
6	Sycamore Canyon Bl. & Alessandro Bl.	TS	**79.4**	47.6	**E**	D	**81.1**	48.3	**F**	D	D	Riverside/JPA	No
7	Meridian Pkwy. & Cactus Av.	TS	45.0	36.7	D	D	45.3	42.1	D	D	D	JPA	No
8	Meridian Pkwy. & Innovation Dr.	CSS	24.4	24.9	C	C	25.1	26.2	D	D	D	JPA	No
9	Meridian Pkwy. & Opportunity Wy.	TS	10.0	23.1	A	C	10.0	23.4	B	C	D	JPA	No
10	Meridian Pkwy. & Van Buren Bl.	TS	44.6	41.2	D	D	45.2	41.5	D	D	D	JPA	No
11	Innovation Dr. & Cactus Av.	TS	18.6	18.1	B	B	18.7	18.3	B	B	D	JPA	No
12	I-215 SB Ramps & Alessandro Bl.	TS	5.5	8.9	A	A	5.5	8.9	A	A	D	Caltrans/Riverside/County	No
13	I-215 SB Ramps & Cactus Av.	TS	4.3	9.1	B	A	4.5	12.6	A	B	D	Caltrans/JPA/County	No
14	I-215 NB Ramps & Alessandro Bl.	TS	21.1	20.4	C	C	21.3	20.6	C	C	D	Caltrans/Riverside/County	No
15	Old 215 Frontage Rd. & Alessandro Bl.	TS	22.0	32.9	C	C	24.2	32.9	C	C	D	MV/Riverside/County	No
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	TS	52.4	20.2	D	C	53.4	31.3	D	C	D	Caltrans/JPA	No
17	Day St. & Alessandro Bl.	TS	23.4	16.1	C	B	23.7	16.5	C	B	D	MV	No
18	Elsworth St. & Alessandro Bl.	TS	20.7	25.5	C	C	20.7	25.7	C	C	D	MV	No
19	Elsworth St. & Cactus Av.	TS	**189.6**	**99.1**	**F**	**F**	**212.3**	**160.3**	**F**	**F**	D	MV/JPA	**Yes**
20	Veterans Wy. & Alessandro Bl.	TS	19.0	19.8	B	B	19.0	19.9	B	B	D	MV	No
21	Veterans Wy. & Cactus Av.	TS	7.1	7.7	A	A	13.9	18.6	B	B	D	MV/JPA	No
22	Frederick St. & Alessandro Bl.	TS	38.5	50.8	A	D	38.8	51.3	D	D	D	MV	No
23	Frederick St. & Cactus Av.	TS	21.7	22.1	C	C	22.1	48.2	C	D	D	MV/JPA	No
24	Graham St./Riverside Dr. & Cactus Av.	TS	47.1	40.5	D	D	52.7	51.7	D	D	D	MV/JPA	No
25	Heacock St. & Cactus Av.	TS	45.4	28.2	D	C	53.9	32.2	D	C	D	MV/JPA	No

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS)

[1] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] See Table 5-2 for a detailed summary of significant impacts.

Table 5-2

Significant Impact Summary for E+P Conditions

#	Intersection	Jurisdiction	Project % of Total Traffic		Change in Delay (secs.)		Project Trip Contribution		Significant Impact? [1,2,3]
			AM	PM	AM	PM	AM	PM	
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside	N/A	N/A	**37.0**	**4.8**	25	58	**Yes**
2	Trautwein Rd. & Alessandro Bl.	Riverside	N/A	N/A	0.1	0.0	N/A	N/A	No
3	Mission Grove Pkwy. & Alessandro Bl.	Riverside	N/A	N/A	0.5	1.1	25	58	No
4	Barton St. & Alessandro Bl.	Riverside/JPA	N/A	N/A	0.3	0.4	N/A	N/A	No
5	San Gorgonio Dr. & Alessandro Bl.	Riverside/JPA	N/A	N/A	0.1	0.0	N/A	N/A	No
6	Sycamore Canyon Bl. & Alessandro Bl.	Riverside/JPA	0.8%	1.7%	1.7	0.7	42	97	No
7	Meridian Pkwy. & Cactus Av.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
8	Meridian Pkwy. & Innovation Dr.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
9	Meridian Pkwy. & Opportunity Wy.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
10	Meridian Pkwy. & Van Buren Bl.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
11	Innovation Dr. & Cactus Av.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
12	I-215 SB Ramps & Alessandro Bl.	Caltrans/Riverside/County	N/A	N/A	0.0	0.0	N/A	N/A	No
13	I-215 SB Ramps & Cactus Av.	Caltrans/JPA/County	N/A	N/A	N/A	N/A	N/A	N/A	No
14	I-215 NB Ramps & Alessandro Bl.	Caltrans/Riverside/County	N/A	N/A	0.2	0.2	N/A	N/A	No
15	Old 215 Frontage Rd. & Alessandro Bl.	MV/Riverside/County	N/A	N/A	2.2	0.0	N/A	N/A	No
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	Caltrans/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
17	Day St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
18	Elsworth St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
19	Elsworth St. & Cactus Av.	MV/JPA	**4.9%**	**10.8%**	N/A	N/A	**197**	**450**	**Yes**
20	Veterans Wy. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
21	Veterans Wy. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
22	Frederick St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
23	Frederick St. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
24	Graham St./Riverside Dr. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
25	Heacock St. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No

* **BOLD** = Significant Impact

N/A = Not Applicable

[1] For intersections within the jurisdiction of March JPA, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. However, if the pre-project condition is already below LOS D (or acceptable LOS), impact is significant if the Project contributes more than 2% of the total traffic.

[2] For intersections within the jurisdiction of the City of Riverside, a significant impact occurs at a study area intersection when the addition of project related trips causes either peak hour LOS to degrade from acceptable (LOS A through D) to unacceptable levels (LOS E/F) or the peak hour delay to increase as follows:
- LOS A/B = By 10.0 seconds
- LOS C = By 8.0 seconds
- LOS D = By 5.0 seconds
- LOS E = By 2.0 seconds
- LOS F = By 1.0 seconds

[3] For intersections within the jurisdiction of Caltrans, the County of Riverside, or City of Moreno Valley, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. An impact is also significant if the Project contributes 50 or more peak hour trips to an already deficient intersection.

Mission Grove Parkway & Alessandro Boulevard (#3) – Although this intersection was found to operate at an unacceptable LOS (LOS E) during the AM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. The increase in peak hour delay is anticipated to be less than two seconds. Therefore, there is no significant impact based of the City of Riverside's peak hour delay criteria for intersections operating at LOS E.

Sycamore Canyon Boulevard & Alessandro Boulevard (#6) – Although this intersection was found to operate at an unacceptable LOS (LOS E) during the AM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels (LOS F) during the peak hours with the addition of Project traffic. The increase in peak hour delay is anticipated to be less than two seconds. Therefore, there is no significant impact based of the City of Riverside's peak hour delay criteria for intersections operating at LOS E.

Elsworth Street & Cactus Avenue (#19) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the AM and PM peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the AM peak hour with the addition of Project traffic. The project traffic is more than 2% of the total traffic for E+P conditions. Therefore, there is a significant impact based on March JPA's 2% significance criteria.

A summary of the peak hour intersection LOS for E+P conditions are shown on Exhibit 5-3. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants are conducted for unsignalized intersections operating at LOS E or F. For E+P traffic conditions, there are no unsignalized study area intersections that operate at an unacceptable LOS.

5.5 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway at Cactus Avenue interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 5-3 for E+P traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 5-3 and consistent with Existing traffic conditions, the anticipated vehicle queues would be accommodated by the turning lane's available storage length.

Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.2.

EXHIBIT 5-3: E+P SUMMARY OF LOS

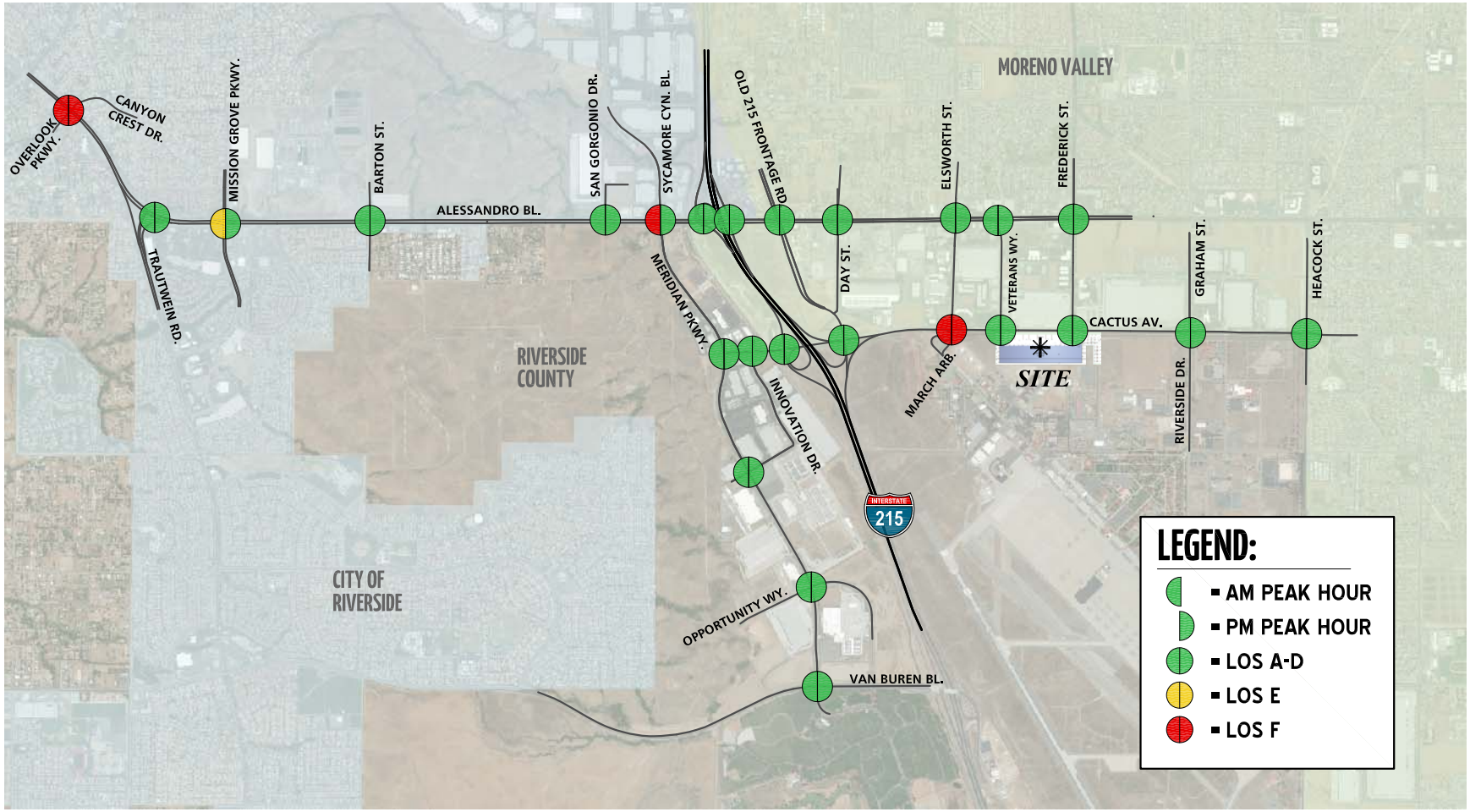


Table 5-3

Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2018)				E+P			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps & Cactus Av.	SBR	1,115	128	0	Yes	Yes	128	0	Yes	Yes
	NBR	1,850	0	0	Yes	Yes	14	23	Yes	Yes
I-215 NB Ramps & Cactus Av.	NBL	145	541[2]	45	Yes[4]	Yes	550[2]	45	Yes[4]	Yes
	NBT/R	1,650	294	54	Yes	Yes	300	54	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

5.6 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 5-4. As shown on Table 5-4 and consistent with Existing traffic conditions, the basic freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours, with the addition of Project traffic. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

E+P basic freeway segment analysis worksheets are provided in Appendix 5.3.

5.7 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for E+P traffic conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5 and consistent with Existing traffic conditions, the freeway ramp merge and diverge areas are anticipated to operate at LOS D or better. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

E+P freeway ramp junction operations analysis worksheets are provided in Appendix 5.4.

EXHIBIT 5-4: E+P FREEWAY MAINLINE VOLUMES



Table 5-4

Basic Freeway Segment Analysis for E+P Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	Existing (2018)				E+P			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Cactus Av.	4	15.1	--[5]	B	**F**	15.3	--[5]	B	**F**
		South of Cactus Av.	4	14.3	--[5]	B	**F**	14.3	--[5]	B	**F**
	NB	North of Cactus Av.	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
		South of Cactus Av.	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[4] LOS = Level of Service

[5] Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

Table 5-5

Freeway Ramp Junction Merge/Diverge Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2018)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215	Southbound	Off-Ramp at Cactus Av.	4	15.4	B	--[4]	**F**	15.7	B	--[4]	**F**
		Loop Off-Ramp at Cactus Av.	4	16.1	C	--[4]	**F**	16.5	C	--[4]	**F**
		On-Ramp at Cactus Av.	3	21.0	C	--[4]	**F**	21.2	C	--[4]	**F**
	Northbound	On-Ramp at Cactus Av.	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**
		Loop On-Ramp at Cactus Av.	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**
		Off-Ramp at Cactus Av.	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

[4] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

5.8 RECOMMENDED IMPROVEMENTS

5.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the proposed recommended improvements is presented in Table 5-6 for E+P traffic conditions. As shown on Table 5-6, the recommended improvements for each of the deficient and significantly impacted intersections are the same for Existing and E+P traffic conditions. Based on the each jurisdiction's significance criteria (see Table 5-2), the Project is anticipated to result in a significant impact at the intersections of Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard and Elsworth Street & Cactus Avenue. As the Project would not contribute significantly to the total traffic for E+P traffic conditions at the other intersections mentioned previously in Section 5.3, the Project would result in a less-than-significant impact at these locations.

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 1.1 – Elsworth Street & Cactus Avenue (#19)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches and restriping of the northbound shared left-through-right turn lane and southbound shared left-through lane.

The intersection operations analysis worksheets for E+P, with improvements, are included in Appendix 5.5.

The locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such, the impacts are considered significant and unavoidable.

5.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously on Table 5-2 and consistent with Existing traffic conditions, there are no peak hour queuing issues anticipated at the I-215 Freeway at Cactus Avenue interchange for E+P traffic conditions. As such, no improvements have been recommended.

Table 5-6

Intersection Analysis for E+P Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
19	Elsworth St. & Cactus Av.																	
	Existing (2018)	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	**189.6**	**99.1**	**F**	**F**
	- With Improvements[4]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	21.6	28.8	C	C
	E+P (Project Buildout)	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	**212.3**	**160.3**	**F**	**F**
	- With Improvements[4]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	21.8	31.1	C	C

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] Recommended improvement consists of modifying the traffic signal to implement protected left turn phasing on the northbound and southbound approaches.

5.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Table 5-3 and Table 5-4 and consistent with Existing traffic conditions, the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the March JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. As such, no improvements have been recommended, and the impact to the freeway facility is significant and unavoidable.

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6 OPENING YEAR CUMULATIVE (2023) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2023) Without and With Project traffic forecasts, and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2023) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by the cumulative development projects to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontage and driveways). Other connections assumed include the extension of San Gorgonio Avenue, south of Alessandro Boulevard, and the extension of Cactus Avenue, west of Meridian Parkway as shown in Exhibit 6-1.

6.2 OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2023) Without Project traffic conditions are shown on Exhibits 6-2 and 6-3, respectively.

6.3 OPENING YEAR CUMULATIVE (2023) WITH PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2023) With Project traffic conditions are shown on Exhibits 6-4 and 6-5, respectively.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

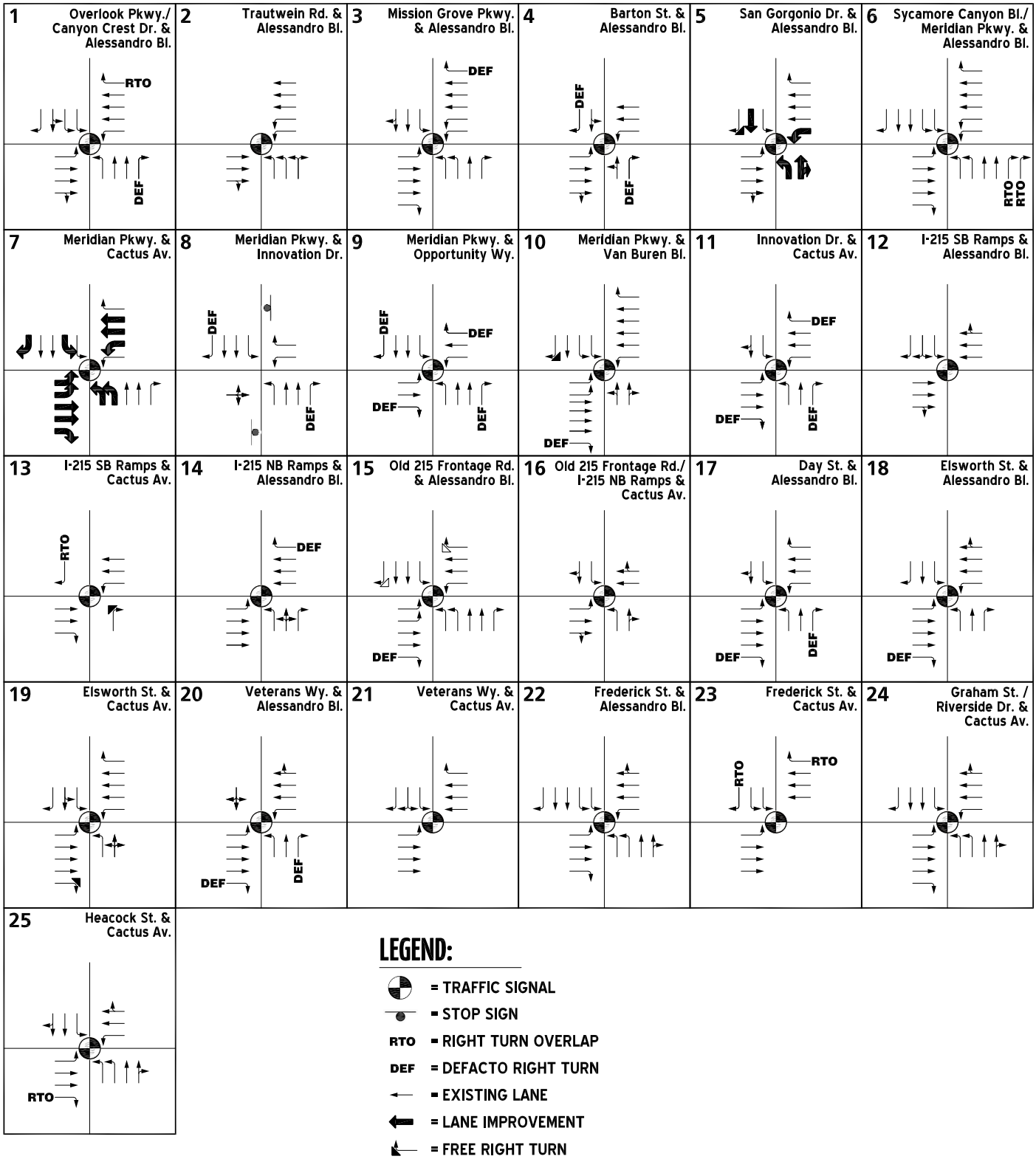
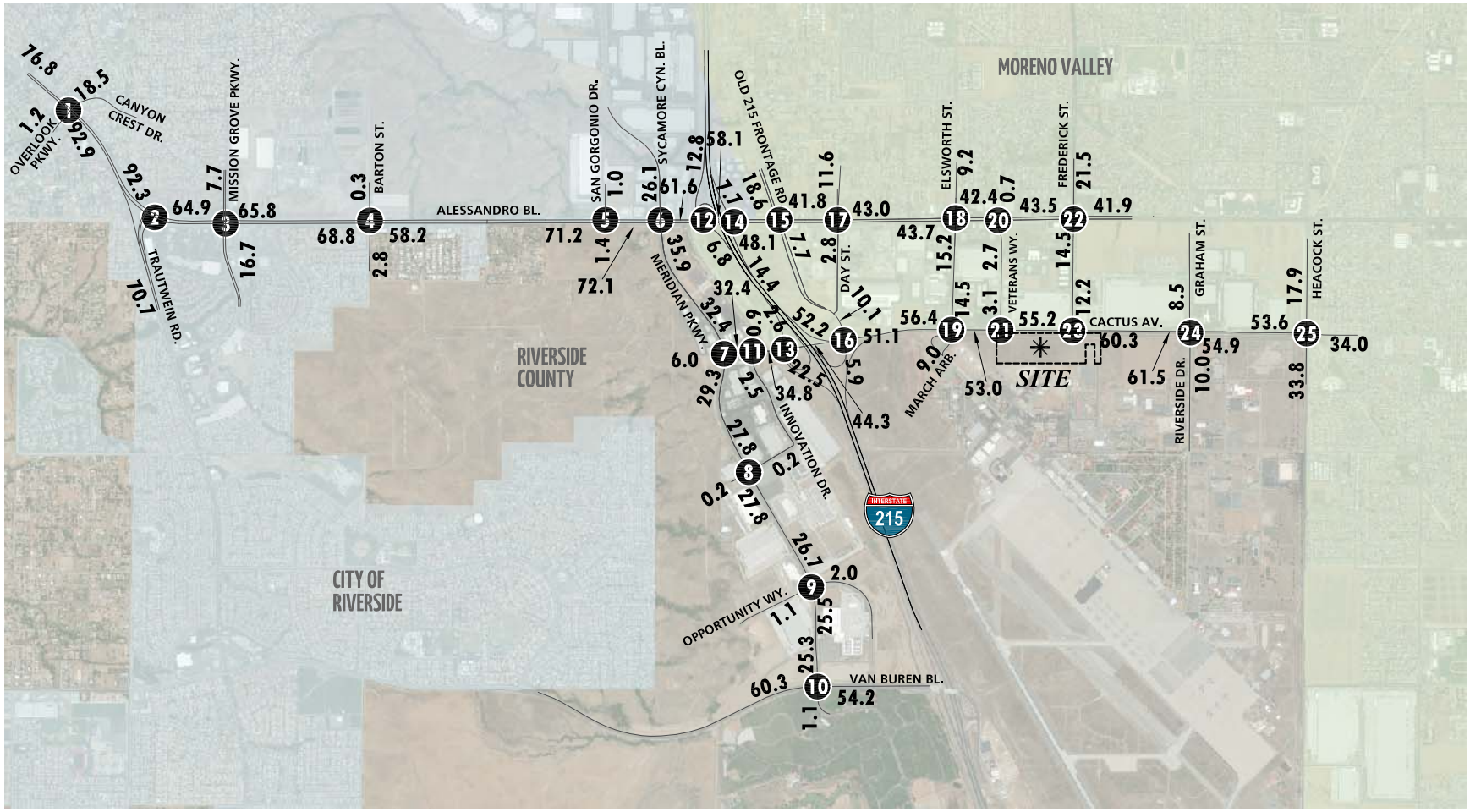


EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT TRAFFIC VOLUMES

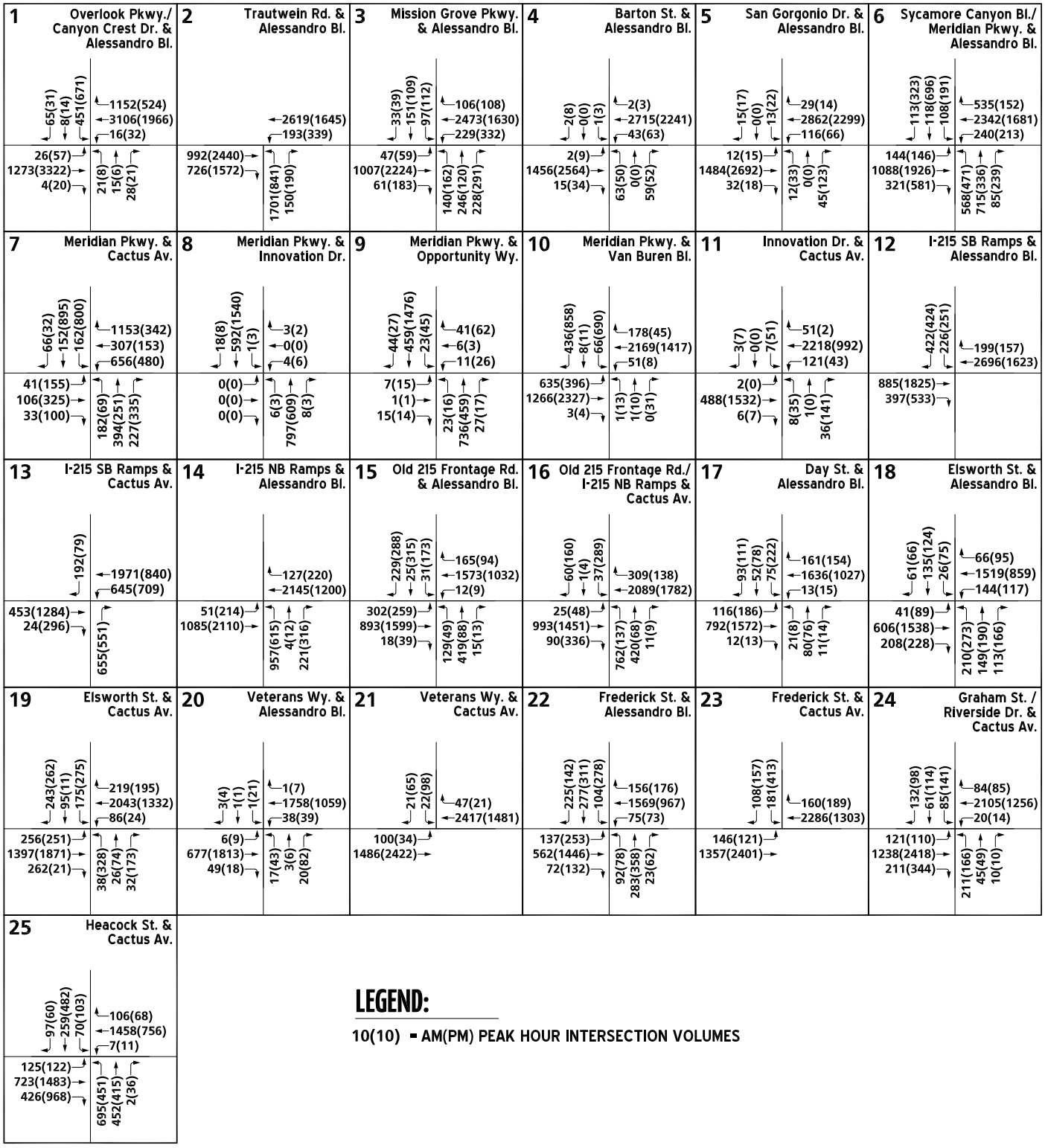
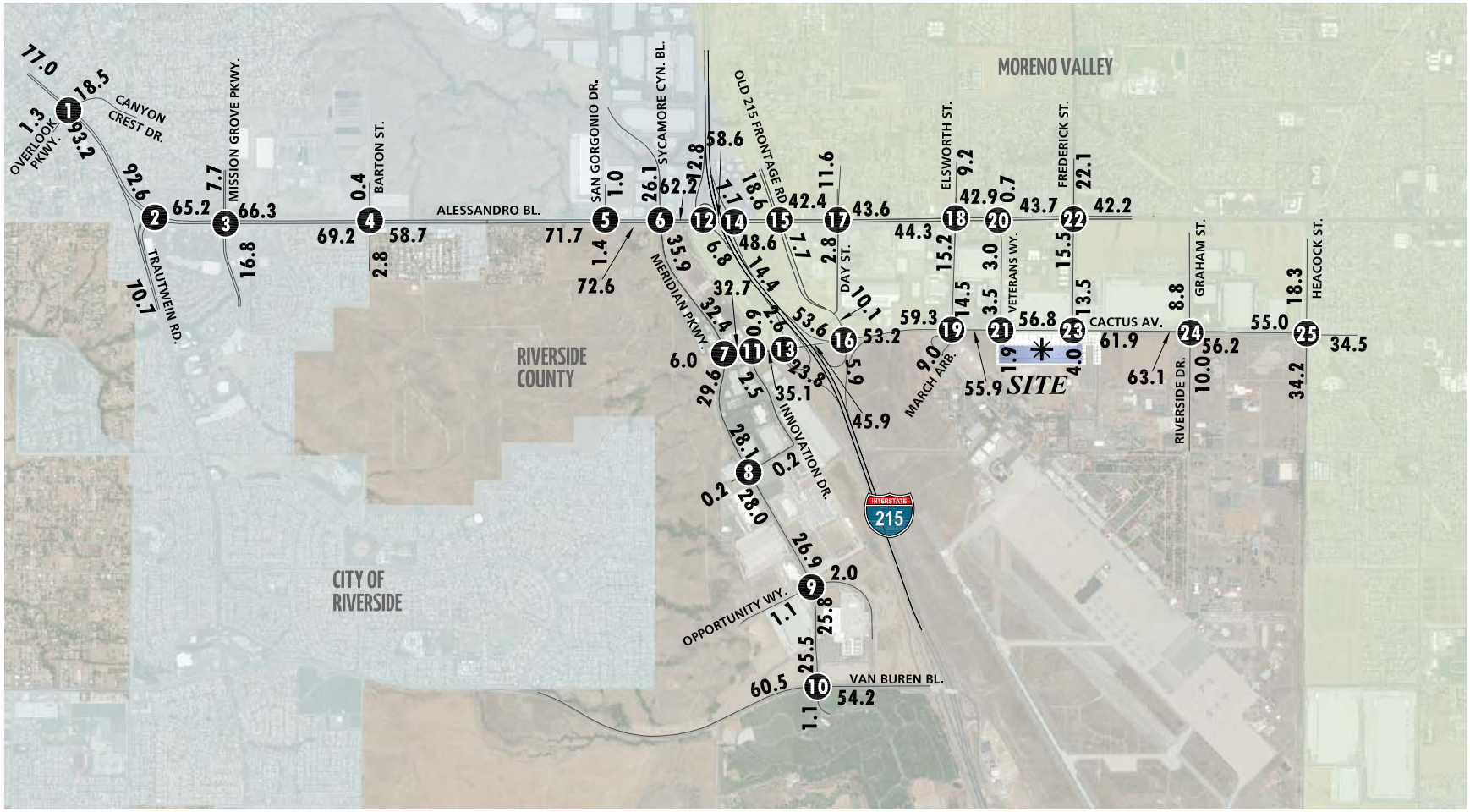


EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2023) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

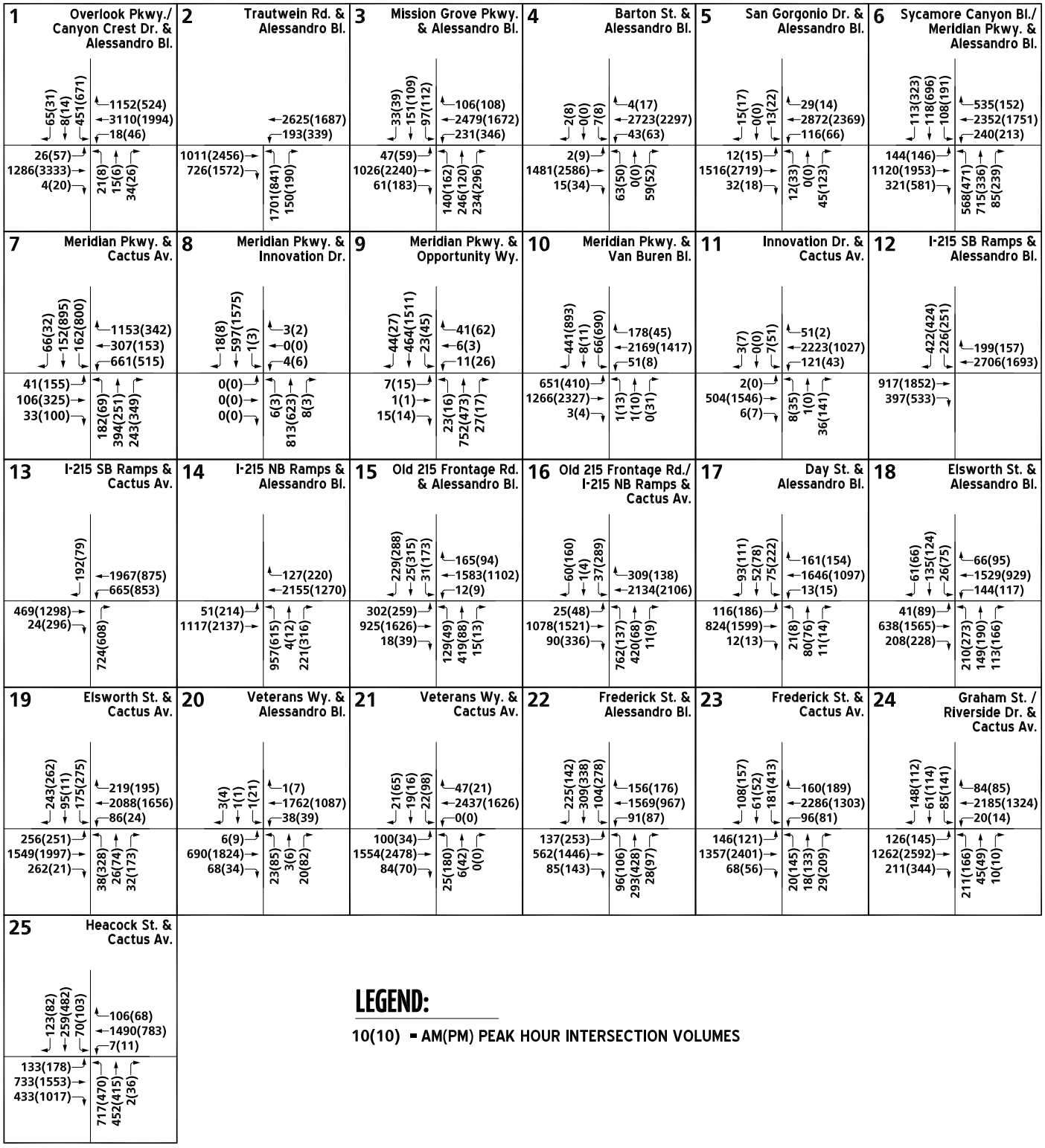


LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2023) WITH PROJECT TRAFFIC VOLUMES



6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations have been conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2023) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 Roadway Improvements. As shown in Table 6-1, the following intersections were found to operate at a deficient LOS:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1) – LOS F AM and PM peak hours
- Mission Grove Pkwy. & Alessandro Bl. (#3) – LOS F AM peak hour only
- Sycamore Canyon Bl. & Alessandro Bl. (#6) – LOS F AM and PM peak hours
- Meridian Pkwy. & Cactus Av. (#7) – LOS F AM and PM peak hours
- Meridian Pkwy. & Van Buren Bl. (#10) – LOS F AM and PM peak hours
- Innovation Dr. & Cactus Av. (#11) – LOS F PM peak hour only
- Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av. (#16) – LOS F AM peak hour; LOS E PM peak hour
- Elsworth St. & Cactus Av. (#19) – LOS F AM and PM peak hours
- Heacock St. & Cactus Av. #25) – LOS F AM peak hour; LOS E PM peak hour

A summary of the peak hour intersection LOS for Opening Year Cumulative (2023) Without Project conditions are shown on Exhibit 6-6. The intersection operations analysis worksheets for Opening Year Cumulative (2023) Without Project traffic conditions are included in Appendix 6.1 of this TIA.

6.4.2 OPENING YEAR CUMULATIVE (2023) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-1 and illustrated on Exhibit 6-7, there are no additional study area intersections anticipated to operate at an unacceptable LOS with the addition of Project traffic during one or more peak hours, in addition to those previously identified under Opening Year Cumulative (2023) Without Project traffic conditions. The intersection operations analysis worksheets for Opening Year Cumulative (2023) With Project traffic conditions are included in Appendix 6.2 of this TIA. The significant impacts are summarized in Table 6-2. Measures to address near-term deficiencies for Opening Year Cumulative traffic conditions are discussed in Section 6.9 *Opening Year Cumulative (2023) Deficiencies and Recommended Improvements.*

As the deficiencies at Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard and Sycamore Canyon Boulevard & Alessandro Boulevard are caused by minimum green times necessary for pedestrian crossing time, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. Potential physical improvements such as grade-separated pedestrian crossings would not be financially feasible based on the pedestrian and bicycle activity at this location. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

Table 6-1

Intersection Analysis for Opening Year Cumulative (2023) Conditions

#	Intersection	Traffic Control[2]	2023 Without Project				2023 With Project				Acceptable LOS	Jurisdiction	Significant Impact?[3]
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service				
			AM	PM	AM	PM	AM	PM	AM	PM			
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	TS	**464.3**	**113.1**	**F**	**F**	**464.4**	**117.9**	**F**	**F**	D	Riverside	**Yes**
2	Trautwein Rd. & Alessandro Bl.	TS	49.0	32.5	D	C	49.1	32.5	D	C	D	Riverside	No
3	Mission Grove Pkwy. & Alessandro Bl.	TS	**97.5**	31.4	**F**	C	**97.9**	33.2	**F**	C	D	Riverside	No
4	Barton St. & Alessandro Bl.	TS	42.1	32.4	D	C	42.8	34.1	D	C	D	Riverside/JPA	No
5	San Gorgonio Dr. & Alessandro Bl.	TS	28.5	29.5	C	C	29.1	31.1	C	C	D	Riverside/JPA	No
6	Sycamore Canyon Bl. & Alessandro Bl.	TS	**98.9**	**80.7**	**F**	**F**	**103.4**	**84.5**	**F**	**F**	D	Riverside/JPA	**Yes**
7	Meridian Pkwy. & Cactus Av.	TS	**62.1**	44.8	**E**	D	**62.6**	49.2	**E**	D	D	JPA	No
8	Meridian Pkwy. & Innovation Dr.	CSS	17.0	29.4	C	D	17.3	31.2	C	D	D	JPA	No
9	Meridian Pkwy. & Opportunity Wy.	TS	11.3	40.9	B	D	20.8	49.2	C	D	D	JPA	No
10	Meridian Pkwy. & Van Buren Bl.	TS	**151.6**	**150.0**	**F**	**F**	**161.5**	**150.6**	**F**	**F**	D	JPA	No
11	Innovation Dr. & Cactus Av.	TS	41.8	**122.9**	D	**F**	45.4	**148.5**	D	**F**	D	JPA	No
12	I-215 SB Ramps & Alessandro Bl.	TS	7.8	12.3	A	B	7.8	12.4	A	B	D	Caltrans/Riverside/County	No
13	I-215 SB Ramps & Cactus Av.	TS	5.3	29.4	A	C	5.5	46.9	A	D	D	Caltrans/JPA/County	No
14	I-215 NB Ramps & Alessandro Bl.	TS	50.7	24.4	D	C	54.7	25.0	D	C	D	Caltrans/Riverside/County	No
15	Old 215 Frontage Rd. & Alessandro Bl.	TS	31.2	50.4	C	D	34.2	52.4	C	D	D	MV/Riverside/County	No
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	TS	**189.0**	43.2	**F**	D	**191.8**	**74.9**	**F**	**E**	D	Caltrans/JPA	**Yes**
17	Day St. & Alessandro Bl.	TS	39.1	17.9	D	B	40.2	18.6	D	B	D	MV	No
18	Elsworth St. & Alessandro Bl.	TS	28.9	43.0	C	D	29.1	44.6	C	D	D	MV	No
19	Elsworth St. & Cactus Av.	TS	**305.5**	**204.9**	**F**	**F**	**328.3**	**265.3**	**F**	**F**	D	MV/JPA	**Yes**
20	Veterans Wy. & Alessandro Bl.	TS	22.4	23.5	C	C	23.2	23.8	C	C	D	MV	No
21	Veterans Wy. & Cactus Av.	TS	8.4	7.6	A	A	17.3	23.5	B	C	D	MV/JPA	No
22	Frederick St. & Alessandro Bl.	TS	24.2	40.3	C	D	26.3	47.6	C	D	D	MV	No
23	Frederick St. & Cactus Av.	TS	31.0	25.0	C	C	37.4	53.2	D	D	D	MV/JPA	No
24	Graham St./Riverside Dr. & Cactus Av.	TS	30.8	24.4	C	C	32.7	29.0	C	C	D	MV/JPA	No
25	Heacock St. & Cactus Av.	TS	**104.1**	**63.8**	**F**	**E**	**117.2**	**64.7**	**F**	**E**	D	MV/JPA	**Yes**

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS)

[1] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] See Table 6-2 for a detailed summary of significant impacts.

EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT SUMMARY OF LOS

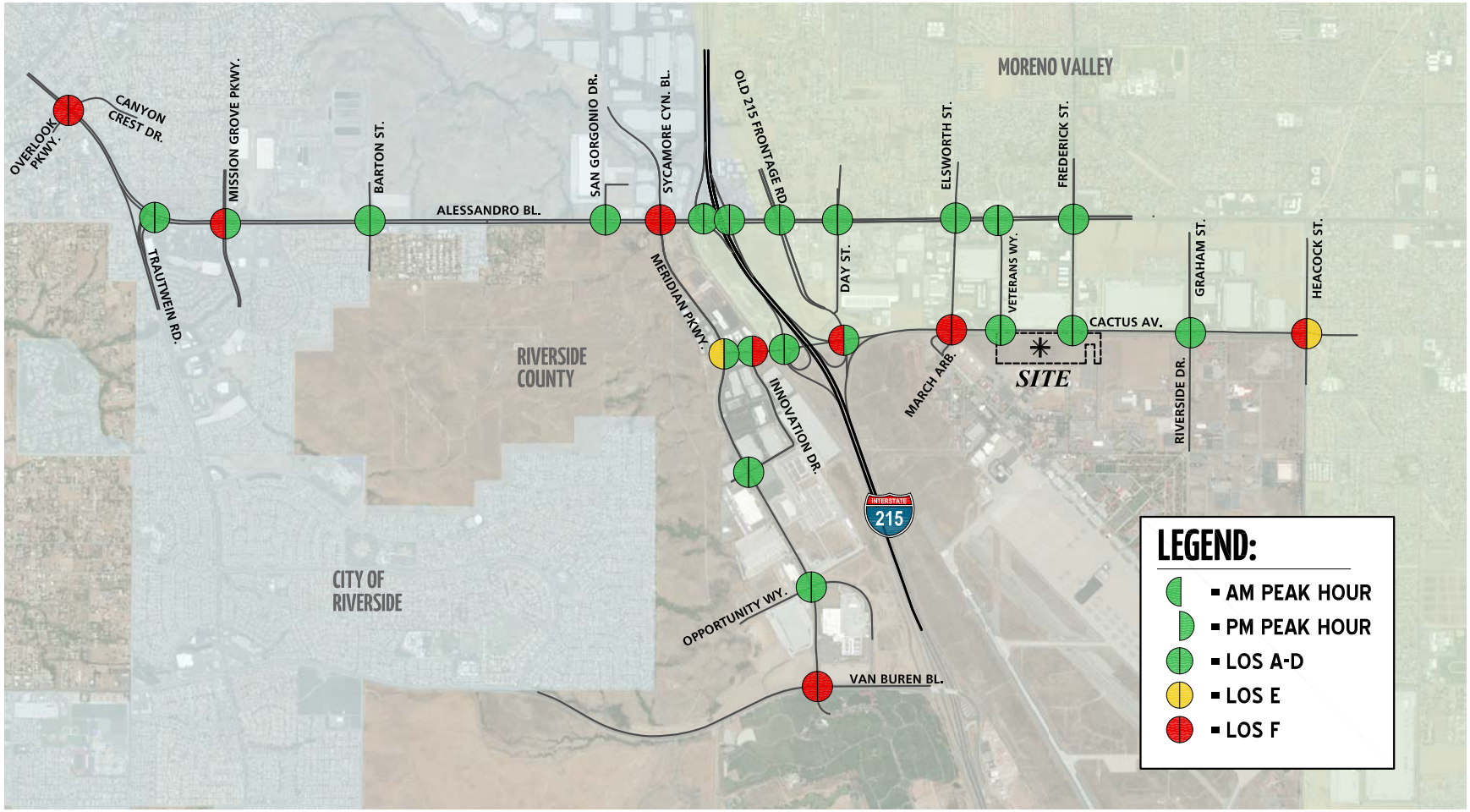


EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2023) WITH PROJECT SUMMARY OF LOS

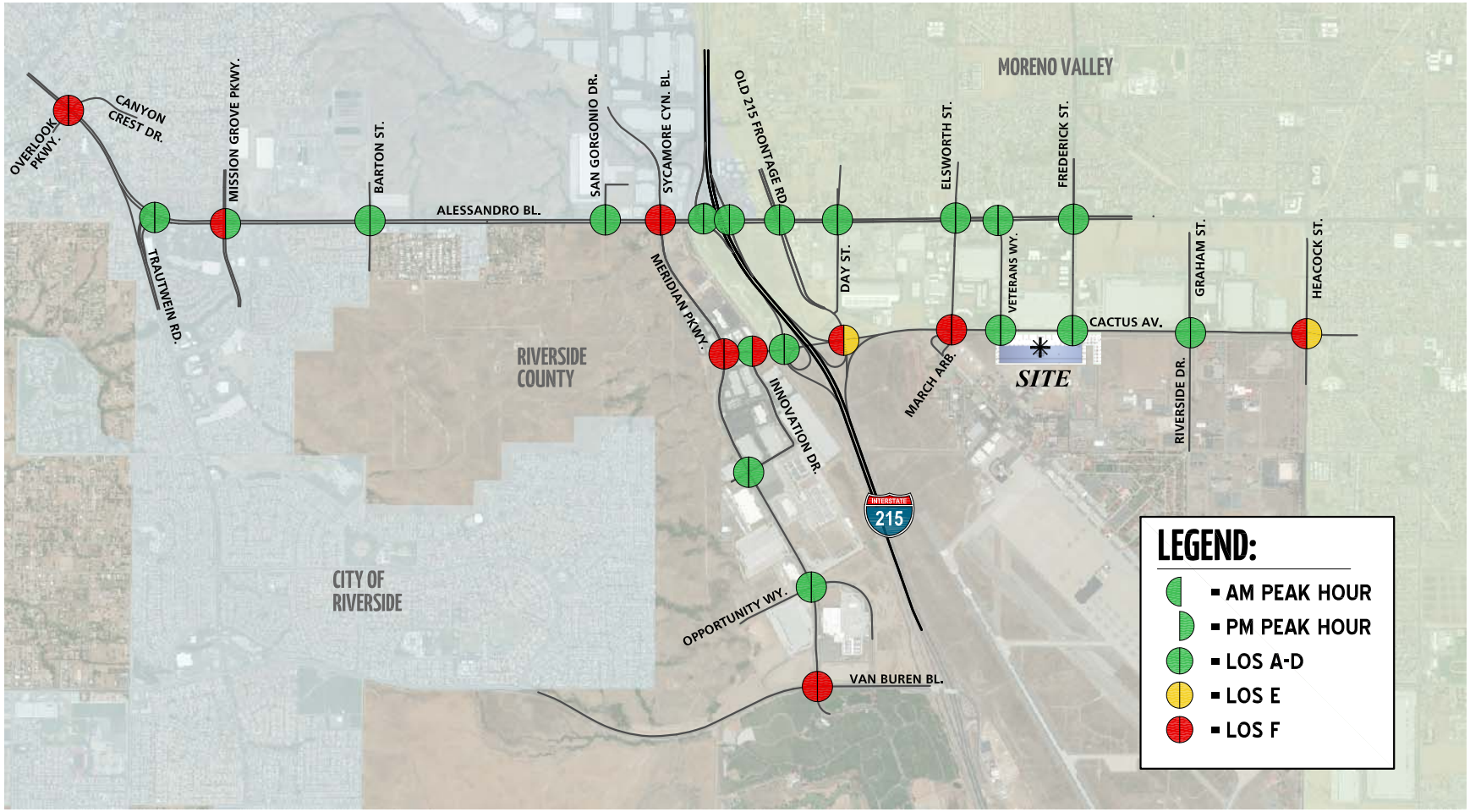


Table 6-2

Significant Impact Summary for Opening Year Cumulative (2023) Conditions

#	Intersection	Jurisdiction	Project % of Total Traffic		Change in Delay (secs.)		Project Trip Contribution		Significant Impact? [1,2,3]
			AM	PM	AM	PM	AM	PM	
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside	N/A	N/A	0.1	**4.8**	25	58	**Yes**
2	Trautwein Rd. & Alessandro Bl.	Riverside	N/A	N/A	0.1	0.0	N/A	N/A	No
3	Mission Grove Pkwy. & Alessandro Bl.	Riverside	N/A	N/A	0.4	1.8	25	58	No
4	Barton St. & Alessandro Bl.	Riverside/JPA	N/A	N/A	0.7	1.7	N/A	N/A	No
5	San Gorgonio Dr. & Alessandro Bl.	Riverside/JPA	N/A	N/A	0.6	1.6	N/A	N/A	No
6	Sycamore Canyon Bl. & Alessandro Bl.	Riverside/JPA	0.7%	1.4%	**4.5**	**3.8**	42	97	**Yes**
7	Meridian Pkwy. & Cactus Av.	JPA	0.6%	1.2%	N/A	N/A	21	49	No
8	Meridian Pkwy. & Innovation Dr.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
9	Meridian Pkwy. & Opportunity Wy.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
10	Meridian Pkwy. & Van Buren Bl.	JPA	0.4%	0.8%	N/A	N/A	21	49	No
11	Innovation Dr. & Cactus Av.	JPA	0.7%	1.7%	N/A	N/A	21	49	No
12	I-215 SB Ramps & Alessandro Bl.	Caltrans/Riverside/County	N/A	N/A	0.0	0.1	N/A	N/A	No
13	I-215 SB Ramps & Cactus Av.	Caltrans/JPA/County	N/A	N/A	N/A	N/A	N/A	N/A	No
14	I-215 NB Ramps & Alessandro Bl.	Caltrans/Riverside/County	N/A	N/A	4.0	0.6	N/A	N/A	No
15	Old 215 Frontage Rd. & Alessandro Bl.	MV/Riverside/County	N/A	N/A	3.0	2.0	N/A	N/A	No
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	Caltrans/JPA	**2.6%**	**8.2%**	N/A	N/A	**130**	**394**	**Yes**
17	Day St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
18	Elsworth St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
19	Elsworth St. & Cactus Av.	MV/JPA	**3.9%**	**8.5%**	N/A	N/A	**197**	**450**	**Yes**
20	Veterans Wy. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
21	Veterans Wy. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
22	Frederick St. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
23	Frederick St. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
24	Graham St./Riverside Dr. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
25	Heacock St. & Cactus Av.	MV/JPA	**2.3%**	**4.7%**	N/A	N/A	**105**	**243**	**Yes**

* **BOLD** = Significant Impact

N/A = Not Applicable

[1] For intersections within the jurisdiction of March JPA, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. However, if the pre-project condition is already below LOS D (or acceptable LOS), impact is significant if the Project contributes more than 2% of the total traffic.

[2] For intersections within the jurisdiction of the City of Riverside, a significant impact occurs at a study area intersection when the addition of project related trips causes either peak hour LOS to degrade from acceptable (LOS A through D) to unacceptable levels (LOS E/F) or the peak hour delay to increase as follows:
- LOS A/B = By 10.0 seconds
- LOS C = By 8.0 seconds
- LOS D = By 5.0 seconds
- LOS E = By 2.0 seconds
- LOS F = By 1.0 seconds

[3] For intersections within the jurisdiction of Caltrans, the County of Riverside, or City of Moreno Valley, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. An impact is also significant if the Project contributes 50 or more peak hour trips to an already deficient intersection.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Opening Year Cumulative (2023) traffic conditions are conducted for unsignalized intersections operating at LOS E or F. For Opening Year Cumulative (2023) traffic conditions, there are no unsignalized study area intersections that currently operate at an unacceptable LOS.

6.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway at Cactus Avenue interchange to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative (2023) Without and With Project traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 6-3, there are no queuing issues anticipated for Opening Year Cumulative (2023) Without and With Project traffic conditions.

Worksheets for Opening Year Cumulative (2023) Without Project conditions off-ramp queuing analysis are provided in Appendix 6.5. Worksheets for Opening Year Cumulative (2023) With Project conditions off-ramp queuing analysis are provided in Appendix 6.6.

6.7 BASIC FREEWAY SEGMENT ANALYSIS

6.7.1 OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT TRAFFIC CONDITIONS

Opening Year Cumulative (2023) Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-8. As shown on Table 6-4, the freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours under Opening Year Cumulative (2023) With Project traffic conditions. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Opening Year Cumulative (2023) Without Project basic freeway segment analysis worksheets are provided in Appendix 6.7.

Table 6-3

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2023) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2023 Without Project				2023 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable? [1]		95th Percentile Queue (Feet)[3]		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps & Cactus Av.	SBR	1,115	147	0	Yes	Yes	146	0	Yes	Yes
	NBR	1,850	48	80	Yes	Yes	157 [2]	369	Yes	Yes
I-215 NB Ramps & Cactus Av.	NBL	145	892 [2]	111	Yes[4]	Yes	892 [2]	111	Yes[4]	Yes
	NBT/R	1,650	367 [2]	60	Yes	Yes	367 [2]	60	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

Table 6-4

Basic Freeway Segment Analysis for Opening Year Cumulative (2023) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2023 Without Project				2023 With Project			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Cactus Av.	4	18.5	--[5]	C	**F**	18.9	--[5]	C	**F**
		South of Cactus Av.	4	17.6	--[5]	B	**F**	17.7	--[5]	B	**F**
	NB	North of Cactus Av.	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**
		South of Cactus Av.	4	--[5]	--[5]	**F**	**F**	--[5]	--[5]	**F**	**F**

[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[4] LOS = Level of Service

[5] Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



6.7.2 OPENING YEAR CUMULATIVE (2023) WITH PROJECT TRAFFIC CONDITIONS

Opening Year Cumulative (2023) With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-9. As shown on Table 6-4, the freeway segments are anticipated to continue to operate at an acceptable LOS with the addition of Project traffic. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Worksheets for Opening Year Cumulative (2023) With Project conditions basic freeway segment analysis worksheets are provided in Appendix 6.8.

6.8 FREEWAY MERGE/DIVERGE ANALYSIS

6.8.1 OPENING YEAR CUMULATIVE (2023) WITHOUT PROJECT TRAFFIC CONDITIONS

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative (2023) Without Project conditions and the results of this analysis are presented in Table 6-5. As shown in Table 6-5, the following freeway ramp merge and diverge areas evaluated for the purposes of this traffic study are anticipated to operate at unacceptable LOS during the peak hours (LOS E) during one or more of the peak hours:

- I-215 Freeway – Northbound, Off-Ramp at Cactus Avenue (#6) – LOS F AM peak hour only

However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. . Where applicable, the freeway mainline is assumed to operate at LOS F.

Opening Year Cumulative (2023) Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 6.9.

Table 6-5

Freeway Ramp Junction Merge/Diverge Analysis for Opening Year Cumulative (2023) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2023 Without Project				2023 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215	Southbound	Off-Ramp at Cactus Av.	4	19.1	C	--[5]	**F**	19.4	C	--[5]	**F**
		Loop Off-Ramp at Cactus Av.	4	19.4	C	--[5]	**F**	20.4	C	--[5]	**F**
		On-Ramp at Cactus Av.	3	26.6	C	--[5]	**F**	26.7	C	--[5]	**F**
	Northbound	On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**
		Loop On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**
		Off-Ramp at Cactus Av.	3	--[4]	**F**	--[5]	**F**	--[4]	**F**	--[5]	**F**

* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

[4] HCS7 does not report density for freeway facilities operating at LOS F.

[4] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

EXHIBIT 6-9: OPENING YEAR CUMULATIVE (2023) WITH PROJECT FREEWAY MAINLINE VOLUMES



6.8.2 OPENING YEAR CUMULATIVE (2023) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-5, there are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Opening Year Cumulative (2023) Without Project conditions. However, the addition of Project traffic is not anticipated to result in an LOS letter grade change to the total Opening Year Cumulative traffic forecasts along the deficient freeway ramp junctions. As such, the Project's impact would be less than significant. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

Worksheets for Opening Year Cumulative (2023) With Project conditions freeway ramp junction operations analysis worksheets are provided in Appendix 6.10.

6.9 OPENING YEAR CUMULATIVE (2023) DEFICIENCIES AND MITIGATION MEASURES

6.9.1 MITIGATION MEASURES TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the proposed mitigation measures for significantly impacted intersections (see Table 6-2) is presented in Table 6-6 for Opening Year Cumulative (2023) traffic conditions. Based on the each jurisdiction's significance criteria, the Project is anticipated to result in significant impacts at the following intersections, as the Project would contribute significantly to the total Opening Year Cumulative With Project traffic forecasts:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1)
- Sycamore Canyon Bl. & Alessandro Bl. (#6)
- Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av. (#16)
- Elsworth St. & Cactus Av. (#19)
- Heacock St. & Cactus Av. (#25)

The improvements identified at the remaining cumulatively impacted intersections are those needed to reduce the impact to less-than-significant, in addition to the improvements mentioned previously under E+P conditions. The impacts and mitigation measures for Opening Year Cumulative (2023) conditions are described below.

Mitigation Measure 2.1 – Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- Contribute fair share towards the restriping of the SB shared left-through lane as a 3rd left turn lane and the SB right turn lane as a shared through-right turn lane, and the modification of the traffic signal to implement protected left turn phasing on the northbound and southbound approaches.

Table 6-6

Intersection Analysis for Opening Year Cumulative (2023) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.																	
	- 2023 Without Project[5,6,7]	TS	1	2	d	**3**	1	**0**	1	3	0	1	3	1>	**66.2**	**65.3**	**E**	**E**
	- 2023 With Project[5,6,7]	TS	1	2	d	**3**	1	**0**	1	3	0	1	3	1>	**66.6**	**68.8**	**E**	**E**
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.																	
	- 2023 Without Project[4]	TS	**2**	1	0	1	1	0	1	2	0	0	**3**	**1**	46.4	32.0	D	C
	- 2023 With Project[4]	TS	**2**	1	0	1	1	0	1	2	0	0	**3**	**1**	48.1	35.3	D	D
19	Elsworth St. & Cactus Av.																	
	- 2023 Without Project[5]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	40.1	48.8	D	D
	- 2023 With Project[5]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	41.3	53.4	D	D
25	Heacock St. & Cactus Av.																	
	- 2023 Without Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	45.5	32.5	D	D
	- 2023 With Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	49.7	35.2	D	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] Recommended improvements consist of modifying the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches.

[5] Recommended improvements consist of modifying the traffic signal to implement protected left turn phasing on the northbound and southbound approaches.

[6] As the deficiencies are caused by minimum green times necessary for pedestrian crossing time, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

[7] The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. As such, the deficiency is significant and unavoidable.

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 3.1 – Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue (#16)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches, a 2nd northbound left turn lane, a 3rd westbound through lane, and a westbound right turn lane.

Mitigation Measure 4.1 – Heacock Street & Cactus Avenue (#25)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

The intersection operations analysis worksheets for Opening Year Cumulative (2023) Without and With Project traffic conditions, with improvements, are included in Appendix 6.11 and Appendix 6.12, respectively.

6.9.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously on Table 6-3, there are no peak hour queuing issues anticipated at the I-215 Freeway at Cactus Avenue interchange for Opening Year Cumulative (2023) traffic conditions. However, the off-ramp at Old 215 Frontage Road/I-215 Northbound Ramps at Cactus Avenue has been improved to achieve acceptable LOS. The improvement to the off-ramp queues is shown on Table 6-7. This improvement is not required to achieve acceptable off-ramp queues and is shown for informational purposes only.

Table 6-7

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2023) Conditions With Improvements

Intersection	Movement	Available Stacking Distance (Feet)	2023 Without Project				2023 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 NB Ramps & Cactus Av.	NBL	145	469 [2]	89	Yes[4]	Yes	469 [2]	89	Yes[4]	Yes
	NBT/R	1,650	568 [2]	109	Yes	Yes	568 [2]	109	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

6.9.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Tables 6-4 and 6-5, the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F.

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the March JPA (or other neighboring jurisdictions) on SHS roadway segments. The WRCOG TUMF Program identifies this interchange, inclusive of on/off-ramps as a transportation mitigation project on the Regional System of Highways and Arterials. However, there are also no known near-term planned improvements along the I-215 Freeway. As such, no improvements have been recommended, and the impact to the freeway facility is significant and unavoidable.

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7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, freeway mainline operations, and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by the cumulative development projects to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontage and driveways). Other connections assumed include the extension of San Gorgonio Avenue, south of Alessandro Boulevard, and the extension of Cactus Avenue, west of Meridian Parkway as shown in Exhibit 7-1.

7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibits 7-2 and 7-3, respectively.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibits 7-4 and 7-5, respectively.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

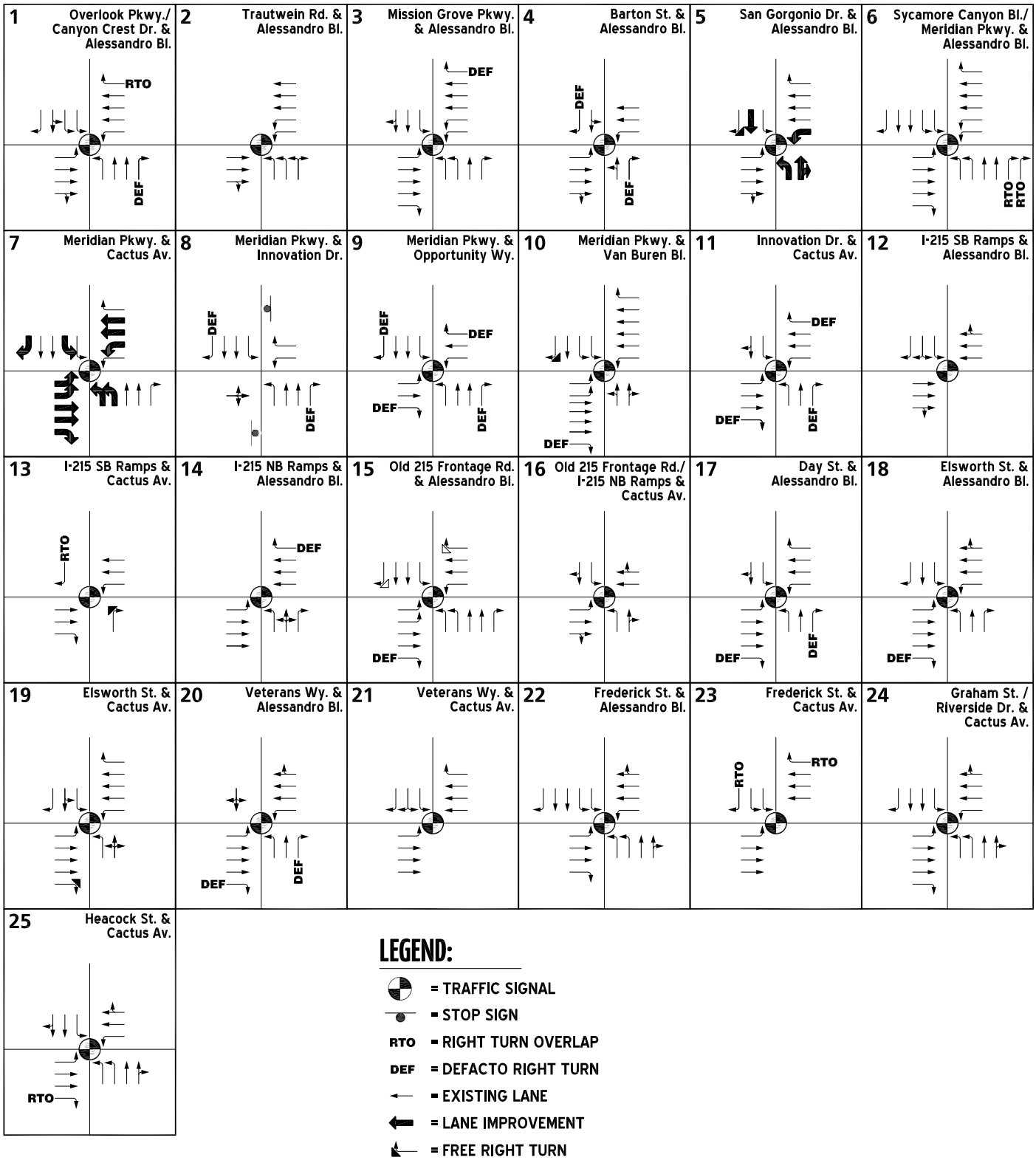
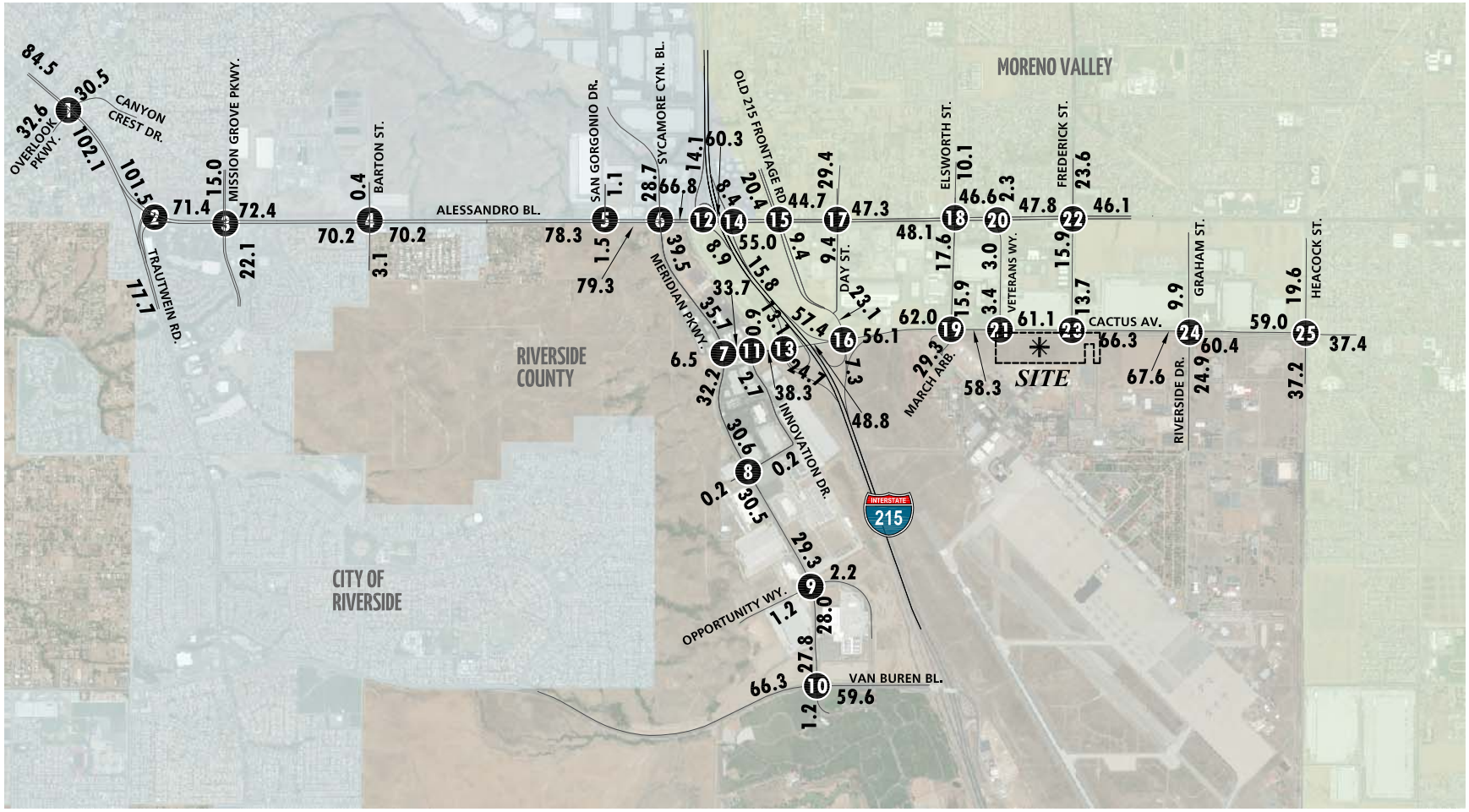


EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES

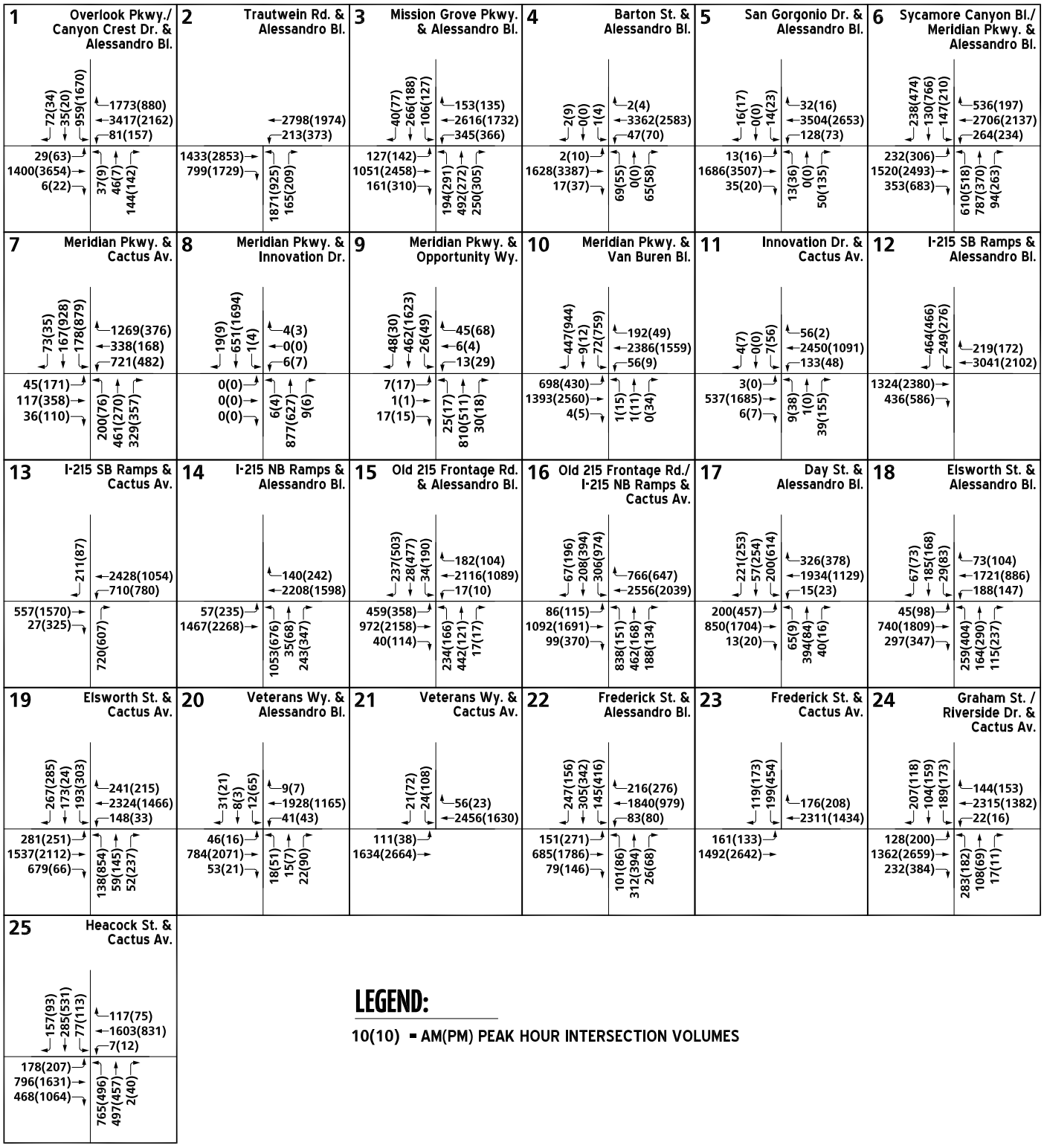
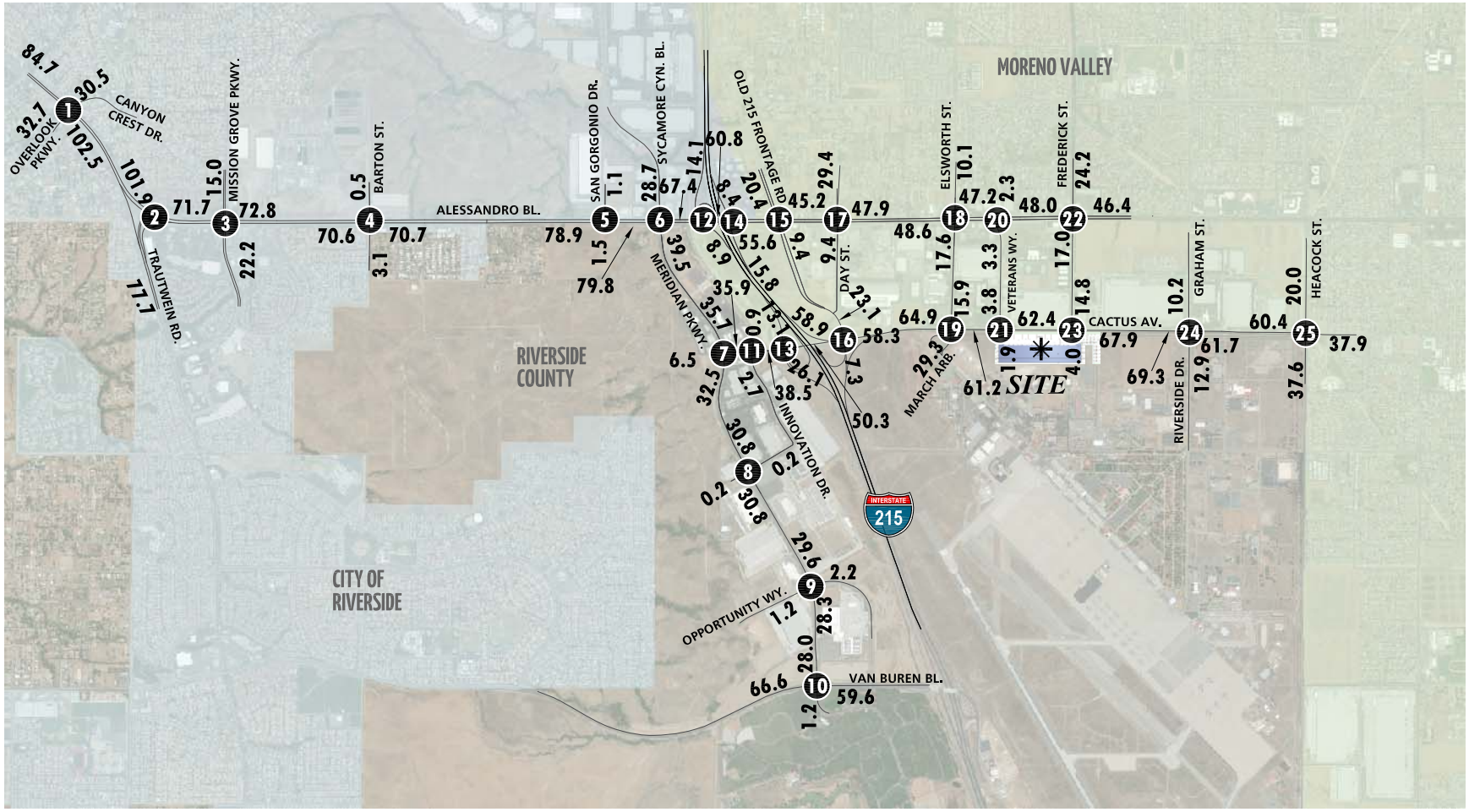


EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

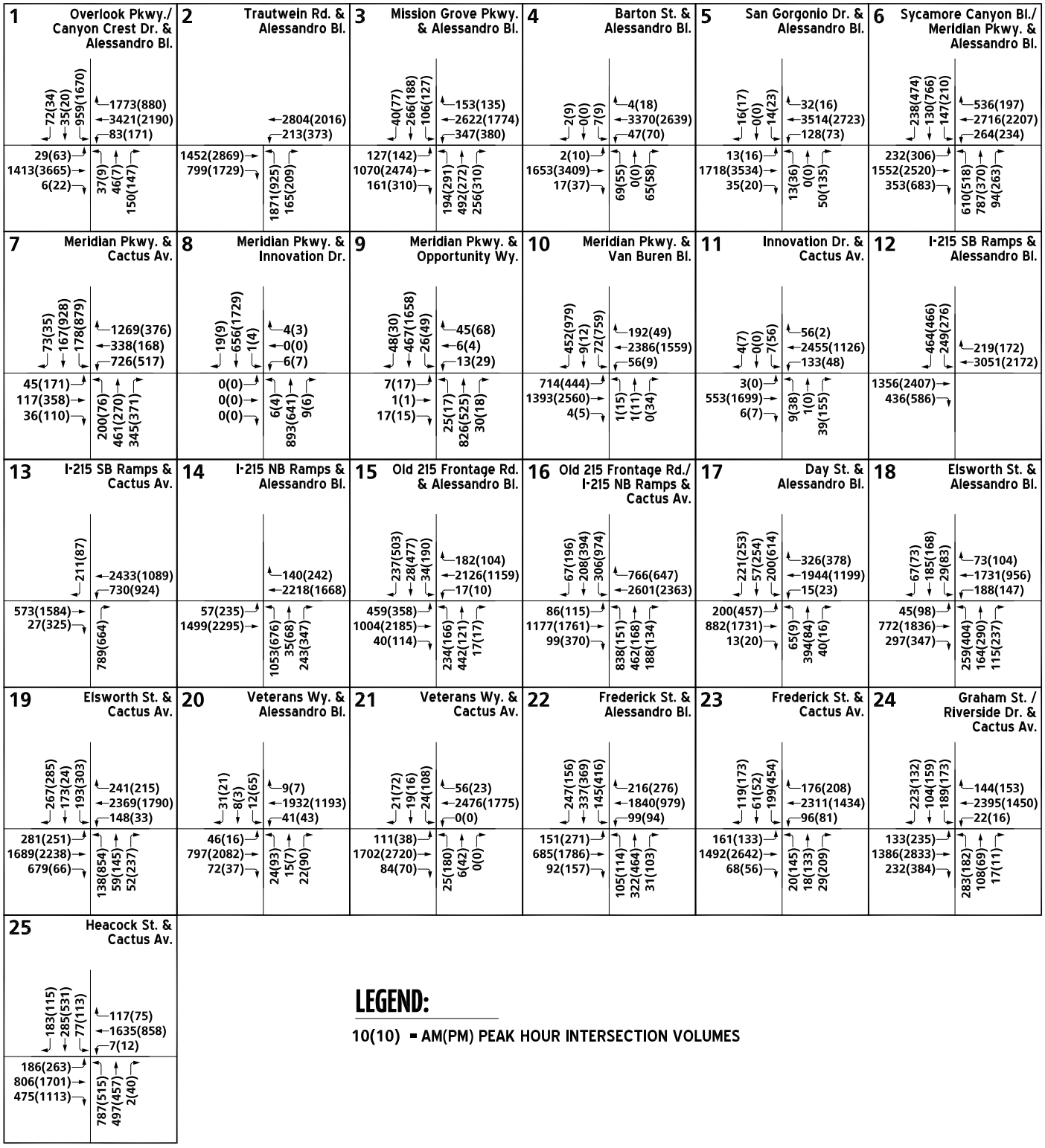


LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 7-5: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES



7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the following study area intersections are anticipated to operate at an unacceptable level of service (e.g., LOS E or worse):

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1) – LOS F AM and PM peak hours
- Mission Grove Pkwy. & Alessandro Bl. (#3) – LOS F AM peak hour; LOS E PM peak hour
- Sycamore Canyon Bl. & Alessandro Bl. (#6) – LOS F AM and PM peak hours
- Meridian Pkwy. & Cactus Av. (#7) – LOS F AM peak hour; LOS E PM peak hour
- Meridian Pkwy. & Van Buren Bl. (#10) – LOS F AM and PM peak hours
- Innovation Dr. & Cactus Av. (#11) – LOS E AM peak hour; LOS F PM peak hour
- I-215 SB Ramps & Cactus Av. (#13) – LOS F PM peak hour only
- I-215 NB Ramps & Alessandro Bl. (#14) – LOS E AM and PM peak hours
- Old 215 Frontage Rd. & Alessandro Bl. (#15) – LOS F AM peak hour only
- Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av. (#16) – LOS F AM and PM peak hours
- Day St. & Alessandro Bl. (#17) – LOS E PM peak hour only
- Elsworth St. & Alessandro Bl. (#18) – LOS F PM peak hour only
- Elsworth St. & Cactus Av. (#19) – LOS F AM and PM peak hours
- Frederick St. & Alessandro Bl. (#22) – LOS F AM and PM peak hours
- Graham St./Riverside Dr. & Cactus Av. (#24) – LOS F AM and PM peak hours
- Heacock St. & Cactus Av. (#25) – LOS F AM and PM peak hours

A summary of the peak hour intersection LOS for Horizon Year Without Project conditions are shown on Exhibit 7-6. The intersection operations analysis worksheets for Horizon Year Without Project traffic conditions are included in Appendix 7.1 of this TIA.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project				2040 With Project				Acceptable LOS	Jurisdiction	Significant Impact?[3]
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service				
			AM	PM	AM	PM	AM	PM	AM	PM			
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	TS	**530.8**	**156.9**	**F**	**F**	**548.1**	**162.6**	**F**	**F**	D	Riverside	**Yes**
2	Trautwein Rd. & Alessandro Bl.	TS	53.9	34.0	D	C	54.3	34.3	D	C	D	Riverside	No
3	Mission Grove Pkwy. & Alessandro Bl.	TS	**139.6**	**58.2**	**F**	**E**	**139.8**	**58.9**	**F**	**E**	D	Riverside	No
4	Barton St. & Alessandro Bl.	TS	49.0	45.4	D	D	52.7	49.5	D	D	D	Riverside/JPA	No
5	San Gorgonio Dr. & Alessandro Bl.	TS	38.3	51.6	D	D	39.0	54.8	D	D	D	Riverside/JPA	No
6	Sycamore Canyon Bl. & Alessandro Bl.	TS	**116.1**	**103.4**	**F**	**F**	**118.0**	**104.8**	**F**	**F**	D	Riverside/JPA	**Yes**
7	Meridian Pkwy. & Cactus Av.	TS	**88.8**	**63.2**	**F**	**E**	**89.8**	**67.2**	**F**	**E**	D	JPA	No
8	Meridian Pkwy. & Innovation Dr.	CSS	19.1	33.9	C	D	20.0	34.2	C	D	D	JPA	No
9	Meridian Pkwy. & Opportunity Wy.	TS	12.1	46.2	B	D	12.2	51.3	B	D	D	JPA	No
10	Meridian Pkwy. & Van Buren Bl.	TS	**190.7**	**196.5**	**F**	**F**	**193.2**	**197.2**	**F**	**F**	D	JPA	No
11	Innovation Dr. & Cactus Av.	TS	**73.7**	**161.2**	**E**	**F**	**74.2**	**163.7**	**E**	**F**	D	JPA	No
12	I-215 SB Ramps & Alessandro Bl.	TS	11.6	19.5	B	B	11.8	20.0	B	C	D	Caltrans/Riverside/County	No
13	I-215 SB Ramps & Cactus Av.	TS	6.9	**85.6**	A	**F**	7.2	**103.8**	A	**F**	D	Caltrans/JPA/County	**Yes**
14	I-215 NB Ramps & Alessandro Bl.	TS	**67.1**	**56.9**	**E**	**E**	**67.9**	**59.4**	**E**	**E**	D	Caltrans/Riverside/County	**Yes**
15	Old 215 Frontage Rd. & Alessandro Bl.	TS	**83.8**	51.7	**F**	D	**96.4**	52.3	**F**	D	D	MV/Riverside/County	**Yes**
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	TS	**872.4**	**339.0**	**F**	**F**	**876.9**	**366.7**	**F**	**F**	D	Caltrans/JPA	**Yes**
17	Day St. & Alessandro Bl.	TS	30.8	**77.4**	C	**E**	31.5	**78.5**	C	**E**	D	MV	**Yes**
18	Elsworth St. & Alessandro Bl.	TS	45.8	**95.2**	D	**F**	46.4	**97.5**	D	**F**	D	MV	**Yes**
19	Elsworth St. & Cactus Av.	TS	**374.8**	**270.5**	**F**	**F**	**396.7**	**324.6**	**F**	**F**	D	MV/JPA	**Yes**
20	Veterans Wy. & Alessandro Bl.	TS	32.9	40.0	C	D	33.1	40.7	C	D	D	MV	No
21	Veterans Wy. & Cactus Av.	TS	9.0	27.7	A	C	18.4	30.8	B	C	D	MV/JPA	No
22	Frederick St. & Alessandro Bl.	TS	**112.8**	**193.7**	**F**	**F**	**114.6**	**195.3**	**F**	**F**	D	MV	**Yes**
23	Frederick St. & Cactus Av.	TS	33.9	28.5	C	C	36.7	54.2	D	D	D	MV/JPA	No
24	Graham St./Riverside Dr. & Cactus Av.	TS	**139.7**	**111.9**	**F**	**F**	**149.8**	**133.3**	**F**	**F**	D	MV/JPA	**Yes**
25	Heacock St. & Cactus Av.	TS	**162.5**	**74.3**	**F**	**E**	**178.4**	**87.6**	**F**	**F**	D	MV/JPA	**Yes**

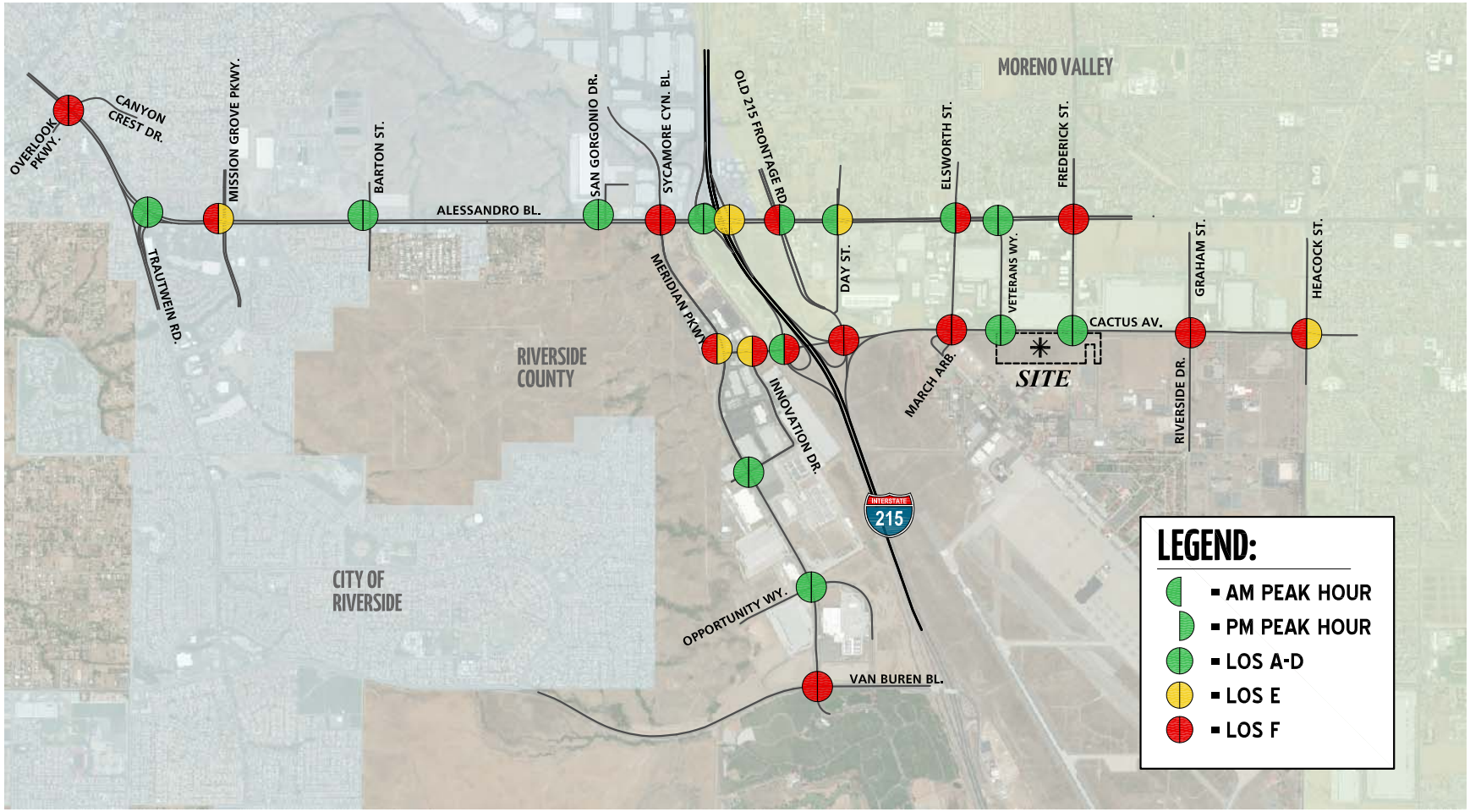
* **BOLD** = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS)

[1] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal

[3] See Table 7-2 for a detailed summary of significant impacts.

EXHIBIT 7-6: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS



7.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-7, there are no additional study area intersections anticipated to operate at an unacceptable LOS (LOS E or worse) with the addition of Project traffic, other than those previously identified under Horizon Year Without Project conditions. The intersection operations analysis worksheets for Horizon Year With Project traffic conditions are included in Appendix 7.2 of this TIA. The significant impacts are summarized in Table 7-2. Measures to address long range deficiencies for Horizon Year traffic conditions are discussed in Section 7.9 *Horizon Year Deficiencies and Recommended Improvements.*

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Horizon Year (2040) traffic conditions are conducted for unsignalized intersections operating at LOS E or F. For Horizon Year (2040) traffic conditions, there are no unsignalized study area intersections that currently operate at an unacceptable LOS.

7.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway at Cactus Avenue interchange to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 7-3 for Horizon Year (2040) Without and With Project traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 7-3, there are no queuing issues anticipated for Horizon Year (2040) Without and With Project traffic conditions.

Worksheets for Horizon Year (2040) Without Project conditions off-ramp queuing analysis are provided in Appendix 7.5. Worksheets for Horizon Year (2040) With Project conditions off-ramp queuing analysis are provided in Appendix 7.6.

7.7 BASIC FREEWAY SEGMENT ANALYSIS

7.7.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

Horizon Year (2040) Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-8. As shown on Table 7-4, the following freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours:

- I-215 Freeway – Northbound, North of Cactus Avenue (#3) – LOS E PM peak hour only
- I-215 Freeway – Northbound, South of Cactus Avenue (#4) – LOS F AM peak hour; LOS E PM peak hour

EXHIBIT 7-7: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS

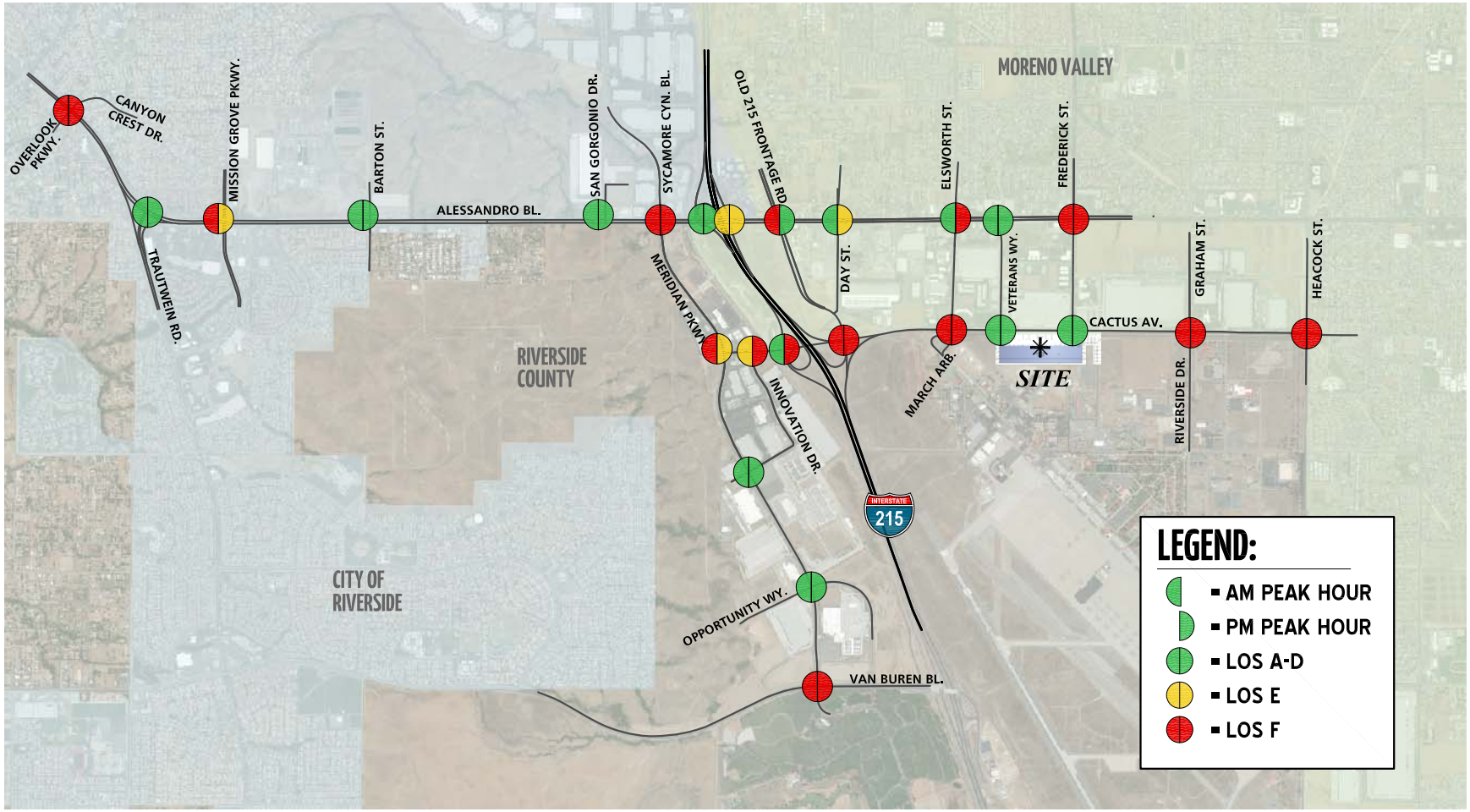


Table 7-2

Significant Impact Summary for Horizon Year (2040) Conditions

#	Intersection	Jurisdiction	Project % of Total Traffic		Change in Delay (secs.)		Project Trip Contribution		Significant Impact? [1,2,3]
			AM	PM	AM	PM	AM	PM	
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.	Riverside	N/A	N/A	**17.3**	**5.7**	N/A	N/A	**Yes**
2	Trautwein Rd. & Alessandro Bl.	Riverside	N/A	N/A	0.4	0.3	N/A	N/A	No
3	Mission Grove Pkwy. & Alessandro Bl.	Riverside	N/A	N/A	0.2	0.7	N/A	N/A	No
4	Barton St. & Alessandro Bl.	Riverside/JPA	N/A	N/A	3.7	4.1	N/A	N/A	No
5	San Gorgonio Dr. & Alessandro Bl.	Riverside/JPA	N/A	N/A	0.7	3.2	N/A	N/A	No
6	Sycamore Canyon Bl. & Alessandro Bl.	Riverside/JPA	0.5%	1.1%	**1.9**	**1.4**	42	97	**Yes**
7	Meridian Pkwy. & Cactus Av.	JPA	0.5%	1.2%	N/A	N/A	21	49	No
8	Meridian Pkwy. & Innovation Dr.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
9	Meridian Pkwy. & Opportunity Wy.	JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
10	Meridian Pkwy. & Van Buren Bl.	JPA	0.4%	0.8%	N/A	N/A	21	49	No
11	Innovation Dr. & Cactus Av.	JPA	0.6%	1.6%	N/A	N/A	21	49	No
12	I-215 SB Ramps & Alessandro Bl.	Caltrans/Riverside/County	N/A	N/A	0.2	0.5	N/A	N/A	No
13	I-215 SB Ramps & Cactus Av.	Caltrans/JPA/County	**2.3%**	**5.3%**	N/A	N/A	110	250	**Yes**
14	I-215 NB Ramps & Alessandro Bl.	Caltrans/Riverside/County	0.8%	1.7%	0.8	**2.5**	42	97	**Yes**
15	Old 215 Frontage Rd. & Alessandro Bl.	MV/Riverside/County	0.9%	1.8%	**12.6**	0.6	42	97	**Yes**
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.	Caltrans/JPA	1.9%	**5.4%**	N/A	N/A	130	394	**Yes**
17	Day St. & Alessandro Bl.	MV	1.0%	1.9%	N/A	N/A	42	97	**Yes**
18	Elsworth St. & Alessandro Bl.	MV	1.1%	**2.0%**	N/A	N/A	42	97	**Yes**
19	Elsworth St. & Cactus Av.	MV/JPA	**3.1%**	**7.0%**	N/A	N/A	197	450	**Yes**
20	Veterans Wy. & Alessandro Bl.	MV	N/A	N/A	N/A	N/A	N/A	N/A	No
21	Veterans Wy. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
22	Frederick St. & Alessandro Bl.	MV	**4.9%**	**3.6%**	N/A	N/A	80	185	**Yes**
23	Frederick St. & Cactus Av.	MV/JPA	N/A	N/A	N/A	N/A	N/A	N/A	No
24	Graham St./Riverside Dr. & Cactus Av.	MV/JPA	**2.4%**	**5.0%**	N/A	N/A	125	291	**Yes**
25	Heacock St. & Cactus Av.	MV/JPA	**2.1%**	**4.2%**	N/A	N/A	105	243	**Yes**

* **BOLD** = Significant Impact

N/A = Not Applicable

[1] For intersections within the jurisdiction of March JPA, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. However, if the pre-project condition is already below LOS D (or acceptable LOS), impact is significant if the Project contributes more than 2% of the total traffic.

[2] For intersections within the jurisdiction of the City of Riverside, a significant impact occurs at a study area intersection when the addition of project related trips causes either peak hour LOS to degrade from acceptable (LOS A through D) to unacceptable levels (LOS E/F) or the peak hour delay to increase as follows:
- LOS A/B = By 10.0 seconds
- LOS C = By 8.0 seconds
- LOS D = By 5.0 seconds
- LOS E = By 2.0 seconds
- LOS F = By 1.0 seconds

[3] For intersections within the jurisdiction of Caltrans, the County of Riverside, or City of Moreno Valley, impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. An impact is also significant if the Project contributes 50 or more peak hour trips to an already deficient intersection.

Table 7-3

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps & Cactus Av.	SBR	1,115	167	14	Yes	Yes	167	20	Yes	Yes
	NBR	1,850	148 [2]	216 [2]	Yes	Yes	339 [2]	312 [2]	Yes	Yes
I-215 NB Ramps & Cactus Av.	NBL	145	952 [2]	245 [2]	Yes[4]	Yes[4]	952 [2]	245 [2]	Yes[4]	Yes[4]
	NBT/R	1,650	663 [2]	222	Yes	Yes	663 [2]	224	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

Table 7-4

Basic Freeway Segment Analysis for Horizon Year (2040) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2040 Without Project				2040 With Project			
				Density[3, 5]		LOS[4]		Density[3, 5]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Cactus Av.	4	22.3	--[6]	C	**F**	22.7	--[6]	C	**F**
		South of Cactus Av.	4	21.2	--[6]	C	**F**	21.5	--[6]	C	**F**
	NB	North of Cactus Av.	4	--[6]	--[6]	**F**	**F**	--[6]	--[6]	**F**	**F**
		South of Cactus Av.	4	--[6]	--[6]	**F**	**F**	--[6]	--[6]	**F**	**F**

[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[4] LOS = Level of Service

[5] HCS7 does not report density for freeway facilities operating at LOS F.

[6] Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

EXHIBIT 7-8: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Horizon Year (2040) Without Project basic freeway segment analysis worksheets are provided in Appendix 7.5.

7.7.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

Horizon Year (2040) With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-9. As shown on Table 7-4, the following freeway segment is anticipated to operate at an unacceptable LOS with the addition of Project traffic under Horizon Year (2040) With Project traffic conditions during the peak hours, in addition to the freeway segments previously identified under Horizon Year (2040) Without Project traffic conditions:

- I-215 Freeway – Southbound, South of Cactus Avenue (#2) – LOS E PM peak hour only

However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. Where applicable, the freeway mainline is assumed to operate at LOS F. Worksheets for Horizon Year (2040) With Project conditions basic freeway segment analysis worksheets are provided in Appendix 7.6.

7.8 FREEWAY MERGE/DIVERGE ANALYSIS

7.8.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

Ramp merge and diverge operations were also evaluated for Horizon Year (2040) Without Project conditions and the results of this analysis are presented in Table 7-5. As shown in Table 7-5, the following freeway ramp merge and diverge areas evaluated for the purposes of this traffic study are anticipated to operate at unacceptable LOS during one or more peak hours:

- I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue (#2) – LOS E PM peak hour only
- I-215 Freeway – Southbound, On-Ramp at Cactus Avenue (#3) – LOS F PM peak hour only
- I-215 Freeway – Northbound, On-Ramp at Cactus Avenue (#4) – LOS E PM peak hour only
- I-215 Freeway – Northbound, Loop On-Ramp at Cactus Avenue (#5) – LOS F AM and PM peak hours

However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours due to queuing from downstream bottlenecks. . Where applicable, the freeway mainline is assumed to operate at LOS F. Horizon Year (2040) Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 7.7.

EXHIBIT 7-9: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

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Table 7-5

Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215	Southbound	Off-Ramp at Cactus Av.	4	22.7	C	--[5]	**F**	23.0	C	--[5]	**F**
		Loop Off-Ramp at Cactus Av.	4	24.1	D	--[5]	**F**	24.5	D	--[5]	**F**
		On-Ramp at Cactus Av.	3	32.8	D	--[4]	**F**	32.9	D	--[4]	**F**
	Northbound	On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**
		Loop On-Ramp at Cactus Av.	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**
		Off-Ramp at Cactus Av.	3	--[4]	**F**	--[4]	**F**	--[4]	**F**	--[4]	**F**

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

[4] HCS7 does not report density for freeway facilities operating at LOS F.

[4] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks.

7.8.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-5, there are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, other than those previously identified under Horizon Year (2040) Without Project conditions. However, observations made in the field indicated that the I-215 Southbound mainline experiences significant traffic congestion in the AM peak hour and the I-215 Northbound mainline experiences significant traffic congestion in both the AM and PM peak hours. Where applicable, the freeway mainline is assumed to operate at LOS F.

Horizon Year (2040) With Project freeway ramp junction operations analysis worksheets are provided in Appendix 7.8.

7.9 HORIZON YEAR (2040) DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

7.9.1 MITIGATION MEASURES TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the proposed mitigation measures are presented in Table 7-6 for Horizon Year (2040) traffic conditions. Based on the each jurisdiction's significance criteria, the Project is anticipated to result in significant impacts at the following intersections, as the Project would contribute significantly to the total Horizon Year With Project traffic forecasts:

- Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl. (#1)
- Sycamore Canyon Bl. & Alessandro Bl. (#6)
- I-215 Southbound Ramps & Cactus Av. (#13)
- I-215 NB Ramps & Alessandro Bl. (#14)
- Old 215 Frontage Rd. & Alessandro Bl. (#15)
- Old 215 Frontage Rd./I-215 Northbound Ramps & Cactus Av. (#16)
- Day St. & Alessandro Bl. (#17)
- Elsworth St. & Alessandro Bl. (#18)
- Elsworth St. & Cactus Av. (#19)
- Frederick St. & Alessandro Bl. (#22)
- Graham St./Riverside Dr. & Cactus Av. (#24)
- Heacock St. & Cactus Av. (#25)

The improvements identified at the remaining cumulatively impacted intersections are those needed to reduce the impact to less-than-significant, in addition to the improvements mentioned previously under E+P and Opening Year Cumulative (2023) conditions. The impacts and mitigation measures for Horizon Year (2040) conditions are described below.

Table 7-6

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Overlook Pkwy./Canyon Crest Dr. & Alessandro Bl.																	
	- 2040 Without Project[6,7]	TS	1	2	d	**3**	1	**0**	1	3	0	1	3	1>	**233.7**	**250.0**	**F**	**F**
	- 2040 With Project[6,7]	TS	1	2	d	**3**	1	**0**	1	3	0	1	3	1>	**236.3**	**252.2**	**F**	**F**
6	Sycamore Canyon Bl. & Alessandro Bl.																	
	- 2040 Without Project[6,7]	TS	2	2	2>	2	2	**1>**	**2**	3	**1>**	2	3	**1>**	**82.9**	**94.2**	**F**	**F**
	- 2040 With Project[6,7]	TS	2	2	2>	2	2	**1>**	**2**	3	**1>**	2	3	**1>**	**83.5**	**98.4**	**F**	**F**
13	I-215 SB Ramps & Cactus Av.																	
	- 2040 Without Project	TS	0	0	1>>	0	0	1>	0	**3**	1	**2**	**3**	0	4.2	8.7	A	A
	- 2040 With Project	TS	0	0	1>>	0	0	1>	0	**3**	1	**2**	**3**	0	4.3	10.5	A	B
14	I-215 NB Ramps & Alessandro Bl.																	
	- 2040 Without Project	TS	**2**	1	1	0	0	0	1	3	0	0	3	d	34.3	19.2	C	B
	- 2040 With Project	TS	**2**	1	1	0	0	0	1	3	0	0	3	d	34.6	19.5	C	B
15	Old 215 Frontage Rd. & Alessandro Bl.																	
	- 2040 Without Project	TS	2	2	1	1	2	1	2	**3**	d	1	**3**	1	30.0	29.2	C	C
	- 2040 With Project	TS	2	2	1	1	2	1	2	**3**	d	1	**3**	1	30.1	29.6	C	C
16	Old 215 Frontage Rd./I-215 NB Ramps & Cactus Av.																	
	- 2040 Without Project[4]	TS	**2**	**2**	0	1	1	**2>**	**2**	**3**	**1**	0	**4**	**1**	51.8	38.2	D	D
	- 2040 With Project[4]	TS	**2**	**2**	0	1	1	**2>**	**2**	**3**	**1**	0	**4**	**1**	52.1	40.5	D	D
17	Day St. & Alessandro Bl.																	
	- 2040 Without Project	TS	1	1	d	1	1	0	1	3	d	1	**3**	1	39.9	38.7	D	D
	- 2040 With Project	TS	1	1	d	1	1	0	1	3	d	1	**3**	1	40.3	42.2	D	D
18	Elsworth St. & Alessandro Bl.																	
	- 2040 Without Project	TS	**2**	1	1	1	1	1	1	3	d	1	3	0	29.3	49.5	C	D
	- 2040 With Project	TS	**2**	1	1	1	1	1	1	3	d	1	3	0	29.4	50.8	C	D
19	Elsworth St. & Cactus Av.																	
	- 2040 Without Project[5]	TS	**2**	1	0	1	1	1>	1	**4**	1>>	1	**4**	1	32.0	44.1	C	D
	- 2040 With Project[5]	TS	**2**	1	0	1	1	1>	1	**4**	1>>	1	**4**	1	32.2	48.6	C	D
22	Frederick St. & Alessandro Bl.																	
	- 2040 Without Project	TS	2	2	0	2	2	1	1	**3**	1	1	3	0	33.4	43.6	C	D
	- 2040 With Project	TS	2	2	0	2	2	1	1	**3**	1	1	3	0	33.8	50.1	C	D
24	Graham St./Riverside Dr. & Cactus Av.																	
	- 2040 Without Project	TS	2	2	0	1	2	1	**2**	3	1	1	3	0	45.7	35.9	D	D
	- 2040 With Project	TS	2	2	0	1	2	1	**2**	3	1	1	3	0	50.0	48.2	D	D
25	Heacock St. & Cactus Av.																	
	- 2040 Without Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	50.3	33.1	D	C
	- 2040 With Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	54.8	37.3	D	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual 6th Edition, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

[4] Recommended improvements consist of modifying the traffic signal to implement protected left turn phasing on the northbound, southbound, and eastbound approaches.

[5] Recommended improvements consist of modifying the traffic signal to implement protected left turn phasing on the northbound and southbound approaches.

[6] As the deficiencies are caused by minimum green times necessary for pedestrian crossing time, there are no feasible physical improvements to bring the vehicular LOS to acceptable levels without the removal of crosswalks. The deficiency exists only when a pedestrian call occurs during the peak hour and nominal pedestrian and bicycle activity was observed at both these intersections (also validated by peak hour count data).

[7] The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. As such, the deficiency is significant and unavoidable.

Overlook Parkway/Canyon Crest Drive & Alessandro Boulevard (#1)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 5.1 – Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- Contribute fair share towards a 2nd northbound left turn lane and the modification of the traffic signal to implement protected left turn phasing on the southbound, eastbound, and westbound approaches.

Sycamore Canyon Boulevard & Alessandro Boulevard (#6)

- The roadway improvements have been built up to the ultimate width of the intersection as designated in the General Plan. Additional improvements may be infeasible due to physical constraints. As such, the impact is considered significant and unavoidable.

Mitigation Measure 6.1 – I-215 Southbound Ramps & Cactus Avenue (#13)

- Contribute fair share towards a 3rd eastbound through lane, a 2nd westbound left turn lane, and a 3rd westbound through lane.

Mitigation Measure 7.1 – I-215 NB Ramps & Alessandro Boulevard (#14)

- Contribute fair share towards a 2nd northbound left turn lane.

Mitigation Measure 8.1 – Old 215 Frontage Road & Alessandro Boulevard (#15)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

Mitigation Measure 3.2 – Old 215 Frontage Road/I-215 Northbound Ramps & Cactus Avenue (#16)

- Contribute fair share towards the modification of the traffic signal to implement protected left turn phasing on the southbound approaches, a 2nd northbound through lane, 2 southbound right turn lanes, a 2nd eastbound left turn lane, a 3rd eastbound through lane, an eastbound right turn lane, and a 4th westbound through lane.

Mitigation Measure 9.1 – Frederick Street & Alessandro Boulevard (#17)

- Contribute fair share towards a 3rd westbound through lane.

Mitigation Measure 10.1 – Elsworth Street & Alessandro Boulevard (#18)

- Contribute fair share towards a 2nd northbound left turn lane.

Mitigation Measure 1.2 – Elsworth Street & Cactus Avenue (#19)

- Contribute fair share towards a 2nd northbound left turn lane, a 4th eastbound through lane, and a 4th westbound through lane.

Mitigation Measure 11.1 – Frederick Street & Alessandro Boulevard (#22)

- Contribute fair share towards a 3rd eastbound through lane.

Mitigation Measure 12.1 – Graham Street/Riverside Drive & Cactus Avenue (#24)

- Contribute fair share towards a 2nd eastbound left turn lane.

Mitigation Measure 4.2 – Heacock Street & Cactus Avenue (#25)

- Contribute fair share towards a 3rd eastbound through lane and a 3rd westbound through lane.

The applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of TUMF. These fees shall be collected by the March JPA, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases.

Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.9 and 7.10, respectively.

The locations where only a fair share contribution has been identified would remain a significant impact until such time the recommended improvement is implemented. Because the March JPA does not have plenary control over intersections under other jurisdictions, the March JPA cannot guarantee that such improvements will be constructed. As such the impacts are considered significant and unavoidable.

7.9.2 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously on Table 7-2, there are no peak hour queuing issues anticipated at the I-215 Freeway at Cactus Avenue interchange for Horizon Year (2040) traffic conditions. However, the off-ramps at I-215 Freeway & Cactus Avenue has been improved to achieve acceptable LOS. The improvements to the off-ramp queues is shown on Table 7-7. These improvements are not required to achieve acceptable off-ramp queues and are shown for informational purposes only.

Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, off-ramp queuing analysis are provided in Appendix 7.11 and Appendix 7.12, respectively.

Table 7-7

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions With Improvements

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps & Cactus Av.	SBR	1,115	137	31	Yes	Yes	137	36	Yes	Yes
	NBR	1,850	409 [2]	353 [2]	Yes	Yes	525 [2]	449 [2]	Yes	Yes
I-215 NB Ramps & Cactus Av.	NBL	145	457 [2]	94	Yes[4]	Yes	457 [2]	94	Yes[4]	Yes
	NBT/R	1,650	355 [2]	203 [2]	Yes	Yes	355 [2]	203 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown in this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Maximum queue length for the approach reported.

[4] Although the 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-215 Freeway mainline.

7.9.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

The Project Study Report/Project Development Support in Riverside County on I-215 and SR-60 between Nuevo Road (I-215) & I-215/SR-60 Junction and Box Springs Road (I-215) & Day Street (SR-60) (prepared by Caltrans in April 2008), also known as the I-215 North Project, includes the construction of an HOV lane in each direction of the I-215 Freeway between Nuevo Road and Box Springs Road within the existing median. (5) According to the Riverside County Transportation Commission (RCTC) and Caltrans websites, the I-215 North Project is a longer term project, as priority has been given to the southern and central projects along the I-215 corridor.

Caltrans typically assumes a reduction of 14 percent to the freeway mainline through volumes in this region to account for vehicles utilizing the carpool (HOV) lanes. The reduction to the I-215 Freeway mainline volumes has been applied to account for the proposed HOV lanes. The analysis has been performed assuming the same number of mixed-flow lanes and on and off-ramp configurations as existing baseline conditions at the I-215 Freeway and Alessandro Boulevard interchange.

As shown on Tables 7-8 and 7-9, the I-215 freeway mainline segments and ramp junctions are anticipated to continue to operate at unacceptable LOS with the improvements discussed above. Worksheets for Horizon Year (2040) Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.15 and Appendix 7.16.

The Project is anticipated to have a cumulatively considerable impact to the identified freeway mainline segments and merge/diverge ramp junctions, however, no mitigation measures have been identified as no other improvements beyond those planned by the I-215 North Project have been evaluated. Neither Caltrans or the State have adopted a fee program that can ensure that locally-contributed impact fees will be tied to improvements to freeway mainlines, and only Caltrans has the jurisdiction over mainline improvements. Because Caltrans has exclusive control over state highway improvements, ensuring that fair share contributions to mainline improvements are actually part of a program tied to implementation is within the jurisdiction of Caltrans. As such, the impacts are considered significant and unavoidable.

Horizon Year (2040) Without and With Project freeway ramp junction level of service analysis worksheets, with improvements, are provided in Appendix 7.15 and Appendix 7.16.

Table 7-8

Basic Freeway Segment Analysis for Horizon Year (2040) Conditions With Improvements

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2040 Without Project				2040 With Project			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Cactus Av.	4	18.9	--[6]	C	**F**	19.2	--[6]	C	**F**
		South of Cactus Av.	4	18.0	--[6]	B	**F**	18.3	--[6]	C	**F**
	NB	North of Cactus Av.	4	--[6]	--[6]	**F**	**F**	--[6]	--[6]	**F**	**F**
		South of Cactus Av.	4	--[6]	--[6]	**F**	**F**	--[6]	--[6]	**F**	**F**

[1] NB = Northbound; SB = Southbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

[3] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[4] LOS = Level of Service

[5] HCS7 does not report density for freeway facilities operating at LOS F.

[6] Observations made in the field indicate that the freeway segments experience traffic congestion during the peak hours due to queuing from downstream bottlenecks.

Table 7-9

Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2040) Conditions With Improvements

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2, 4]	LOS[3]	Density[2]	LOS[3]	Density[2, 4]	LOS[3]	Density[2]	LOS[3]
I-215	Southbound	Off-Ramp at Cactus Av.	4	19.4	C	--[5]	**F**	19.7	C	--[5]	**F**
		Loop Off-Ramp at Cactus Av.	4	20.5	C	--[5]	**F**	20.9	C	--[5]	**F**
		On-Ramp at Cactus Av.	3	27.3	C	--[5]	**F**	27.5	C	--[5]	**F**
	Northbound	On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**
		Loop On-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[5]	**F**	--[5]	**F**
		Off-Ramp at Cactus Av.	3	--[5]	**F**	--[5]	**F**	--[4]	**F**	--[5]	**F**

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

[4] HCS7 does not report density for freeway facilities operating at LOS F.

[5] Observations made in the field indicate that the freeway segments experience traffic congestion due to queuing from downstream bottlenecks. The freeway mainline is anticipated to operate at a deficient LOS with the planned improvements

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